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COMMITTEE ON ACCOUNTING FOR SOCIOECONOMIC STATUS IN MEDICARE PAYMENT PROGRAMS

DONALD M. STEINWACHS (Chair), Professor Emeritus, Johns Hopkins Bloomberg School of Public Health

JOHN Z. AYANIAN, Alice Hamilton Professor of Medicine, Director, Institute for Healthcare Policy and Innovation, University of Michigan

CHARLES BAUMGART, Senior Medical Director, xG Health Solutions

MELINDA BUNTIN, Professor and Chair, Department of Health Policy, Vanderbilt University School of Medicine

ANA V. DIEZ ROUX, Dean and Distinguished Professor of Epidemiology, Drexel University School of Public Health

MARC N. ELLIOTT, Senior Principal Researcher, RAND Corporation

JOSÉ J. ESCARCE, Professor of Medicine, David Geffen School of Medicine, University of California, Los Angeles

ROBERT FERRER, Dr. John M. Smith, Jr., Professor, Department of Family and Community Medicine, University of Texas Health Science Center at San Antonio

DARRELL J. GASKIN, William C. and Nancy F. Richardson Professor of Health Policy and Director, Johns Hopkins Center for Health Disparities Solutions, Johns Hopkins Bloomberg School of Public Health

MARK D. HAYWARD, Professor of Sociology, Centennial Commission Professor in the Liberal Arts, Faculty Research Associate, Population Research Center, The University of Texas at Austin

JAMES S. JACKSON, Daniel Katz Distinguished University Professor of Psychology, Research Professor, Institute for Social Research, University of Michigan

DANIEL POLSKY, Executive Director, Leonard Davis Institute of Health Economics, University of Pennsylvania

MEREDITH ROSENTHAL, Professor of Health Economics Policy, Harvard T.H. Chan School of Public Health

ANTHONY SHIH, Executive Vice President, The New York Academy of Medicine

Study Staff

KATHLEEN STRATTON, Study Director

LESLEY Y. KWAN, Associate Program Officer

EMILY VOLLBRECHT, Senior Program Assistant (until May 2016)

1Resigned in July 2016.
ALEXIS WOJTOWICZ, Senior Program Assistant (from May 2016)
REBECCA MORGAN, Senior Research Librarian
DORIS ROMERO, Financial Associate
HOPE HARE, Administrative Assistant
ROSE MARIE MARTINEZ, Senior Board Director, Board on Population Health and Public Health Practice
SHARYL NASS, Board Director, Board on Health Care Services

National Academy of Medicine Greenwall Fellow in Bioethics

BRENDAN SALONER, Assistant Professor, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health
This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

MICHAEL CHERNEW, Harvard Medical School
KAREN COOK, Stanford University
JACK EBELE R, Independent Consultant
LISA I. IEZZONI, Harvard Medical School
DAVID NERENZ, Henry Ford Health System
THOMAS H. RICE, University of California, Los Angeles, Fielding School of Public Health
JOSHUA SHARFSTEIN, Johns Hopkins Bloomberg School of Public Health
DOUGLAS O. STAIGER, Dartmouth College
STEPHEN B. THOMAS, University of Maryland
ALAN M. ZASLAVSKY, Harvard Medical School

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its
release. The review of this report was overseen by GEORGES BENJAMIN, American Public Health Association, and CHARLES E. PHELPS, University of Rochester. They were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.
Preface

The Health and Human Services Assistant Secretary for Planning and Evaluation presented the committee with quite a challenge. From a substantive standpoint, the committee was asked to present options for accounting for social risk factors in Medicare value-based payment (VBP) programs. This is a demanding intellectual endeavor, requiring the committee to engage in interdisciplinary thinking, dialogue, analysis, and authorship. From a process standpoint, preparing and releasing five consensus reports in 15 months required a relentless push to think about each piece of this complex problem somewhat in isolation. The crafting of the early reports was done with only a sense of where the entire series would go. Committees of the National Academies of Sciences, Engineering, and Medicine (the National Academies) often have many months to shape and reshape even the very foundation of a report. With this series, the committee finalized work in the hopes that as the rest of the reports developed, the prior efforts remained relevant. I think that the committee has shown in this fifth report that each of the four previous reports provides the foundation for each that followed. I hope the reports are useful to the government, researchers, and the many health care providers who care for socially at-risk populations, who deserve the best health care quality the American health care system can provide.

I would like to thank the National Academies offices that worked efficiently and seamlessly to accommodate the committee’s rigorous timeline. More importantly, I would like to thank the National Academies project staff for their diligence and commitment to excellence and timeliness. Sharyl Nass and Rose Marie Martinez, the directors of the Boards on Health Care
Services and Population Health and Public Health Practice, provided strategic advice and helpful commentary throughout the process. The committee and I are extremely grateful for the expert and speedy research support provided by Leslie Kwan. Finally, we acknowledge the steady hand and experience provided by Kathleen Stratton.

I would also like to thank my fellow committee members. It has been my honor and privilege to work with each and every one of them. Their congeniality, expertise, good humor, and willingness to respectfully question each other and themselves made my job as chair a joy.

Another special thanks goes to the health policy researchers and policy analysts across the country who served as peer reviewers for this series of reports. The timeline was always tight, and they consistently kept to the deadlines. The cogent comments provided helped clarify our thinking and improved the reports immensely. I would particularly like to thank those who reviewed more than one report and, in some cases, all five. That you volunteered so much of your time to participate in multiple reviews in support of the National Academies’ process is admirable, and we are grateful.

Donald M. Steinwachs, Chair
Committee on Accounting for Socioeconomic Status in Medicare Payment Programs
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Summary

The Centers for Medicare & Medicaid Services (CMS) and other health care payers have increasingly moved from traditional, fee-for-service payment models to value-based payment (VBP), which aims to improve quality and efficiency, while also controlling costs. Although this focus on improving health care outcomes has led providers to address social risk factors in the delivery of health care, current VBP design generally does not account for the role of social risk factors in producing health care outcomes. This has led to concerns that the trend toward VBP could result in certain adverse consequences for socially at-risk populations, such as leading providers and health plans to avoid patients with social risk factors, underpayment of providers disproportionately serving socially at-risk populations (e.g., safety-net providers), and thus exacerbating health disparities.

Some have proposed accounting for social risk factors in quality measurement and payment as a way to address the negative consequences of the status quo. Accounting for social risk factors extends the logic of clinical risk adjustment, which accounts for underlying clinical risk factors that can independently drive variation in performance and may differ systematically across providers, and which can therefore statistically bias measured performance, to also include social risk factors. The committee identified five domains of social risk factors—(1) socioeconomic position; (2) race, ethnicity, and cultural context; (3) gender; (4) social relationships, and
Accounting for social risk factors can achieve important policy goals. It can align incentives to reduce disparities and improve quality and efficiency both for socially at-risk populations and overall. It can also improve fairness and accuracy in reporting and compensate providers fairly without obscuring true differences in quality among providers. Accounting for social risk factors is complex and recommending whether CMS should account for social risk factors is beyond the scope of the committee’s task, but the committee provides guidance on what CMS could do if they choose to do so. Specifically, the committee details how to choose factors to include in Medicare VBP and which factors one might start with. Once the factors are selected, there are several ways to account for them, and a combination of methods, including both payment and public reporting, are likely needed to achieve policy goals while also mitigating risks. Indicators, data, and methods exist to account for social risk factors now; in addition, the committee recommends that the government collect data and develop methods, measures, and models for improved use in VBP. Finally, even after social risk factors are accounted for in VBP, providers need knowledge about how to improve care for populations with these factors, and the committee provides a framework on how to approach this. Research, monitoring, and quality improvement interventions can help ensure that accounting for social risk factors in VBP does not increase health disparities.

It is possible to deliver high quality care to socially at-risk populations, but it is harder on average and costs money, and providers who disproportionately serve socially at-risk populations frequently have fewer resources. It is also possible to improve on the status quo with respect to the effect of VBP on socially at-risk populations, although it is important to minimize potential risks to patients with social risk factors and to monitor any specific approach to accounting for social risk factors to ensure that unanticipated adverse effects on health disparities do not emerge.

Equity is a critical aim of any high-performance health system (IOM, 2001; NASEM, 2016d). Health equity can be conceptualized at the level of a health care system or more broadly at the population level (IOM, 2001). Equitable health care represents a commitment by providers and payers to provide a universally high standard of health care quality to all patients and enrollees regardless of their individual characteristics (NASEM, 2016b). Achieving this may require greater resources and more intensive care for
patients with social risk factors compared to more advantaged patients. At the population level, health equity is an ethical value that promotes improvement in health status for all individuals (Braveman and Gruskin, 2003; IOM, 2001). Because achieving the same health care outcomes, health status, or health improvements may require remediating deep social inequalities in social risk factors such as inadequate housing or food insecurity, providing equitable health care is unlikely to be sufficient on its own to achieve health equity at the population level (NASEM, 2016b,c). Although providers can address and mitigate the effects of social risk factors (NASEM, 2016c), when social risk factors are not accounted for in performance measurement and payment in the health care system, achieving performance benchmarks (i.e., good outcomes) may be more difficult for providers disproportionately serving socially at-risk populations owing to the influence of social risk factors.

One lever to achieve high-performance health systems, including one that promotes equity, is through payment (IOM, 2001). When payment strategies are aligned with policy goals, such as improving quality and efficiency in health care or reducing disparities, payment can help incentivize these goals. When payment strategies and policy goals are misaligned, payment can act as a barrier (IOM, 2001). Reforms to better align payment with policy goals shift from paying for volume (fee-for-service) to paying for quality, also known as value-based payment (VBP). Specifically, VBP programs aim to improve the quality of care and efficiency of delivering care, while also controlling costs (Burwell, 2015; Rosenthal, 2008). The Centers for Medicare & Medicaid Services (CMS) and other health care payers have increasingly moved from traditional, fee-for-service payment models to VBP payments and are continuing to do so at a rapid rate (Burwell, 2015). Although VBP programs have catalyzed health care providers and plans to address social risk factors in health care delivery through their focus on improving health care outcomes and controlling costs, the role of social risk factors in producing health care outcomes is not generally reflected in payment under current VBP design. This misalignment has led to concerns that trends toward VBP could result in tangible harms to socially at-risk populations. Providers disproportionately serving socially at-risk populations are more likely to score poorly on performance/quality rankings, more likely to be penalized, and less likely to receive bonus payments under VBP. VBP may be taking resources from the organizations that need them the most (Chien et al., 2007; Ryan, 2013).

One proposal to address the documented harms of the status quo under current VBP is to account for social risk factors in quality measurement and/or payment. Currently, to ensure accurate comparisons, VBP models account for underlying clinical risk factors known to independently drive variation in performance and to differ systematically across providers
and therefore could statistically bias measured performance. Proposals to account for social risk factors extend the rationale of accounting for clinical risk factors in performance measurement and payment by also including social risk factors as underlying patient characteristics that independently influence performance indicators and that differ systematically across providers and thus lead to bias in measured performance.

Proponents of this method cite the unintended consequences of the status quo—disproportionate penalties on providers serving socially at-risk populations and incentives to avoid patients with social risk factors. Opponents argue that providers should be held accountable for providing care that mitigates the effect of social risk factors on health care outcomes. Proponents of accounting for social risk factors might counter that because social risk factors are difficult to address through provider action, providers should not be held accountable for them (Boozary et al., 2015; Feemster and Au, 2014; Fiscella et al., 2014; Girotti et al., 2014; Jha and Zaslavsky, 2014; Joynt and Jha, 2013; Lipstein and Dunagan, 2014; Pollack, 2013; Renacci, 2014).

STATEMENT OF TASK

The U.S. Department of Health and Human Services (HHS) acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to prepare a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated under the Improving Medicare Post-Acute Care Treatment (IMPACT) Act. In the first report, the committee presented a conceptual framework and described the results of a literature search linking five social risk factors and health literacy to health-related measures of importance to Medicare quality measurement and payment programs. In the second report, the committee reviewed the performance of providers disproportionately serving socially at-risk populations, discussed drivers of variations in performance, and identified six community-informed and patient-centered systems practices that show promise to improve care for socially at-risk populations. The committee’s third report identified social risk factors that could be considered for inclusion in Medicare quality measurement and payment, criteria to identify these factors, and methods to account for them in ways that can promote health equity and improve care for all patients. The fourth report provides guidance on where to find and how to collect data on social risk factor indicators that could be used for Medicare quality measurement and payment programs. In this fifth and final report, the committee aims to put the entire series in context and offers additional thoughts about how to best
consider the various methods for accounting for social risk factors, as well as next steps. Notably, it is beyond the committee’s task to recommend whether social risk factors should be accounted for in Medicare VBP. The committee’s reports detail what the ASPE and CMS could do if they choose to do so. Details of the statement of task and the sequence of reports can be found in Chapter 1. Reports 1–4 are reproduced in their entireties in Appendixes A–D.

THE COMMITTEE’S GOALS

The committee emphasizes that any approach to accounting for social risk factors should do so in a manner that can improve care and promote equity for all patients, especially those with social risk factors. As presented in its third report (NASEM, 2016b), the committee’s four goals in accounting for social risk factors in Medicare payment programs are

1. Reducing disparities in access, quality, and outcomes;
2. Quality improvement and efficient care delivery for all patients;
3. Fair and accurate reporting; and
4. Compensating providers fairly.

Any approach to account for social risk factors (including the status quo, which generally does not account for social risk factors) will achieve important policy goals, but could also have unintended consequences. The committee identified five categories of potential unintended consequences:

1. Avoiding patients with social risk factors
2. Reducing incentives to improve the quality of care for patients or enrollees with social risk factors
3. Underpayment to providers disproportionately serving socially at-risk populations
4. Negative symbolic value: perceptions of different standards for different populations
5. Obscuring disparities

SOCIAL RISK FACTORS AND INDICATORS

The committee first developed a framework by which social risk factors might influence health care outcomes of interest to Medicare’s VBP programs. Each social risk factor has a conceptual and an empirical association with those outcomes and could be included as adjustments to Medicare VBP. The committee further identified one or more indicators for each social risk factor that meet the committee’s criteria of having a relationship
to health care outcomes of interest, preceding care delivery and not being a consequence of the quality of care, not being something the provider can manipulate, and also meeting practical considerations. The rationale for the criterion that a social risk factor is not modifiable through provider actions aims to exclude factors that reflect genuine differences in the quality of care. Whether a social risk factor is modifiable or unmodifiable is not binary, but rather describes a spectrum of effects. Thus, it can be challenging to identify where a given social risk factor lies on this spectrum, particularly as health care providers and plans are increasingly addressing social risk factors for poor health outcomes. It is critical to distinguish between factors that can be modified themselves and factors that are not modifiable themselves, but whose effects on health can be mitigated through provider actions (such as use of tailored interventions) without altering the underlying disadvantage. The text that follows includes a brief description of the social risk factors. Note, the listing of social risk factors does not reflect an order of priority. See Figure S-1 for the conceptual framework and the indicators identified by the committee.

As described in the committee’s first report (NASEM, 2016a), the committee prefers *socioeconomic position* (SEP) to the more common phrase *socioeconomic status*, because *socioeconomic position* is a broader term encompassing resources as well as status (Krieger et al., 1997). SEP reflects a person’s absolute and relative position in a socially stratified society, and captures a combination of access to material and social resources, as well as relative status (i.e., prestige- or rank-related characteristics).

Race and ethnicity are related but conceptually distinct constructs that are dimensions of a society’s stratification system by which resources, risks, and rewards are distributed. In particular, race and ethnicity capture features of social disadvantage, including access to social institutions and rewards; behavioral and other sociocultural norms; inequality in the distribution of power, status, and material resources; and psychosocial exposures (IOM, 2014; Williams, 1997). Constructs of cultural context include language and nativity.

The term *gender* captures social dimensions of gender as distinguished from biological effects of sex and encompasses both normative and nonnormative (e.g., transgender) gender identity. Normative gender categories (men and women) are included in clinical risk adjustments in Medicare. Sexual orientation includes individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming. Sexual orientation is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011).

Social relationships are important for health because they provide access to social networks that can provide access to resources (including instrumental support and access to health care services or health-promoting
resources), as well as emotional support (Berkman and Glass, 2000; Cohen, 2004; Eng et al., 2002; House et al., 1988). Social relationships are most frequently assessed in the health care and health services research literature with three constructs: marital/partnership status, living alone, and social support.

Residential and community context captures a set of broadly defined characteristics of residential environments, including compositional characteristics that describe aggregate characteristics of individuals residing in a given neighborhood or community, as well as characteristics of social and physical environments.

**DATA SOURCES**

The committee identified three sources of data on social risk factors for possible use by CMS: (1) new and existing sources of CMS data, (2) data from providers and plans, and (3) alternative government data sources.¹ Existing sources of CMS data include administrative records (enrollment records and claims data) and beneficiary surveys with limited social risk factor data, such as race and ethnicity (ResDAC, n.d.). CMS could also collect new data on social risk factors, such as through a new administrative form or beneficiary survey. The committee recognizes the substantial barriers of collecting new data, including cost and burden. However, accounting for social risk factors could mitigate adverse consequences of the current VBP and therefore could justify the expected costs and burden of new data collection. **Such data collection will also facilitate monitoring for potential unintended consequences of accounting for social risk factors in VBP on health disparities.²**

Data from providers and plans include electronic health record (EHR) data and administrative data that providers and plans send to CMS. Some social risk factor data (for example, race and ethnicity and language) is already captured in some EHRs and some administrative data (e.g., IOM, 2014). New social risk factor data that providers and plans could collect could also be important for the care or services providers and plans provide (IOM, 2014).

Alternative government data refer to administrative data and national surveys that federal agencies other than CMS (including other agencies within HHS) and state agencies oversee and maintain that contain informa-

¹ Social risk factor data could also be obtained from private data sources, but because these sources and their data collection methods are not fully transparent and because CMS would have to purchase this data at unknown cost, the committee deemed use of such private data as out of scope.

² See Conclusion 4 in the committee’s third report (NASEM, 2016b).
SOCIAL RISK FACTORS

Socioeconomic Position
- Income
- Education
- Dual Eligibility
- Wealth
- Occupation

Race, Ethnicity, and Cultural Context
- Race and Ethnicity
- Language
- Nativity
- Acculturation
- Documentation Status

Gender
- Gender Identity
- Sexual Orientation

Social Relationships
- Marital/Partnership Status
- Living Alone
- Emotional and Instrumental Social Support

Residential and Community Context
- Neighborhood Deprivation
- Urbanicity
- Housing
- Other Environmental Measures

PERFORMANCE INDICATORS FOR VALUE-BASED PAYMENT
- Access
- Clinical and Behavioral Risk Factors
- Health Literacy and Numeracy
- Resource Use
- Health Care Use
- Health Care Outcomes
FIGURE S-1 Conceptual framework of social risk factors and performance indicators used for value-based payment (VBP).
NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships. For the indicators listed in bullets under each social risk factor, bold lettering denotes measurable indicators that could be accounted for in Medicare VBP programs in the short term; italicized lettering denotes measurable indicators that capture the basic underlying constructs and currently present practical challenges, but are worth attention for potential inclusion in accounting methods in Medicare VBP programs in the longer term; and plain lettering denotes indicators that have considerable limitations.

a As described in Figure 1-1, health care use captures measures of utilization and clinical processes of care; health care outcomes capture measures of patient safety, patient experience, and health outcomes; and resource use captures cost measures.
tion on social risk factors and that CMS could use. These include data that could be linked to Medicare beneficiary data at the individual level as well as area-level data that could be used to describe a Medicare beneficiary’s residential environment or serve as a proxy for individual-level effects. The Social Security Administration may be the best source of individual-level social risk factor data that could be linked to Medicare beneficiary data. The American Community Survey may be most useful as a source of area-level social risk factor data.

After considering data sources for each social risk factor with respect to three characteristics (collection burden, accuracy, and clinical usefulness), the committee recommended specific data CMS could use to account for social risk factors in Medicare VBP if it so chooses. The committee also recommended that CMS should collect information about relevant, relatively stable social risk factors, such as race and ethnicity, language, and education, at the time of enrollment. Table S-1 summarizes the availability of data for social risk factor indicators.

GENERAL CONSIDERATIONS ABOUT SOCIAL RISK FACTOR INDICATORS

Upon release of the committee’s prior reports, several questions arose about specific risk factors in the committee’s framework and about the discussions of data sources. The committee addresses these here.

The committee has found compelling reasons for considering each indicator listed for inclusion in Medicare quality and measurement programs and makes no distinctions in terms of which social risk factor or indicator is “most important” from either a conceptual or empirical standpoint. Table S-1 is meant to convey “readiness” for use of any specific indicator, not a prioritization or preference. For example, theory suggests that sexual orientation and gender identity may contribute to health disparities experienced by Medicare beneficiaries who identify as gender or sexual minorities (IOM, 2011; NASEM, 2016a,b). Although there are best practices for collecting data on gender identity and sexual orientation, there are no standards (NASEM, 2016c). Consequently, there remains little information on the effect of sexual orientation and gender identity on performance indicators used in VBP. The committee recommended that, as such evidence emerges, CMS should revisit inclusion of these indicators in Medicare quality measurement and payment programs.

In addition to the five domains of social risk factors, the committee also considered the influence of health literacy on performance indicators.

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3 See Recommendation 7 in the committee’s fourth report (NASEM, 2016c).
4 See Recommendations 2, 3, 4, 5, and 6 in the committee’s fourth report (NASEM, 2016c).
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<td>Education</td>
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<td>Dual eligibility</td>
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<td><strong>Race, Ethnicity, and Cultural Context</strong></td>
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<td>Race and ethnicity</td>
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<tr>
<td>Language</td>
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<tr>
<td>Nativity</td>
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<td>Acculturation</td>
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<td>Marital/partnership status</td>
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<td><strong>Residential and Community Context</strong></td>
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<td>Other environmental measures</td>
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1. Available for use now
2. Available for use now for some outcomes, but research needed for improved, future use
3. Not sufficiently available now; research needed for improved, future use
4. Research needed to better understand relationship with health care outcomes and on how to best collect data
used in Medicare VBP, because it is specifically mentioned in the committee’s task. It is also included in the IMPACT Act of 2014. The committee does not consider health literacy to be a social risk factor, but rather a more proximal risk factor that is influenced by (more distal) social risk factors. Specifically, health literacy can be considered the product of an individual’s skills and abilities (including reading and other critical skills), sociocultural factors, education, health system demands, and the health care context (IOM, 2004). Exclusion of health literacy in the social risk factor framework and the discussions of data sources should not be interpreted as a lack of appreciation for the contribution of health literacy to health and health care outcomes.

The committee considers disability to be a proximal risk factor for poor health care outcomes that is influenced by more distal social risk factors, somewhat like health literacy. The World Health Organization’s *International Classification of Functioning, Disability, and Health* advocated in the 2007 Institute of Medicine (IOM) report *The Future of Disability in America* conceives of disability not as an inherent attribute of individuals, but rather the product of individual capacities (health conditions) and social conditions (including social and physical environments) (IOM, 2007b; WHO, 2001). Some current clinical risk adjustment systems capture disability as an origin of Medicare entitlement. Additionally, clinical risk factors included in existing Medicare VBP clinical risk adjustments capture clinical elements of disability through major clinical diagnoses. Accounting for social risk factors could capture additional risk unmeasured by clinical risk factors not currently accounted for in Medicare payment programs. The committee acknowledges that disability can be differentiated from some clinical risk factors because of increased stigma, which may result in discrimination and other barriers to adequate health care. However, the committee notes that many clinical and behavioral diagnoses—for example, mental health and substance use disorders—are also stigmatized. Additionally, these types of barriers are consequences of the quality of care and therefore are not appropriate adjustors because they reflect true differences in the quality of care.

**METHODS TO ACCOUNT FOR SOCIAL RISK FACTORS**

In its third report (NASEM, 2016b), the committee identified 10 methods in 4 categories that could be used individually or in combination to account for social risk factors. These categories are

A. Stratified public reporting;
B. Adjustment of performance measure scores;
C. Direct adjustment of payment; and
D. Restructuring payment incentive design.
Stratified public reporting, adjustment of performance scores, and direct adjustments of payment build on the existing payment system. Restructuring incentive design presents entirely new approaches. Any approach to accounting for social risk factors will interact with the underlying incentive design to achieve certain policy goals or produce certain adverse consequences. As the committee concluded, strategies to account for social risk factors for measures of cost and efficiency may differ from strategies for quality measurement, because observed lower resource use may reflect unmet need rather than the absence of waste, and thus lower cost is not always better, while higher quality is always better (NASEM, 2016b).^5^

The committee provides specifics examples and methods for accounting for social risk factors and underscores the differences in the goals of each approach that guide their applications. Stratified public reporting aims to allow a decision maker (e.g., patient) to observe and act on differences in performance for different types of patients. Similarly, adjustment of performance measure scores affects what patients observe about the performance of a provider or health plan and CMS. On their own (that is, without stratified data), adjusted scores by definition send a single performance signal that accounts for differences in the mix of patients served but does not make disparities apparent. In contrast, adjusting payment algorithms (through either the third or fourth category of methods) is intended to alter the incentives for the plan or provider directly. The reliability of those measures will affect the balance of incentives and risk inherent in the payment formula: noisy measures impose risk and diminish the returns to improvement efforts.

Public reporting aims to make quality of care and outcomes visible to consumers, providers, payers, and regulators (IOM, 2007a). Provision of quality information to these stakeholders can lead to quality improvement for all beneficiaries through reputational incentives and by increasing market share (i.e., influencing beneficiaries’ choice of provider or plan) for reporting units (i.e., the hospital, health plan, etc. reporting performance information to CMS) with higher performance (IOM, 2007a). Stratified public reporting provides this information for specific subgroups and thus could lead not only to quality improvement, but also disparities reduction. Just as overall performance can lead to quality improvement for all beneficiaries, publicly reported performance scores stratified by social risk factors could influence beneficiaries’ choices by allowing patients to see which providers or plans provide the best care for patients like them. Because public reporting with stratification by patient characteristics within reporting units is the only method that presents information on subpopulations and can therefore highlight any disparities that may exist, it is also the only method

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^5^ See Conclusion 7 in the committee’s third report (NASEM, 2016b).
that would allow CMS to monitor disparities. Thus, if monitoring disparities is an important policy goal, any approach to account for social risk factors must include public reporting stratified by patient characteristics within reporting units.

Adjusting performance measure scores aims to estimate the true quality of reporting units (i.e., the quality a reporting unit would have if all units had the population average patient). Such adjustment aims to statistically minimize the effect of factors, such as social risk factors, that may independently influence performance indicators used in VBP. The current system generally does not take these factors into account. Because social risk factors should no longer have substantial influence on performance measure scores, accurate adjustment would reduce incentives to avoid patients with social risk factors. Incorrect adjustment of performance measure scores could produce several potential unintended consequences. In particular, adjusting for between-provider differences may conflate differences that arise from patient characteristics and true differences in quality, because it may capture not only the measured patient characteristic (e.g., low income), but also the unmeasured influence of a provider or plan characteristic linked to overall quality. Thus, accounting for between-provider differences would remove incentives to improve care, especially for patients with social risk factors. This is a serious disadvantage that CMS would want to consider carefully. Adjustment for within-provider differences is less subject to this concern, because it accounts for differences between subpopulations within a provider (e.g., subgroups with high and low levels of social risk factors). Although adjusting performance measure scores for within-provider differences creates an estimate of the average disparity within providers, neither the magnitude of this disparity nor subgroup performance are apparent in the publicly reported performance scores. Even if both adjusted and unadjusted performance scores are publicly reported, only whether a provider is doing better or worse relative to the average disparity is visible. Thus, this method does not make disparities visible unless it is combined with public reporting stratified by patient characteristics within reporting units.

Direct adjustment of payment refers to any adjustment in payment with no adjustment of performance measure scores. This could be done by adjusting the payment formula (CMS, 2015) or by setting different benchmarks for payment for different strata of social risk factors (Damberg et al., 2015). By accounting for the increased resources (i.e., estimated costs) needed to care for socially at-risk populations, directly adjusting payments avoids unintentionally redistributing resources away from (i.e., underpaying) providers who serve patients with social risk factors and reduces incentives to avoid these patients. More favorable allocation of resources to these providers would increase their resources (Damberg et al., 2015), which they could invest in reducing disparities and improving
quality and efficiency. However, if the payment formula is adjusted directly, providers could be rewarded despite poor performance or poor outcomes, which would reduce incentives to improve care. Because directly adjusting payments does not affect publicly reported measures, this method does not make disparities visible unless coupled with public reporting stratified by patient characteristics within reporting units. Relatedly, if payment is directly adjusted, but performance is still reported without adjustment, then there could be incentives to avoid patients with social risk factors.

Restructured payment incentive designs do not explicitly incorporate measures of social risk factors; instead, they implicitly account for them. Like directly adjusting for payment, this implicit adjustment accounts for the increased resources needed to care for socially at-risk populations and therefore avoids unintentionally underpaying providers who serve these populations and reduces incentives to avoid patients with social risk factors. Payment incentives can be restructured in several ways. For example, in addition to other rewards and penalties, providers and plans could receive a bonus for having low disparities (Blustein et al., 2010; Casalino et al., 2007). This has the obvious advantages of directly incentivizing disparities reduction. Similarly, providers and plans could receive a bonus for improving quality and efficiency relative to their own benchmark (i.e., paying for improvement) (Casalino et al., 2007; Rosenthal et al., 2004). This would directly incentivize quality improvement and efficiency, but may also reward providers at lower levels of absolute performance. Like directly adjusting payments, restructuring payment incentive design does not affect publicly reported measures and therefore does not improve the accuracy of performance scores. Restructuring incentive design does not make disparities visible unless it is combined with public reporting stratified by patient characteristics within reporting units.

Comprehensive descriptions of the 10 methods, as well as their advantages and disadvantages can be found in Table C4-1 in Appendix C. Table 3-1 in Chapter 3 summarizes how different categories of methods to account for social risk factors might achieve the committee’s four policy goals. Table 3-2 summarizes how different categories of methods might result in unintended consequences. Chapter 3 includes an example of how these four methods could be applied to one of Medicare’s flagship programs, the Hospital Readmissions Reduction Program.

Comments on Unintended Consequences

The committee expands on two potential unintended consequences about which some opponents of accounting for social risk factors have raised particular concerns and suggests how these unintended consequences might be mitigated. First, some opponents of accounting for social risk fac-
tors worry that by making it easier for providers and plans to reach performance targets or rewarding them at lower levels of absolute performance, accounting for social risk factors may remove incentives to improve quality and efficiency (in particular, to exceed benchmarks) for patients with social risk factors (Bernheim, 2014; Kertesz, 2014; Krumholz and Bernheim, 2014; O’Kane, 2015). The committee recognizes that certain methods may diminish (but not entirely remove) incentives to improve quality and reduce disparities, but the committee also suggests that any approach must be sure to include sufficient incentive for quality improvement for all patients, including socially at-risk populations. As described above and as the committee concluded, achieving this might require a combination of reporting and payment methods.6

Second, critics of adjustment are concerned that accounting for social risk factors would obscure differences that arise from poor quality care (Krumholz and Bernheim, 2014). A risk of some methods to account for social risk factors is the perception of different standards for different populations, which could have negative symbolic value. Approaches that adjust for and report by patient characteristics and within-provider differences are less subject to this concern than approaches that would adjust for and report by provider characteristics. The committee emphasizes if CMS’s goals for VBP include monitoring and reducing disparities, then because only public reporting stratified by patient characteristics within reporting units makes disparities visible by providing quality information for different subgroups, stratified public reporting by patient characteristics within reporting units must be part of any approach to improve on the status quo.

Conclusion: The committee supports four goals of accounting for social risk factors in Medicare payment programs: reducing disparities in access, quality and outcomes; improving quality and efficient care delivery for all patients; fair and accurate reporting; and compensating health plans and providers fairly. These goals would best be achieved through payment based on performance measure scores adjusted for social risk factors (or adjusting payment directly for these risk factors) when combined with public reporting stratified by patient characteristics within reporting units.

The committee notes that some restructuring of payment formulas may still be needed to ensure that there are sufficient incentives for health plans and providers to improve access, quality, and outcomes for groups that are disadvantaged by high levels of social risk factors. Payment formulas that

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6 See Conclusion 6 in the committee’s third report (NASEM, 2016b).
incentivize improving care for disadvantaged individuals and communities may include paying for performance or change in performance for subgroups with high levels of social risk factors. Furthermore, improving health equity may require both accounting for social risk factors in payment and quality improvement interventions.

MOVING FORWARD

The committee recognizes that implementing any approach to accounting for social risk factors in Medicare quality measurement and payment can be complex and will require substantial analyses to identify the best approaches to do so for different Medicare incentive programs; it will also require considerable resources—including costs. This final report provides some clarifications, observations, and other considerations to guide ASPE and CMS if they choose to begin accounting for social risk factors in Medicare payment programs, and to help them to identify priorities and preferences from among the options presented.

Existing analyses do not address which of the social risk factors that may influence performance indicators used in VBP must be individually accounted for to ensure adjustments to performance measures and payment are accurate. It may be that some are not adequately measured using current data or data collection techniques. It may also be that a smaller set of indicators is sufficient. If the latter, the literature does not currently indicate which factors should be included. Thus, in order to determine which social risk factors should be incorporated in any given VBP system, their usefulness in explaining variation in outcomes should be investigated. ASPE has already conducted some analyses of the associations of different types of social risk factors with certain outcomes (Filice and Joynt, 2016; Samson et al., 2016; Snyder et al., 2016).

Research Suggestions

Further research could inform ASPE or CMS as they determine the optimal way in which to adjust indicators used in VBP for social risk factors. Specifically, further work would address the following questions:

1. How can ASPE/CMS implement the use of an initial set of social risk factors on a rapid timeline?
2. How can ASPE/CMS implement the use of an expanded set of social risk factors?
3. How can ASPE/CMS monitor and refine the use of social risk factors in VBP?
Chapter 4 elaborates on these questions. Through research answering these questions ASPE/CMS can determine the best path for implementing adjustments for social risk factors, and can ensure that doing so furthers the policy goals of VBP.

**Improving Care for All Socially At-Risk Populations**

To the extent that accounting for social risk factors in Medicare payment improves fairness in compensating providers disproportionately serving socially at-risk populations, doing so may increase the resources available to these providers to invest in quality improvement and disparities reduction. The approaches the committee identified to account for social risk factors in quality measurement and payment could be applied to other payers, which could further increase resources to these providers via the same mechanisms as under Medicare. However, any policy that modifies incentive payments (as accounting for social risk factors in these payment does) does not (and cannot) fix the payment system at large, nor does it solve the problem of safety-net financing. Indeed, other payment reforms (for example, direct payments for quality improvement among safety-net providers and direct payments to incentivize collaboration with public health and social service agencies and community-based organizations) may also be needed to incentivize high-quality care for socially at-risk populations. Accounting for social risk factors is necessary but insufficient by itself to achieve health equity. Achieving equity may require accounting for social risk factors as well as other payment reforms, further research to identify what drives observed differences in quality and outcomes for patients with social risk factors, and interventions to improve the quality of care and to reduce disparities.

The committee’s second report, *Systems Practices for the Care of Socially At-Risk Populations*, shows that there are strategies health care providers and payers can undertake to improve care and health outcomes for socially at-risk populations (NASEM, 2016d). The committee identified commonalities across the strategies identified. These six systems practices, grounded in community-informed and patient-centered care, are shown in Figure S-2. In this approach, the health care system includes not only medical providers, but it also partners with public health and social service agencies, community-based organizations, and the community in which those medical providers are embedded. The committee found evidence that it is possible to deliver high-quality care to socially at-risk populations, and patients with social risk factors need not experience low-quality care and poor health outcomes.
CONCLUDING REMARKS

The committee urges policy makers to remember that quality measurement and payment policies affect the lives of real patients. In the case of accounting for social risk factors, changes to the current VBP system would especially influence the lives of patients with social risk factors who have historically experienced barriers to accessing high quality health care. Together, accounting for social risk factors in quality measurement and payment in combination with complementary approaches may achieve the policy goals of reducing disparities in access, quality, and outcomes, as
well as quality improvement and efficient care delivery for all patients, and thereby promote health equity.

REFERENCES


Health equity means that every person has the opportunity to attain his or her full health potential, and socioeconomic position (SEP) or other socially determined circumstances do not hinder anyone from achieving this potential (CDC, 2015; NASEM, 2016a). As put forth in Crossing the Quality Chasm, the Institute of Medicine’s (IOM’s) seminal report on health care quality, equity is a critical aim of any high-performance health system (IOM, 2001). Health equity can be conceptualized at the level of a health care system or more broadly at the population level (IOM, 2001). Equitable health care represents a commitment by providers and payers to provide a universally high standard of health care quality to all patients and enrollees regardless of their individual characteristics (NASEM, 2016b). In other words, equitable health care refers to the availability, delivery, and quality of health care services based solely on individual needs and preferences, rather than on differences by individual characteristics such as race/ethnicity, SEP, and other social risk factors (IOM, 2001). Achieving this may require greater resources and more intensive care for patients with social risk factors compared to more advantaged patients. At the population level, health equity is an ethical value that promotes improvement in health status for all individuals (Braveman and Gruskin, 2003; IOM, 2001). Achieving health equity may require reducing the influence of unfair inequalities in health status by power, wealth, or prestige, which may exist across social groupings owing to social risk factors such as income, race and ethnicity, or gender (Braveman and Gruskin, 2003; IOM, 2001; NASEM, 2016b).

The social risk factors that contribute to health disparities often lie outside of the health care system and therefore may not be modifiable by
actors within the health system (including providers and payers). Thus, equity in health status and health outcomes (health equity at the population level) may not be attainable within a health care system (i.e., through the provision of equitable health care alone). In other words, because achieving the same health care outcomes, health status, or health improvements may require remediating deep social inequalities in social risk factors such as inadequate housing or food insecurity, providing equitable health care is unlikely to be sufficient on its own to achieve health equity at the population level (NASEM, 2016b,d). The committee recognizes there may be opportunities for targeted intervention on social risk factors outside of the health system, and while such interventions can provide meaningful benefits to patients, they are unlikely to achieve full population health equity. At the same time, providers can nevertheless address social risk factors to mitigate their effect on health care outcomes such as through tailored approaches to achieving good outcomes. Indeed, the committee found evidence that it is possible to achieve good outcomes for socially at-risk populations (NASEM, 2016d). However, when social risk factors are not accounted for in performance measurement and payment in the health care system, achieving performance benchmarks (i.e., good outcomes) may be more difficult for providers disproportionately serving socially at-risk populations owing to the influence of social risk factors.

One lever to achieve high-performance health systems, including one that promotes equity, is through payment. Payment policies in the health care system can influence health and health care outcomes by encouraging or discouraging provider behavior (such as how health care providers and health systems deliver care) and patient behavior (such as how patients select and use care) (IOM, 2001). When payment strategies are aligned with such policy goals as improving quality and efficiency in health care or reducing disparities, payment can help incentivize these goals. When payment strategies and policy goals are misaligned, payment can act as a barrier. The misalignment of traditional, fee-for-service payment and the goals of high-performing health systems—safe, effective, patient-centered, timely, efficient, and equitable care—has been documented extensively elsewhere (e.g., IOM, 2001).

Reforms to better align payment with policy goals shift from paying for volume (fee-for-service) to paying for quality, also known as value-based payment (VBP). Specifically, VBP programs aim to improve the quality of care and the efficiency of delivering care, while also controlling costs (Burwell, 2015; Rosenthal, 2008). VBP strategies to achieve these goals can be broadly classified in two categories, which the committee characterizes as financial or quality incentives and risk-based alternative payment models. Financial or quality incentives such as pay-for-performance tie financial bonuses or penalties to quality or value; whereas, risk-based alternative pay-
ment models such as bundled payments and accountable care organizations (ACOs) shift greater financial risk to health care providers to hold them accountable for the care they provide and the health outcomes they achieve.

The Centers for Medicare & Medicaid Services (CMS) and other health care payers have increasingly moved from traditional, fee-for-service payment models to VBP and are continuing to do so at a rapid rate (Burwell, 2015). In 2015, U.S. Department of Health and Human Services (HHS) Secretary Sylvia Burwell set goals for CMS to have 85 percent of fee-for-service Medicare payments tied to quality or value by 2016 and 90 percent by 2018, and to have 30 percent of Medicare payment in alternative payment models by 2016 and 50 percent by 2018 (Burwell, 2015). In March 2016, CMS announced that it achieved its goal to have 30 percent of Medicare payments made through alternative payment models (HHS, 2016).

Although the goals of VBP programs are explicitly to improve health care quality and outcomes and to control costs, the focus on health care outcomes provides implicit incentive to address social risk factors that may contribute to poor health care outcomes and to health disparities. This can be seen in ACOs, which explicitly aim to improve population health (Berwick, 2011a,b). ACO contracts provide financial incentives to improve health and health care and to control costs for patients that payers attribute to the ACO (their panel population). Importantly, this includes patients who have barriers accessing care. This responsibility incentivizes providers to proactively and systematically improve the health of their entire panel population, even beyond the clinical encounter, and particularly with respect to preventing and managing chronic illnesses (Casalino et al., 2007). Efforts to do so may include addressing social risk factors for poor health care outcomes. For example, in the prevention and management of patients with diabetes, clinicians might not only monitor clinical risks but also assess patients’ feasible opportunities for a healthy diet and physical activity and refer patients to community resources to support a healthy diet and promote physical activity (NASEM, 2016d).

A broader approach defines the population in population health more expansively than a health care provider or plan’s panel population. As described in the committee’s second report, *Systems Practices for the Care of Socially At-Risk Populations* (NASEM, 2016d), the committee endorses a definition of population health where the population “refers to all people residing in the provider’s catchment area or the geographic community it serves, and is not restricted to an enrollee or patient population” (NASEM, 2016d, p. 38). Such an interpretation therefore extends beyond current patients to also include all members of the community a hospital or health plan serves. This approach to population health might also consider the distribution of health outcomes within the defined population group and therefore the multiple determinants of these health outcomes (Kindig and
Stoddart, 2003). These determinants include health care, but they also include social risk factors that lie outside of the medical system (Kindig and Stoddart, 2003). Thus, health care organizations that have adopted this broader approach to improving population health not only actively manage the health of their panel population, but they have also begun to intervene on social risk factors “beyond their walls.” As described in the committee’s second report, some providers are collaborating with social service and public health agencies and community-based organizations to link clinical interventions to social programs such as housing assistance, vocational counseling, legal assistance, and assistance applying for government benefits (NASEM, 2016d). Other providers are directly intervening on social risk factors, such as through the provision of transportation assistance, career and education counseling, and life skills and financial literacy training; hosting farmers markets to increase access to healthy foods; and even integrating clinical care and supportive housing (NASEM, 2016d). In recognition of these increasing efforts by health care organizations to intervene on social risk factors, CMS launched the Accountable Health Communities model under the auspices of the CMS Innovation Center. This model aims to test whether systematically screening for and addressing unmet social needs can reduce health care use and costs (Alley et al., 2016). The model is founded on screening, but also links payment to three tiers of approaches to addressing social risk factors: awareness, assistance, and alignment (Alley et al., 2016; Minyard, 2016).

Another policy that encourages providers to address social risk factors is the community benefit requirement for nonprofit hospitals to maintain their tax exempt status under the Patient Protection and Affordable Care Act of 2010 (ACA). For historical reasons, community benefit is often used synonymously with charity care, or subsidizing health care costs for patients who cannot afford them. However, the ACA’s community benefit requirement as finalized by the Internal Revenue Service in Section 501(r) in the Internal Revenue Code requires tax-exempt hospitals to not only establish a written financial assistance (charity care) policy, but also to conduct a community health needs assessment at least once every 3 years (IRS, 2016). Importantly, the Internal Revenue Code defines community and health needs broadly. Community refers to the community that needs the care of the hospital, not just existing patients, and health needs refer not only to health care needs, but also health needs that arise from social risk factors (Rosenbaum, 2015). Because the requirement to conduct a community health needs assessment includes not only the description of needs and available resources, but also a plan to address significant needs identified, it aims to inform community benefit spending. By defining community health broadly, the requirement clarifies that community benefit spending can include not only charity care, but also investments in com-
munity health improvement. Because the new requirements arose from concerns over whether nonprofit hospitals historically provide sufficient charity care to justify their tax-exempt status, it is logical that the vast majority of community benefits currently goes toward subsidizing health care costs (Nikpay and Ayanian, 2015; Young et al., 2013). Nevertheless, a small proportion of community benefits goes toward community health improvement activities, and some of these efforts include addressing social risk factors for poor health care outcomes, such as violence prevention programs, advocating for housing improvements, and promoting literacy (Casalino et al., 2015; Young et al., 2013). These types of health system interventions on social risk factors may mitigate the effects of the social risk factors on certain health care outcomes, but they do not change the underlying social conditions. For example, if a hospital provides transportation services for patients to overcome barriers to transportation and to improve access to health care services, this does not address problems in the underlying transportation system.

Although VBP programs have catalyzed health care providers and plans to address social risk factors in health care delivery through their focus on improving health care outcomes and controlling costs, the role of social risk factors in producing health care outcomes is not reflected in payment under current VBP design. This misalignment has led to concerns that trends toward VBP could result in tangible harms to socially at-risk populations.

An emerging body of evidence suggests that providers disproportionately serving socially at-risk populations are more likely to score poorly on performance and quality rankings, more likely to be penalized, and less likely to receive bonus payments under VBP. Evidence suggests that this is true for safety-net providers who disproportionately serve low-income and other socially at-risk populations (Berenson and Shih, 2012; Gilman et al., 2014, 2015; Joynt and Jha, 2013; Rajaram et al., 2015; Williams et al., 2014), minority-serving institutions that serve high proportions of racial and ethnic minorities (Karve et al., 2008; Mehta et al., 2008; Shih et al., 2015), and critical access hospitals that serve rural areas (Joynt and Jha, 2011; Joynt et al., 2011, 2013; Lutfiyya et al., 2007), as well as primary care practices with more vulnerable populations (Friedberg et al., 2010). A Medicare Payment Advisory Commission (MedPAC) analysis of the Hospital Readmission Reduction Program also found that not only were hospitals serving the most low-income patients more likely to be penalized, but that their average penalty was substantially greater than that of hospitals serving the fewest low-income patients (MedPAC, 2013). Because these types of providers are historically less well reimbursed and therefore have fewer resources to begin with, by disproportionately penalizing them, VBP may be taking resources from the organizations that need them the most (Chien et al., 2007; Ryan, 2013).
Because patients with more social risk factors may require more resources to achieve the same outcomes as more advantaged patients, VBP that does not account for social risk factors may undervalue the resources and effort required to provide high-quality care to patients with high social risk factors (Chien et al., 2007). Consequently, it may be difficult for these providers to gain (or not lose) revenue (Joynt et al., 2014). In so doing, VBP may widen the resource gap between providers (Joynt et al., 2014). This may lead to deterioration in the quality of care, and VBP may have the unintended consequence of increasing health disparities (Bhalla and Kalkut, 2010; Chien et al., 2007; Cunningham et al., 2008; Joynt and Rosenthal, 2012; Joynt et al., 2014; Ryan, 2013; Volpp et al., 2006; Woolhandler and Himmelstein, 2015). Moreover, over the long term, revenue shortfalls to which more and greater penalties under VBP may contribute could lead to the closure of provider practices that serve socially at-risk populations (including hospitals, clinics, and physician offices) (Kane et al., 2012; Lipstein and Dunagan, 2014). Such closures would reduce access to care for patients with social risk factors (Bazzoli et al., 2012; Buchmueller et al., 2006; Walker et al., 2011).

If covering patients with social risk factors makes it more difficult to achieve quality ratings on par with plans serving fewer patients with social risk factors, this may also lead insurers to avoid covering socially at-risk populations and to leave markets (Joynt and Jha, 2013; Young et al., 2014). Consequently, enrollees may face higher premiums (Gaynor and Town, 2011). Relatedly, if penalties are larger than hospital margins to care for patients with social risk factors, this could reduce incentives to treat socially at-risk populations (Joynt and Jha, 2013). Such incentives to avoid serving patients with social risk factors would result in reduced access to care for these patients.

Finally, for providers and plans that serve populations including patients with both high and low levels of social risk factors, because it is more difficult to achieve quality benchmarks for patients with high social risk factors, these providers and plans may find incentives to improve care for patients with low levels of social risk factors only (Casalino et al., 2007). As a result, patients with high social risk factors may have barriers accessing high-quality care, which could in turn widen disparities.

One proposal to address the documented harms of the status quo under current VBP is to account for social risk factors in quality measurement and/or payment. Currently, to ensure accurate comparisons, VBP models account for underlying clinical risk factors known to independently drive variation in performance and to differ systematically across providers and therefore could statistically bias measured performance. Proposals to account for social risk factors extend the rationale of accounting for clinical risk factors in performance measurement and payment by also including
social risk factors as underlying patient characteristics that independently influence performance indicators and that differ systematically across providers and thus lead to bias in measured performance.

Proponents of this method cite the unintended consequences of the status quo—disproportionate penalties on providers serving socially at-risk populations and incentives to avoid patients with social risk factors, which could reduce quality and access and increase disparities—as rationale for accounting for the influence of social risk factors on performance indicators in VBP. Opponents of accounting for social risk factors acknowledge the potential influence of social risk factors on performance indicators in VBP, but argue that providers should be held accountable for providing care that mitigates the effect of social risk factors on health care outcomes. Proponents of accounting for social risk factors might counter that because social risk factors are difficult to address through provider action, providers should not be held accountable for them (Boozary et al., 2015; Feemster and Au, 2014; Fiscella et al., 2014; Girotti et al., 2014; Jha and Zaslavsky, 2014; Joynt and Jha, 2013; Lipstein and Dunagan, 2014; Pollack, 2013; Renacci, 2014).

Opponents of accounting for social risk factors are also worried that, because observed differences in quality reflect both the influence of social risk factors and true differences in the quality of care provided but cannot be quantitatively separated, accounting for social risk factors may obscure disparities (Krumholz and Bernheim, 2014). Consequently, this would institutionalize a poor standard of care for socially at-risk populations and also reduce incentives to improve quality and outcomes for them (Bernheim, 2014; Kertesz, 2014; Krumholz and Bernheim, 2014; O’Kane, 2015). Proponents suggest that, if observed differences for patients with social risk factors are observed consistently across the health care system, providers disproportionately serving socially at-risk populations should not bear the full financial penalty as they appear to under the status quo (Girotti et al., 2014).

A number of preliminary analyses have examined the effect of including social risk factors in risk adjustments. Several studies have found that adding socioeconomic status (SES) and other social risk factors would not substantively change risk adjustments and thus quality rankings (Bernheim et al., 2016; Blum et al., 2014; Eapen et al., 2015; Keyhani et al., 2014; Martsolf et al., 2016). In some cases, the lack of effect may reflect measurement issues. For example, studies often used area-level measures of SES (e.g., median household income) as proxies for individual-level effects and found no effect (Bernheim et al., 2016; Blum et al., 2014; Eapen et al., 2015; Keyhani et al., 2014; Martsolf et al., 2016). As described in the committee’s fourth report on data, geospatial units like counties and even zip codes are likely to be too heterogeneous to be useful (NASEM, 2016c).
There is also a difference in interpretation as to what constitutes a meaningful effect (Bernheim et al., 2016; Gerrard, 2016; Grover, 2016; Kind et al., 2016).

Other studies found that including SES and other social risk factors in risk adjustments had a strong effect on quality rankings (Fiscella and Franks, 1999, 2001; Franks and Fiscella, 2002; Glance et al., 2016; Maney et al., 2007; Nagasako et al., 2014; Reidhead and Kuhn, 2016). One study reported a more nuanced effect, where incorporating social risk factors had little effect on most providers’ quality scores, but a substantial effect on a few (Zaslavsky and Epstein, 2005). Relatedly, one study found that, under the Hospital Readmissions Reduction Program, social risk factors explained some but not all of the increased readmission rates seen among safety-net hospitals (Sheingold et al., 2016). One study found that including patient characteristics in payment adjustments (but not performance measure scores) would reduce payment disparities (Damberg et al., 2015). Note that these studies, which found substantial effects of including social risk factors in risk adjustments of quality rankings, are not without measurement issues, such as the use of imperfect proxies to assess socioeconomic disadvantage (e.g., Damberg et al., 2015; Franks and Fiscella, 2002; Glance et al., 2016; Zaslavsky and Epstein, 2005).

STATEMENT OF TASK

HHS acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to do the following:

- Provide a definition of socioeconomic status for the purposes of application to Medicare quality measurement and payment programs;
- Identify the social factors that have been shown to affect health outcomes of Medicare beneficiaries;
- Specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs;
- Identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies; and
- Recommend existing or new sources of data and/or strategies for data collection.

The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of
INTRODUCTION

health, risk adjustment, and Medicare programs (see Appendix F for the biographical sketches).

This report is the fifth and final report in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the Improving Medicare Post-Acute Care Transformation (IMPACT) Act. In the first report, the committee presented a conceptual framework and described the results of a literature search linking five social risk factors and health literacy to health-related measures of importance to Medicare quality measurement and payment programs. In the second report, the committee reviewed the performance of providers disproportionately serving socially at-risk populations, discussed drivers of variations in performance, and identified six community-informed and patient-centered systems practices that show promise to improve care for socially at-risk populations. The committee’s third report identified social risk factors that could be considered for inclusion in Medicare quality measurement and payment, criteria to identify these factors, and methods to account for them in ways that can promote health equity and improve care for all patients. The fourth report provided guidance on where to find and how to collect data on social risk factor indicators that could be used for Medicare quality measurement and payment programs. Details of the statement of task and the sequence of reports can be found in Box 1-1. Notably, it is beyond the committee’s task to recommend whether social risk factors should be accounted for in Medicare VBP. The committee’s reports detail what the ASPE and CMS could do if they choose to do so.

THE COMMITTEE’S APPROACH

This final report draws together the committee’s previous reports; provides some additional context around and clarity about the committee’s findings, conclusions, and recommendations, and offers some guidance on implementation issues that may arise. The committee emphasizes that any approach to accounting for social risk factors should do so in a manner that can improve care and promote equity for all patients, especially those with social risk factors. As presented in its third report (NASEM, 2016b), the committee’s four goals in accounting for social risk factors in Medicare payment programs are

1. Reducing disparities in access, quality, and outcomes;
2. Quality improvement and efficient care delivery for all patients;
3. Fair and accurate reporting; and
4. Compensating providers fairly.
BOX 1-1
Statement of Task

An ad hoc committee will provide a definition of socioeconomic status (SES) for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Further, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports, which build on the Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine’s previous studies relevant to this study.

The first report will:
- Define socioeconomic status for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.
- Identify SES factors and other social factors (such as race, health literacy, limited English proficiency) that have been shown to impact health outcomes of Medicare beneficiaries.

The second report will:
- Identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of lowperforming providers serving similar patient populations.

The third report will:
- Specify criteria (along with their strengths and weaknesses) that could potentially be used to determine whether an SES factor or other social factor should be accounted for in Medicare quality, resource use, or other measures used in Medicare payment programs.
- Identify SES factors or other social factors that could be incorporated into quality, resource use, or other measures used in Medicare payment programs.
- Identify methods that could be used in the application of SES factors and other social factors to quality, resource use, or other measures used in Medicare payment programs.

The fourth report will:
- For each of the SES factors or other social factors described above, recommend existing or new sources of data on these factors and/or strategies for data collection, while also identifying challenges to obtaining appropriate data and strategies for overcoming these challenges.

In the fifth report:
- The committee will synthesize and interpret the four brief reports issued as described above into one report that will include comprehensive project findings, conclusion, and recommendations based on the four previous reports.
The following sections review the approach the committee took to identify relevant indicators and data sources based on sections of its first, third, and fourth reports. The committee’s processes for identifying methods to account for social risk factors in Medicare payment (from its third report) and systems practices for the care of socially at-risk populations (from its second report) are described in Chapters 3 and 4, respectively.

**Identifying Social Risk Factors and a Conceptual Framework**

The committee’s first report, *Accounting for Social Risk Factors in Medicare Payment: Identifying Social Risk Factors* (NASEM, 2016a), presented a conceptual framework illustrating the primary hypothesized relationships between five domains of social risk factors plus health literacy and the health outcomes of Medicare beneficiaries (see Figure 1-1). Because the committee’s task aims to inform Medicare VBP programs, the committee interpreted “health outcomes” as encompassing three domains of performance indicators used in Medicare VBP, which the committee roughly categorizes as health care use, health care outcomes, and resource use. Health care use encompasses clinical processes of care and health care utilization. Health care outcomes include health outcomes, patient safety outcomes, and patient experience outcomes. Resource use comprises costs. Similarly, the committee interpreted “socioeconomic status” and “other social factors” from its charge broadly to encompass five domains of social risk factors: SEP; race, ethnicity, and cultural context; gender; social relationships; and residential and community context (NASEM, 2016a).

The conceptual framework implies that social risk factors may influence performance indicators used in VBP in many interrelated ways. To provide empirical evidence to support these hypothesized relationships, the committee presented results of a literature search to identify social risk factors that have been shown to influence performance indicators used in VBP such as measures of health care use, health care outcomes, and health care costs. The committee uses the term influence to describe an association between a social risk factor and health care use or outcome measures without implying a causal association. The complete results of the literature search can be found in Appendix AA. In sum, and as will be discussed in Chapter 2, the committee identified literature showing that indicators of each of the five social risk factors and health literacy may influence the health care use, health care outcomes, and health care costs of Medicare beneficiaries (NASEM, 2016a). All other things being equal, the social composition of the population a health care provider or health plan serves can certainly influence that provider or plan’s performance (in terms of health care use, health care outcomes, and cost).
FIGURE 1-1 Conceptual framework of social risk factors for health care use, outcomes, and cost. NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships.
Selection Criteria for Possible Inclusion of a Social Risk Factor in VBP

The selection criteria aim to minimize the influence of social risk factors as patient characteristics that may influence performance indicators used in VBP independently of provider actions, and thus to promote accuracy in performance measurement. In other words, the criteria seek to guide selection of social risk factors that could be accounted for in Medicare quality measurement and payment such that providers (or health plans) are rewarded for delivering quality and value independently of the patients (or enrollees) they serve. Box 1-2 lists the three overarching considerations and five criteria that could be used to determine whether a social risk factor should be accounted for in performance indicators used in Medicare VBP programs. Descriptions of the criteria along with their rationale, potential limitations, and practical considerations for applying the criteria can be found in Appendix C.

The committee takes the opportunity to expand on the criterion that a social risk factor is not modifiable through provider actions. The rationale for this criterion is to exclude factors that are the consequence of care and therefore reflect genuine differences in the quality of care. Whether a social risk factor is modifiable or unmodifiable is not binary, but rather describes a spectrum of effects. Thus, it can be challenging to identify where a given social risk factor lies on this spectrum, particularly as health care providers and plans are increasingly addressing social risk factors for poor health outcomes. To guide this task, it is critical to distinguish between factors that can be modified themselves and factors that are not modifiable themselves, but whose effects on health can be mitigated through provider actions (such as use of tailored interventions) without altering the underlying disadvantage.

For example, for individuals with limited health literacy, evidence-based methods to improve patient health literacy exist (Berkman, 2011) and health literate health care organizations can align health care system demands with patient capacities to reduce barriers for patients to access, understand, and use health care information and services (Brach et al., 2012; IOM, 2012). Thus, health literacy is itself modifiable, as something that providers can influence and that can be a consequence of the quality of care provided. By comparison, for patients and enrollees whose preferred language is not English, providers and plans can tailor care such as by providing language interpreters and written materials in languages other than English. This may help patients to overcome language barriers by improving communication between providers and patients or plans and enrollees, and which may lead to improved quality and outcomes. However, doing

1 See Conclusion 1 in the committee’s third report (NASEM, 2016b).
BOX 1-2
Criteria for Selecting Social Risk Factors for Application in Medicare Quality Measurement and Payment

The social risk factor is related to the outcome.
1. The social risk factor has a conceptual relationship with the outcome of interest.
2. The social risk factor has an empirical association with the outcome of interest.

The social risk factor precedes care delivery and is not a consequence of the quality of care.
3. The social risk factor is present at the start of care.
4. The social risk factor is not modifiable through provider actions.

The social risk factor is not something the provider can manipulate.
5. The social risk factor is resistant to manipulation or gaming.

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The committee’s criteria draw on previously developed guidelines for risk adjustment, including those developed by the National Quality Forum in their 2014 report, *Risk Adjustment for Socioeconomic Status or Other Sociodemographic Factors*, as well as those developed for clinical risk adjustments (Elliott et al., 2009; Kautter et al., 2014; O’Malley et al., 2005; Pope et al., 2004). The criteria the committee reviewed and drew upon in developing their criteria are reproduced in Appendix CA.

so addresses language barriers without changing the underlying language skills of patients and enrollees.

The third report expanded the social risk factor framework presented in the first report to include specific indicators of each of the five domains of social risk factors. Indicators are ways to measure the underlying construct that differ from individual measures. For example, income is an indicator of socioeconomic position that can be measured in many ways (e.g., continuous or categorical measures of individual or household income, as annual income or lifetime earnings, etc.). After applying the selection criteria to these indicators, the committee concluded that there are measureable social risk factors that could be accounted for in the short or long term. The rationale for the selection or exclusion of each social risk factor indicator is detailed in Chapter 2 and Appendix C.

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2 See Conclusions 2 and 3 in the committee’s third report (NASEM, 2016b).
Data Sources

The committee’s fourth report takes the social risk factor indicators identified in the third report that could be accounted for in Medicare VBP programs in the short and long term and identifies data sources and data collection strategies CMS could use to account for social risk factors in Medicare payment if it chooses to do so. The committee identified three categories of data sources: (1) new and existing sources of CMS data; (2) data from providers and plans; and (3) alternative government data sources.3

Existing sources of CMS data include administrative records (enrollment records and claims data) and beneficiary surveys with limited social risk factor data, such as beneficiaries’ race and ethnicity (ResDAC, n.d.). If CMS collected new social risk factor data, it could design measures and data collection methods that would ensure collection of accurate data that meet the needs of the intended method to account for those social risk factor indicators in Medicare performance measurement and payment programs. Importantly, such new data collection on social risk factors need not be restricted to Medicare quality measurement and payment applications. CMS could also use these data for other purposes, including research and quality improvement.

For social risk factor indicators that are relevant and relatively stable (for example, race and ethnicity, language, and education), the committee recommends that CMS collect new social risk factor information at the time of enrollment (NASEM, 2016c).4 Additionally, if research shows an important explanatory effect of a social risk factor indicator and a pilot test shows it feasible, CMS could supplement the new social risk factor information collected at the time of enrollment with a universal survey of current beneficiaries, whose social risk factor information would not have been captured at enrollment.

The committee recognizes the substantial barriers of collecting new data, including cost and burden. At the same time, the committee documented tangible if unintended, adverse consequences of the VBP status quo (which generally does not account for social risk factors). The committee also found that accounting for social risk factors could mitigate these adverse consequences. The need to mitigate unintended consequences of the status quo could justify the expected costs and burden of new data collection. Furthermore, because it is also important to monitor any approach to accounting for social risk factors to ensure unintended, adverse consequences for health disparities do not arise, such data collection would also facilitate such monitoring for both new approaches and under the status quo.

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3 The committee deemed private data sources out of scope, because CMS would have to purchase it at unknown cost and because data collection methods may not be fully transparent.
4 See Recommendation 7 in the committee’s fourth report (NASEM, 2016c).
Other uses of such social risk factor data such as to target quality improvement initiatives and to inform the development and implementation of appropriately tailored interventions (CMS, 2016) provide additional rationale for CMS to collect such data.

Data from providers and plans include electronic health record (EHR) data and administrative data. Providers and plans that care for and cover Medicare beneficiaries already send these data to CMS. Some social risk factor data (for example, race and ethnicity and language) are already captured in some EHRs and some administrative data (IOM, 2014; Lawson et al., 2011; Nerenz et al., 2013a,b). New social risk factor data that providers and plans could collect could also be important for the care or services providers and plans provide (IOM, 2014). Furthermore, collecting social risk factor information from providers and plans could increase burdens on providers and plans (including the need for infrastructure upgrades), as well as patients and enrollees (IOM, 2014). In particular, patients and enrollees may not know or be willing to disclose information on their social risk factors, and efforts to gather such information may raise concerns about privacy and the security of their health and social risk factor information, especially if such data are used for nonclinical purposes (such as for quality measurement and payment) (IOM, 2014).

Alternative government data refer to administrative data and national surveys that federal agencies other than CMS (including other agencies within HHS) and state agencies oversee and maintain that contain information on social risk factors and that CMS could use. These include data that could be linked to Medicare beneficiary data at the individual level, area-level data that could be used to describe a Medicare beneficiary’s residential environment or serve as a proxy for individual level effects, and data CMS could use to determine how to elicit social risk factor information from Medicare beneficiaries. The Social Security Administration may be the best source of individual-level social risk factor data that could be linked to Medicare beneficiary data. The American Community Survey may be most useful as a source of area-level social risk factor data.

Patients are the underlying source of social risk factor data for each of the three categories of sources. For some social risk factors like race, ethnicity, and gender, it is important for patients to self-identify. However, CMS, health care providers and health plans, and government agencies collect and maintain social risk factor information and—more importantly—standardize, assess, interpret, and report this information in a valid, consistent, and reliable way. In the future, new and better methods of data collection could emerge (e.g., methods that are more accurate, less burdensome, or less costly). As these methods emerge, an ideal system would be responsive to evolving data availability and could adapt to use new data sources.
The committee evaluated data from these three categories of sources with respect to three characteristics:

1. Collection burden, or resources, including cost and effort required to collect and store data on the part of CMS, providers/health plans, and respondents;
2. Accuracy, or the extent to which a given measure captures the construct that measure represents, as well as elements of data validity, reliability, and completeness; and
3. Clinical usefulness, meaning whether providers can use social risk factor information in the management and treatment of patients (IOM, 2014).

The committee also considered whether an indicator is relatively stable (such as race and ethnicity) or changes over time (such as social support). The committee recommended five guiding principles CMS should use when choosing data sources for specific indicators of social risk to be used in Medicare performance measurement and payment (see Box 1-3).\(^5\)

Data from any source have advantages and disadvantages with respect to the three characteristics (collection burden, accuracy, and clinical utility) that must be balanced. Thus, selection of any data source requires certain trade-offs. After considering data sources for each social risk factor with respect to the three characteristics (collection burden, accuracy, and clinical utility) and five principles, the committee recommended specific data CMS could use to account for social risk factors in Medicare VBP if it so chooses. This will be discussed in Chapter 2.

**OVERVIEW OF THIS REPORT**

This report synthesizes and elaborates on the committee’s first four reports. Chapter 2 briefly defines each social risk factor and identifies data sources for social risk factors that meet the selection criteria. Chapter 3 discusses the methods to account for social risk factors in Medicare payment programs, and also addresses some issues that may arise when implementing those methods. Chapter 4 discusses ways in which ASPE and CMS could move forward with accounting for social risk factors in Medicare VBP programs, should they choose to do so. Appendixes A, B, C, and D reproduce the committee’s previous reports in order and in their entirety.

\(^5\) See Recommendation 1 in the committee’s fourth report (NASEM, 2016c).
Guiding Principles for Choosing Data Sources for Social Risk Factor Indicators

1. CMS should first use data it already has.
2. CMS should then look for opportunities to use existing data collected by other government agencies (including elsewhere in HHS).
3. To the extent that a social risk factor is relatively stable, CMS should examine the feasibility of collecting additional data at the time of enrollment in Medicare.
4. Where social risk factors change over time and have clinical utility, requiring data collection through electronic health records or other types of provider reporting may be the best approach.
5. For social risk factors that reflect a person’s context or environment, existing data sources that can be used to develop area-level measures should be considered.

REFERENCES


INTRODUCTION


Social Risk Factors: Definitions and Data

The committee’s first report (see Appendix A) presents a conceptual framework that illustrates how social risk factors could affect the health outcomes of Medicare beneficiaries, as well as results from a literature search that provides empirical evidence in support of these hypothesized conceptual relationships (NASEM, 2016a). Thus, that report provides a conceptual basis and empirical evidence that social risk factors could affect performance indicators used in Medicare value-based payment (VBP) programs independently of provider influence. The committee’s third report builds on the first report, identifying social risk factor indicators that could be accounted for in Medicare quality measurement and payment, as well as offering criteria for selecting these social risk factor indicators to account for them in Medicare payment programs (NASEM, 2016b). The committee’s fourth report provides guidance on data the Centers for Medicare & Medicaid Services (CMS) could use to account for social risk factors in Medicare payment programs (NASEM, 2016c). In this chapter, the committee summarizes key material from those reports and defines each social risk factor and relevant indicators, as well as the potential data sources CMS could use if it chose to account for these social risk factors in some or all of its VBP programs. The chapter closes with general considerations to address questions that arose after the publication of the prior reports. The interested reader is referred to Appendices A, C, and D for detailed information.
DEFINITION, EVIDENCE, AND DATA SOURCES

Each indicator described in this section meets the committee’s criteria that a social risk factor has a relationship to health care outcomes of interest (i.e., performance indicators used in VBP such as health care use, health care outcomes, and resource use), precedes care delivery and is not a consequence of the quality of care, and is not something the provider can manipulate, and also meets practical considerations. Potential data sources are also discussed. Figure 2-1 shows the specific social risk factor indicators the committee identified. The committee notes that the listing of social risk factors does not reflect an order of priority.

Socioeconomic Position

Socioeconomic position (SEP) reflects a person’s absolute and relative position in a socially stratified society, and it captures a combination of access to material and social resources, as well as relative status (i.e., prestige- or rank-related characteristics). The committee identified income, education, dual eligibility, and wealth as possible indicators for use by CMS in VBP.

Income

Income is the most commonly used measure of economic resources (Braveman et al., 2005), largely because there are available measures, but also because income has strong face validity. Individual income can affect health and health care outcomes directly as a means of purchasing health care and indirectly as a means of acquiring health promoting resources, such as better education, housing, and nutrition (Adler and Newman, 2002; Braveman et al., 2005). Income can be assessed annually or cumulatively, as lifetime earnings. The latter may be more relevant for older adults, fewer of whom participate in the paid workforce. Lifetime earnings are also less likely to be influenced by current health.

When self-reported, income can be sensitive to collect, but reliable methods exist to accurately, reliably, and feasibly collect income data (Moore and Welniak, 2000). Although there may be less variation in income among older populations, especially the very old (age 80 and older), because income includes both earned and unearned income, there is likely to be sufficient variation in income among the Medicare population (albeit a narrower range than among the general population) to capture the full variation in SEP (HHS, 2015).
CMS does not currently collect or maintain income data (Samson et al., 2016), nor do providers and plans do so through electronic health records (EHRs) or otherwise. The Social Security Administration (SSA) maintains several sources of individual-level income data. Government agencies that collect premiums for Medicare parts B and D (e.g., SSA, Railroad Retirement Board, and Office of Personnel Management) also have income data used for determining premium amounts; however, CMS does not have individual income information.²

An area-level measure of income from the American Community Survey such as median household income could be used as a proxy for individual-level income. However, an area-level proxy measure is an imperfect proxy for the individual-level measure and may therefore be less preferable than a true individual-level measure. **In the short term, CMS should use available area-level income data from the American Community Survey as a proxy for individual income. In the longer term, CMS should explore the feasibility of linking to SSA income data from the uncapped Medicare payroll tax and/or develop standardized measurements and methods for new data collection.³**

**Education**

Education is important for health because it shapes future employment and economic resources (Adler and Newman, 2002; IOM, 2014; NASEM, 2016a). Education can therefore affect health indirectly through other indicators of SEP—employment, occupation, and income. At the same time, education can also affect health by enabling individuals to access and understand health information and health care and to make decisions that promote health and reduce health risks, and by contributing to a patient’s ability to advocate for him- or herself in health care (Cutler and Lleras-Muney, 2006; IOM, 2014). The relationship between education and health care outcomes may vary across age cohorts owing to changes in the distribution of education over time (Lynch, 2003). Education can be measured as continuous or categorical years of schooling completed or as educational attainment measured by credentials of formal schooling (e.g., high school diploma, college degree) (Braveman et al., 2005; IOM, 2014).

Currently, CMS does not collect or maintain data on education, nor do providers and plans routinely collect it. Although some of the more comprehensive EHRs may capture educational attainment, standardized measures

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² Personal communication, John D. Shatto (Centers for Medicare & Medicaid Services, Office of the Actuary) to Kathleen Stratton (National Academies of Sciences, Engineering, and Medicine staff), September 8, 2016.

³ See Recommendation 3 in the committee’s fourth report (NASEM, 2016c).
SOCIAL RISK FACTORS

Socioeconomic Position
- Income
- Education
- Dual Eligibility
- Wealth
- Occupation

Race, Ethnicity, and Cultural Context
- Race and Ethnicity
- Language
- Nativity
- Acculturation
- Documentation Status

Gender
- Gender Identity
- Sexual Orientation

Social Relationships
- Marital/Partnership Status
- Living Alone
- Emotional and Instrumental Social Support

Residential and Community Context
- Neighborhood Deprivation
- Urbanicity
- Housing
- Other Environmental Measures

PERFORMANCE INDICATORS FOR VALUE-BASED PAYMENT

Access
Clinical and Behavioral Risk Factors
Health Literacy and Numeracy

Health Care Use
Health Care Outcomes
Resource Use
FIGURE 2-1 Conceptual framework of social risk factors and performance indicators used for value-based payment (VBP).

NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships. For the indicators listed in bullets under each social risk factor, bold lettering denotes measurable indicators that could be accounted for in Medicare VBP programs in the short term; italicized lettering denotes measurable indicators that capture the basic underlying constructs and currently present practical challenges, but are worth attention for potential inclusion in accounting methods in Medicare VBP programs in the longer term; and plain lettering denotes indicators that have considerable limitations.

a As described in Figure 1-1, health care use captures measures of utilization and clinical processes of care; health care outcomes capture measures of patient safety, patient experience, and health outcomes; and resource use captures cost measures.
and data collection strategies are needed. To that end, the earlier Institute of Medicine (IOM) report on social and behavioral domains and measures for EHRs identified education as a clinically useful social risk factor and recommended its inclusion in EHR meaningful use standards. With respect to other government sources, area-level measures are available through the American Community Survey. Thus, in the short term, CMS should use these available area-level measures as a proxy for individual education. In the long term, because education is relatively stable for Medicare beneficiaries, CMS should develop standardized measures and methods to collect education data.3

Dual Eligibility

In health research, numerous studies assess the effects of insurance coverage on health status (see, for example, IOM, 2009a), but its use here is restricted to its use as a proxy for resources to support health and health care and thus as an indicator of SEP. For the Medicare population, Medicaid eligibility—also referred to as dual (Medicare and Medicaid) eligibility—is an indicator of insurance status that can be used as a proxy that captures elements of both income and wealth, due to income thresholds and asset limits. Because states establish Medicaid eligibility, what dual eligibility represents varies by state.

Dual eligibility may capture dimensions of health status that are unmeasured by other data sources because it represents insurance coverage as a concept distinct from SEP. For example, dual eligibles receive more generous health coverage through Medicare and Medicaid than uninsured or underinsured persons who have relatively higher SEP, but who are ineligible for Medicaid coverage because they have income and/or wealth just above the eligibility threshold. Relatedly, dual eligibility may capture clinical characteristics covering those who are under age 65 and eligible for Medicare coverage based on disability. Because dual eligibility captures elements of income, wealth, and health status, dual eligibility can be considered a broader measure of health-related resource availability that captures medical need.

CMS administers both Medicare and Medicaid programs, and therefore already possess existing data on dual eligibility among Medicare beneficiaries. This includes graded data on full or partial eligibility and is the most reliable source of available data. Thus, following the committee’s guiding principle for CMS to first use data it already has, CMS should use its existing data on dual eligibility.4

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4 See Recommendation 2 in the committee’s fourth report (NASEM, 2016c).
Wealth

Wealth is an alternate measure of economic resources that represents total accumulated economic resources (assets). Similar to income, wealth is likely to be important for health and health care outcomes as a means of acquiring health care and health-promoting resources (Braveman et al., 2005; Deaton, 2002; NASEM, 2016a). Moreover, whereas income may capture less variation in economic attainment among Medicare beneficiaries, especially persons who are very old, wealth may capture more variation. Therefore, wealth may be a more sensitive indicator of SEP for persons who are very old (Allin et al., 2009). Additionally, there are substantial differences by subgroups with similar incomes, especially racial and ethnic subgroups and by gender. For example, blacks have significantly less wealth compared to whites even at the same income levels (Kochhar and Fry, 2014; Shapiro et al., 2013). Wealth can also buffer the effects of changes in income (such as those attributable to unemployment or illness) (Cubbin et al., 2011). However, wealth may still be susceptible to changes as a consequence of health events among individuals (Lee and Kim, 2008). This may be particularly relevant for low-income persons who also share a disproportionate burden of disease. A challenge of using wealth as an indicator of SEP is that relatively few studies have examined the relationship between wealth and performance indicators used in VBP (Braveman et al., 2005; NASEM, 2016a). Hence, there is little evidence documenting an empirical association.

Collecting self-reported net worth is difficult because it is sensitive and because many individuals simply do not know the value of their net worth or what assets they have (Braveman et al., 2005; Eggleston and Klee, 2015). Nevertheless, some reliable and validated measures and data collection methods do exist. In particular, the Health and Retirement Study (HRS) has designed measures and methods to collect data on wealth that overcome traditional barriers to collecting wealth data such as concerns about privacy and imprecise knowledge (National Institute on Aging et al., 2007). Some HRS data are linked to Medicare records (ResDAC, n.d.), and therefore are useful for examining the effect of wealth on health care outcomes. However, as described in the committee’s third report (see Appendix C), because samples for the HRS are small, these data are unlikely to be useful for application in Medicare quality measurement or payment (NASEM, 2016b).

Wealth data are not currently available through CMS, providers and plans, or other government agencies. Medicaid programs do require assets be below a certain threshold for eligibility, and this asset threshold could be used to measure wealth dichotomously (i.e., high wealth above the threshold, and low wealth at or below the threshold). However, Medicaid eligibility criteria, including this asset threshold, vary by state. Moreover, this
measure of wealth would be at least partly captured through dual eligibility status, for which there is better and available existing data (as described in the previous section on dual eligibility).

Because no data sources are available for use in the short term, CMS should conduct more research on both measurement and data collection methods on wealth by CMS or through EHRs. In particular, CMS may want to consider the empirical question of whether the addition of wealth data adds sufficient precision above and beyond income data, for which some data is already available and for which methods and measures exist to collect data with less burden, to warrant additional data collection for inclusion in any method to account for social risk factors in Medicare quality measurement and payment. National surveys such as the HRS that can be linked to individual-level health care outcomes of Medicare beneficiaries could serve as a test bed for CMS to assess this question.

Note Regarding Occupation

Occupation includes both employment status (whether an individual participates in the paid labor force or not, and if so, to what degree), as well as the type of occupation among the employed (Adler and Newman, 2002; NASEM, 2016a). Additionally, occupation can be collected in its current state or in a past state, as primary lifetime occupation. There is relatively little empirical evidence on the association between employment or occupation and performance indicators used in VBP, especially using U.S. data (NASEM, 2016a). This is likely because of the difficulty of collecting and classifying occupation in the United States, which maintains a Standard Occupational Classification System, but many of the categories are too heterogeneous to be meaningful (Braveman et al., 2005). Additionally, some groups such as retired persons and homemakers may not have an employment related to occupation, making it difficult to identify their SEP. In short, occupation is a conceptually powerful indicator of SEP, but practical considerations limit its potential use.

Race, Ethnicity, and Cultural Context

Race and ethnicity are related but conceptually distinct constructs that are dimensions of a society’s stratification system by which resources, risks, and rewards are distributed. In particular, race and ethnicity capture features of social disadvantage, including access to social institutions and rewards; behavioral and other sociocultural norms; inequality in the distribution of power, status, and material resources; and psychosocial exposures

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5 See Recommendation 4 in the committee’s fourth report (NASEM, 2016c).
Three constructs of community context are language, nativity, and acculturation.

**Race and Ethnicity**

Categories of race and ethnicity capture a range of health-relevant dimensions, especially those related to social disadvantage. Race and ethnicity are strongly associated with health and health care outcomes, even after accounting for measures of SEP (Krieger, 2000; LaVeist, 2005; NASEM, 2016a; Williams, 1999; Williams et al., 2010). This effect may be caused by the lack of comparability of a given SEP measure across racial and ethnic groups (e.g., wealth is differentially correlated with income by race), the importance of other unmeasured social factors that are patterned by race and ethnicity (e.g., neighborhood environments, discrimination, immigration-related factors, language), and measurement error in SEP (NASEM, 2016a). Observed differences by race and ethnicity may also represent differences in the quality of care received, including differences related to poor communication, poor cultural competence, discrimination, and bias (IOM, 2003b).

Race and ethnicity are typically identified through self-reported categories. In health research, Hispanic ethnicity is frequently combined with racial categories. The most commonly used “racial” categories are non-Hispanic white, non-Hispanic black, Hispanic, and Asian (see, for example, AHRQ, 2016; CMS, 2016b). This categorization is problematic because it conceals substantial heterogeneity within certain categories. Some existing standards include federal standards from the White House Office of Management and Budget (OMB), which the U.S. Department of Health and Human Services (HHS) is increasingly adopting (CDC, 2010; IOM, 2009b; OMB, 1995), as well as those recommended in a 2009 IOM report (IOM, 2009b). Because race and ethnicity are conceptually distinct, these standards recommend using separate items for collecting race and ethnicity data. The committee acknowledges that causal pathways by which race and ethnicity influence health include mechanisms that can be related to quality of care.

Medicare currently maintains race and ethnicity data in its administrative records (Filice and Joynt, 2016). Current Medicare surveys and administrative records capture self-reported race and ethnicity using categories that adhere to federal standards issued by OMB (Filice and Joynt, 2016; OMB, 1995). However, race and ethnicity information for older beneficiaries who enrolled in Medicare prior to when these standards were issued and implemented may reflect outdated racial and ethnic classifications (Filice and Joynt, 2016; Zaslavsky et al., 2012). EHRs are likely to capture race and ethnicity data. To that end, the Office of the National
Coordinator for Health Information Technology (ONC) included capturing race and ethnicity using categories that adhere to OMB standards in its stage 2 meaningful use standards (CMS, 2012). Race and ethnicity are also clinically useful and were included in the 2014 IOM report on capturing social and behavioral domains and measures. Because race and ethnicity are relatively stable factors for which Medicare already has data, CMS should use available self-report and imputed race and ethnicity data in its existing records and existing methods in the short term. However, the committee acknowledges some limitations with regard to lack of standardization in current measurement and collection, and less accuracy for older age groups. Thus, over the long term, CMS should also continue to collect self-reported race and ethnicity data following the OMB standards and to work on standardizing measures and methods across the various self-report mechanisms it oversees—including administrative forms, Medicare sample surveys, and provider and plan reporting requirements.7

Language

In health care and health services research, language typically represents language barriers, such as speaking a primary language that is not English, having limited English proficiency, or otherwise needing interpreter services. This includes deaf American Sign Language users. Language barriers are strongly associated with health and health care outcomes—in particular, poorer access to health care, poorer health status, poorer quality care, including less recommended care, and more adverse health events (NASEM, 2016a).

CMS currently maintains some data on preferred language, which has high specificity, but poor sensitivity. In its Strategic Language Access Plan, CMS included having the CMS Civil Rights Agency Liaison examine the feasibility of including collection of language preferences to existing CMS surveys as well as ways to standardize data collection on existing and future surveys (CMS, 2014). Providers and plans could also collect language data, because it is clinically useful for providers and plans to provide tailored care, such as providing health information in languages other than English or providing language interpreter services. Indeed, to provide such services, many health plans collect and maintain language data (Lawson et al., 2011; Nerenz et al., 2013a,b). Similarly, providers may voluntarily col-

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6 **Meaningful use** in health information technology refers to the use of EHR data for specific objectives, such as to improve quality of care, care coordination, and population and public health (CMS, 2016a; IOM, 2014; ONC, 2014). CMS meaningful use incentive programs to providers and plans that demonstrate that their EHRs achieve certain meaningful use objectives, and have been implemented in stages.

7 See Recommendation 3 in the committee’s fourth report (NASEM, 2016c).
lect and maintain language data in adherence to national standards, such as those put forth by the CMS Office of Minority Health (2016) and the HHS Office for Civil Rights (HHS, 2016). Capturing preferred language using the Library of Congress language codes was also included in the stage 2 meaningful use regulations as part of the measure of recording demographics (CMS, 2012). Area-level measures, such as those from the American Community Survey and some imputation methods, are also available as individual-level proxies where individual-level data do not exist. In the short term, CMS should use its existing data on preferred language while acknowledging its limitations. In the long term, CMS should continue efforts to standardize measures and data collection methods. A 2009 IOM report provides guidance on standardization of race, ethnicity, and language data (IOM, 2009b).

Nativity and Acculturation

Nativity refers to one’s country of origin. Immigration history includes refugee and documentation status, as well as duration in the United States. Acculturation describes the extent to which an individual adheres to the social norms, values, and practices of his or her own ethnic group or home country or to those of the United States (NASEM, 2016a).

Measures of nativity include identifying a specific country of origin or a dichotomous measure comparing foreign-born to U.S.-born individuals. These measures of nativity and measuring duration in the United States could therefore feasibly be collected during an office visit or in an electronic health record. Measures of nativity and time in the United States are also less sensitive than measures of documentation status or citizenship (IOM, 2014). Nativity, duration in the United States, and measure of language can be crude proxies for acculturation. Although there is evidence on the relationship between acculturation and health, evidence on the effect of acculturation on performance indicators used in VBP is not well established (Abraído-Lanza et al, 2006; IOM, 2014).

Medicare beneficiaries’ place of birth could be collected either by CMS or via EHRs with relatively little burden to patients, providers and plans, or CMS. Nativity is a stable social risk factor, which supports one-time collection by CMS to reduce burden, but nativity also has clinical usefulness, which supports collection through EHRs. The SSA collects place of birth, including city and state or foreign country, on applications for a Social Security card (SSA, 2011) or at enrollment for Social Security benefits (SSA, n.d.), and it maintains place-of-birth data in its Numident file (McNabb et al., 2009). These data could be paired with Medicare beneficiary records.

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8 See Recommendation 3 in the committee’s fourth report (NASEM, 2016c).
Because data exist in SSA records that could be linked to Medicare beneficiary records, CMS should use this available source of data for nativity.9

Because there is a strong interaction between acculturation and race and ethnicity, measures of acculturation frequently assess acculturation among specific subgroups (e.g., Hispanic immigrants) (HHS, 2014). For example, the Brief Acculturation Scale for Hispanics is a reliable, validated measure to assess acculturation among Hispanic Americans using four self-reported language use items (Mills et al., 2014). Duration in the United States is also used as an imperfect proxy for acculturation, because acculturation is expected to increase with the amount of time spent in the United States. Because more evidence is needed on the empirical association between acculturation and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available.10 However, because acculturation is often measured using preferred language, which is available to CMS in the short term, language data could capture elements of acculturation in addition to language itself.

Gender Identify and Sexual Orientation11

Gender minorities (individuals who identify as transgender, intersex, or otherwise nonconforming gender) may experience differences in health and health care outcomes, but there remains little empirical evidence. What evidence does exist suggests that differential health care outcomes may arise from miscommunication, lack of cultural competence, or bias in the patient–provider encounter (IOM, 2011). The lack of evidence is due in part to the lack of a good existing measure, although, based on recommendations from a 2011 IOM report, HHS has been actively working to improve data collection. Emerging literature supports a relationship between gender identity and health care outcomes of interest, but existing measures pose challenges to feasibility. Hence, the empirical association is poorly established.

Sexual orientation in this context primarily refers to sexual minorities, or individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming. Sexual orientation is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011).

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9 See Recommendation 2 in the committee’s fourth report (NASEM, 2016c).
10 See Recommendation 6 in the committee’s fourth report (NASEM, 2016c).
11 As described in the committee’s third report (NASEM, 2016b), normative gender categories (men and women) are strongly associated with health and health care outcomes, despite the fact the gender effects are difficult to separate from biological sex effects. Thus, normative gender is a strong candidate for inclusion in methods to account for social risk factors in Medicare quality measurement and payment programs. However, the committee notes that gender is already included as a risk factor in clinical risk adjustments in Medicare.
As with gender identity, emerging evidence suggests that differential health care outcomes among sexual minorities may be largely attributable to drivers related to the quality of care provided (e.g., miscommunication, poor cultural competence, discrimination) (Elliott et al., 2015; IOM, 2011). Similar to the practical challenges of establishing better evidence between gender identity and performance indicators used in VBP, there are no good existing measures. Any current measures frequently only capture one dimension of sexual orientation, and identifying the dimension or dimensions most relevant to the outcome of interest can be conceptually challenging (IOM, 2011). Specifically, some individuals do not present consistently across the three dimensions of sexual orientation. For example, some men report that they have sex with other men, but do not identify as gay. In cases of such inconsistency across dimensions, identifying the dimension or dimensions most relevant for the outcome of interest will be important to accurately classify individuals. Taken together, like gender identity, emerging literature supports a relationship between sexual orientation and health care outcomes of interest, but poor existing measures have limited available evidence.

Although some measures and best practices for data collection exist and CMS has included data collection of sexual orientation and gender identity in its Equity Plan for Improving Quality in Medicare, there are currently no standards for measuring and collecting data on sexual orientation and gender identity (CMS Office of Minority Health, 2015). Partly because of a lack of standardized measures, there is currently little evidence on the effect of sexual orientation and gender identity on performance indicators used in VBP (NASEM, 2016a,b). Because more evidence is needed on the empirical association between sexual orientation and gender identity and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available.12 In particular, for sexual orientation, CMS should take notice of which dimension or dimensions are most relevant for health care outcomes of interest. At the same time, CMS should continue efforts to develop standardized measures and data collection strategies and to collect data.

Social Relationships

Social relationships are important for health because they provide access to social networks that can provide access to resources (including instrumental support and access to health care services or health-promoting resources), as well as emotional support (Berkman and Glass, 2000; Cohen, 2004; Eng et al., 2002; House et al., 1988). Social relationships are most

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12 See Recommendation 6 in the committee’s fourth report (NASEM, 2016c).
frequently assessed in the health care and health services research literature with three constructs: marital/partnership status, living alone, and social support.

**Marital/Partnership Status**

Marital or partnership status is a foundational structural element of social relationships that is also often considered an important indicator of social support. Being married or partnered is associated with better health care outcomes, while being single, widowed, or otherwise unpartnered is associated with worse health care outcomes (NASEM, 2016a). Literature suggests that this relationship holds true for both heterosexual partners and same-sex couples (Liu et al., 2013). Additionally, the relationship between marriage and health outcomes interacts with gender. Demographic shifts in family structure have emerged over the past several decades—marriage rates have declined while the number of cohabiting individuals and persons who never married has increased (Wang and Parker, 2014). Additionally, there is likely to be greater variability in the future with the increase in the never-married and cohabiting populations, which are increasingly tied to SEP, race, ethnicity, and community of residence (Aughinbaugh et al., 2013; Tamborini, 2007; Wang and Parker, 2014). Some evidence suggests that the relationship between marital status and health is changing along with these demographic shifts (Liu and Umberson, 2008).

CMS maintains data on marital status, because it is important for Social Security benefits, but it does not collect or maintain data on partnership. Providers, plans, and other federal government agencies also do not collect data on partnership. However, because partnership can change over time, especially among older adults, and is clinically useful, it could be collected through EHRs. If so, validated measures of partnership exist in the literature, but CMS would need to develop standardized measures and data collection methods for its own collection or provider/plan reporting requirements. An important consideration for the longer term are ongoing demographic shifts in family structure, including the federal Supreme Court ruling making same-sex marriage legal nationally.¹³ It will be important for CMS to monitor the empirical association between marital/partnership status and health care outcomes and revisit assumptions about marital/partnership status as an indicator of social support over time. In the short term, CMS should use available data on marital status. In the long term, research is needed on measurement and data collection for partnership.¹⁴ In particular, CMS may want to examine whether including partnership in any

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¹⁴ See Recommendation 3 in the committee’s fourth report (NASEM, 2016c).
method to account for social risk factors in Medicare quality measurement and/or payment that already includes marital status and living alone adds substantial additional precision and explanatory value.

Living Alone

Living alone is a structural element of social relationships. In health research, living alone is typically an indicator of social isolation or loneliness, which have been shown to have important negative consequences for health (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988; Wilson et al., 2007). Living alone is also likely to at least partly capture elements of social support. Living alone is strongly associated with health, although literature on the association between living alone and performance indicators used in VBP is sparse (NASEM, 2016a).

Living alone is potentially susceptible to rapid changes, including changes resulting from a health care interaction. For example, an ill parent may temporarily move in with his or her child following a health event or the advice of a doctor. However, living alone is not likely to be susceptible to rapid changes on average. Living alone can be fairly easily and feasibly assessed in the clinical setting using a dichotomous measure (living alone or not) or more finely graded household composition measures (e.g., living alone, with one other person, two other persons, and so on).

CMS currently collects data on living arrangements for some patients in postacute settings, such as through the Home Health Outcome Assessment Information Set (AHRQ, 2016; CMS, n.d.), and in the Medicare Current Beneficiary Survey (CMS, 2015a). Providers and plans do not currently collect data on living arrangements, nor is national data available through other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because living arrangements can change rapidly, especially for older adults and because living alone is clinically useful, living alone may best be captured in the clinical setting, and CMS should develop standardized measures and methods for data collection through EHRs.15

Social Support

Social support is a key function of social relationships and includes emotional elements (such as through caring and concern) as well as instrumental components (such as material and other practical supports). Instrumental social support can support access to health-promoting

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15 See Recommendation 4 in the committee’s fourth report (NASEM, 2016c).
resources (e.g., delivery of nutritious meals) and health care (e.g., providing transportation to a doctor’s appointment) (Berkman and Glass, 2000). Researchers often measure an individual’s perceived or potential social support through measures of social connections or social integration, which may represent potential sources of social support (IOM, 2014).

Measures of social support may pose feasibility issues. Some measures have many items and are burdensome to collect or may only assess one element of social support (e.g., instrumental but not emotional support; perceived support versus actual support). Additionally, because social support is multidimensional, identifying the measure that represents the most relevant dimension for a given health care outcome can be challenging. Despite these limitations, measures of social support are still likely to capture elements of social relationships that are relevant for health care outcomes.

Currently, no social support data are available within CMS, from providers and plans, or from other national data via other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because social support can change rapidly especially among older adults and because it is clinically useful, it may best be captured in the clinical setting, and CMS should develop standardized measures and methods for data collection through EHRs.16

Residential and Community Context

Residential and community context captures a set of broadly defined characteristics of residential environments, including compositional characteristics that describe aggregate characteristics of individuals residing in a given neighborhood or community, as well as characteristics of social and physical environments.

Neighborhood Deprivation

Compositional characteristics of communities include, for example, dimensions of SEP, the proportion of racial and ethnic minority residents, foreign-born residents, single-parent households, and English language-proficient residents. Residential environments include both physical and social elements that are relevant for health. These are described in more detail in the section on environmental measures. Because compositional characteristics can be interpreted to represent a combination of environmental effects, group-level effects, and as a proxy for effects of individual characteristics, in its third report, the committee concluded that a measure

16 See Recommendation 4 in the committee’s fourth report (NASEM, 2016c).
of neighborhood deprivation assessed using a composite measure of compositional characteristic is likely to be a good proxy for a range of individual and true area-level constructs (compositional and environmental) relevant to performance indicators used in VBP (NASEM, 2016b).

Compositional characteristics can be assessed and used individually, such as neighborhood racial and ethnic composition or neighborhood SEP. Compositional characteristics can also be assessed using composites, such as a summary indicator of neighborhood deprivation or neighborhood SEP. For example, Roblin developed a summary measure to assess the neighborhood SEP of a managed care organization’s enrollees measured at the census tract level using seven indicators:

1. Percent of households with income below the federal poverty level,
2. Percent of households receiving public assistance,
3. Percent of households with low income,
4. Percent of unemployed adult males,
5. Percent of adults with low educational attainment,
6. Median household income, and
7. Median home value (Roblin, 2013).

Because neighborhood deprivation captures a patient or beneficiary’s environment or residential context, an area-level measure based on the beneficiary’s residential address is appropriate. Although residential addresses are available from providers, plans, and Medicare records, the latter is preferable, because these are the data CMS already possesses. Neighborhood deprivation can be assessed using a single-item measure such as median household income or using a multi-item composite measure. Numerous neighborhood deprivation indexes comprising multiple items (e.g., median household income, percent of residents with a high school degree, percent of unemployed residents, percent of households with an income below the federal poverty level) have been developed (Oka, 2015), and data on these area-level measures are available through the American Community Survey. The committee recommends that CMS test a composite measure (such as an existing indicator from the literature) and a simple single-indicator item (such as median household income), contrast their performance at the census tract level, and also weigh the benefits of the simplicity of a single indicator against the increased precision from a composite measure for use in the short term. To increase accuracy in the long term, CMS could conduct research on measurement and data collection such as measures to better capture neighborhood deprivation in rural areas, to identify an improved geospatial unit of analysis for rural settings, and to assess the performance of any given variable (single or composite) across multiple geographic areas.
Urbanicity and Rurality

Urbanicity/rurality describes where an individual’s place of residence falls on the spectrum from urban to rural. On one end of the spectrum, rural areas are associated with poorer access to health care owing to both distance and availability. Rural areas are also associated with increased risks from environmental hazards associated with rural industries such as pesticides in farming (IOM, 2003b). On the other end, urban areas may have regions with concentrated disadvantage that expose residents to negative effects of poverty, negative psychosocial exposures, and physical decay. Cities may also expose residents to environmental hazards associated with air pollution and the safety hazards of old or densely populated buildings (IOM, 2003a). Patient urbanicity/rurality may differ in significant ways across provider urbanicity/rurality because, for example, rural patients who receive care from urban hospitals are likely to differ significantly from rural patients who receive care at rural hospitals. Importantly, provider urbanicity/rurality can only measure between-unit effects, whereas patient urbanicity/rurality can be used to assess both within- and between-unit effects. Assessing urbanicity/rurality may pose some potential measurement issues related to identifying the appropriate size to avoid misclassification (Krieger et al., 1997). For example, at the census tract level, there can be substantial variation in population and geographic size. Additionally, census tracts may be too small to capture truly rural or urban areas, misclassifying, for example, areas within a large metropolitan county as “rural” or small towns in rural areas as “urban” (Hart et al., 2005).

For the purpose of inclusion in Medicare performance measurement and payment, the urbanicity or rurality of a beneficiary’s place of residence is likely to be a more salient indicator of his or her social risk factors than a provider’s location. Because urbanicity/rurality represents a beneficiary’s residential and community context, an area-level measure based on the beneficiary’s place of residence is appropriate.

A Medicare beneficiary’s place of residence is available in Medicare administrative records and is also likely to be captured in administrative or EHR data by providers and plans. Following the principle for Medicare to first use its existing data, Medicare should use beneficiaries’ residential addresses in its administrative records. Beginning with the 2010 Census, the U.S. Census Bureau used a trichotomous measure to classify census tracts and/or census blocks (Census Bureau, 2015). Urban areas are defined as regions with 50,000 or more people, urban clusters are regions with at least 2,500 and fewer than 50,000 people, and rural characterizes all areas not included in either urban classification (Census Bureau, 2015). Because an area-level measure of urbanicity/rurality is appropriate and a trichotomous classification of census tract-/block-level urbanicity/rurality
is available through the Census Bureau, this available measure should be used based on a Medicare beneficiary’s residential address in the Medicare record.\textsuperscript{17}

**Housing**

Elements of housing that may influence health and health care outcomes include housing stability, homelessness, and quality and safety. Homelessness and housing instability, defined as a lack of access or threats to reasonable quality housing (Frederick et al., 2014), can be barriers to accessing health care and are associated with poorer physical and mental health and increased mortality (NASEM, 2016a). Poor quality or unsafe housing can expose individuals to such environmental hazards as lead, poor air quality, infectious disease, and poor sanitation, and can lead to injury (IOM, 2003b; NASEM, 2016a).

Currently neither CMS nor providers and plans routinely collect housing information. Some more comprehensive EHRs may collect or link to data on housing (e.g., Gottlieb et al., 2015; ONC, n.d.). Some area-level measures of housing are available through the American Community Survey and the U.S. Department of Housing and Urban Development (HUD). For example, American Community Survey housing data capture physical characteristics (e.g., rooms, age, access to utilities) as well as housing costs, age, and value (Census Bureau, 2013), and the HUD Healthy Communities Index captures vacancy rates, housing costs, and blood lead levels in children as an indicator of environmental hazards, and age of housing (San Diego Council of Governments, n.d.). Because some dimensions of housing reflect beneficiaries’ environment, an area-level measure could be appropriate. This measure would be based on a beneficiary’s residential address, which is collected by CMS, through EHRs, and by plans. Following the principle to first use available existing data it possesses, the residential address in the Medicare record is preferred. Thus, in the short term, the committee recommends that CMS test area-level measures of housing based on a beneficiary’s residential address in the Medicare record and contrast their performance. Because other elements of housing, in particular, physical characteristics, occur at the individual level, and these are likely to change over time, individual-level housing data could be collected through EHRs in the long term, but more research is needed on measurement and data collection methods.\textsuperscript{18}

\textsuperscript{17} See Recommendation 2 in the committee’s fourth report (NASEM, 2016c).

\textsuperscript{18} See Recommendation 5 in the committee’s fourth report (NASEM, 2016c).
Other Environmental Measures of Residential and Community Context

Environmental measures of residential and community context capture dimensions of residential environments including the physical or built environment (e.g., housing, walkability, transportation options, and proximity to services—including health care services) as well as social environments (e.g., safety and violence, social disorder, the presence of social organizations, and social cohesion). Although environmental measures are likely to be associated with health and health care outcomes, evidence is currently limited (NASEM, 2016a). For example, a growing body of literature shows that some neighborhoods have substantially fewer safe recreation spaces, purveyors of healthy foods, and health care resources, and these factors may be related to health (Blustein et al., 2010; Diez Roux and Mair, 2010). However, evidence regarding the effect of these factors on performance indicators used in VBP is still lacking. This is therefore an emerging area of research that could be reevaluated for potential inclusion as more evidence emerges. In sum, environmental measures are conceptually powerful, but this is an emerging area of research and the empirical association with health care outcomes is poorly established. Therefore, CMS should revisit such environmental measures and their appropriate measurement when more evidence is available.

Table 2-1 summarizes the preceding discussion regarding availability of data for social risk factor indicators.

GENERAL CONSIDERATIONS

Upon release of the committee’s prior reports, several questions arose about the placement of specific risk factors in the committee’s framework (in the first report) or in the discussions of data sources (in the fourth report). The committee addresses these here.

Priorities

The placement of each social risk factor indicator in Table 2-1 should not be interpreted as the committee’s preference or priority for that indicator. The committee has found compelling reasons for considering each indicator listed for inclusion in Medicare quality and measurement programs and makes no distinctions in terms of which social risk factor or indicator is “most important” from either a conceptual or empirical standpoint. The table is meant to convey “readiness” for use of any specific indicator. Data availability drives which indicator can be used now versus in the future.

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19 See Recommendation 6 in the committee’s fourth report (NASEM, 2016c).
<table>
<thead>
<tr>
<th>SOCIAL RISK FACTOR</th>
<th>DATA AVAILABILITY</th>
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<tbody>
<tr>
<td>Indicator</td>
<td>1</td>
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<tr>
<td><strong>SEP</strong></td>
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<tr>
<td>Income</td>
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<td>Education</td>
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<td>Dual eligibility</td>
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<td>Wealth</td>
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<tr>
<td><strong>Race, Ethnicity, and Cultural Context</strong></td>
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<tr>
<td>Race and ethnicity</td>
<td>2</td>
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<tr>
<td>Language</td>
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<tr>
<td>Nativity</td>
<td>3</td>
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<tr>
<td>Acculturation</td>
<td>3</td>
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<tr>
<td><strong>Gender</strong></td>
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<tr>
<td>Gender identity</td>
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<tr>
<td><strong>Social Relationships</strong></td>
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<td>Marital/partnership status</td>
<td>3</td>
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<td>Living alone</td>
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<tr>
<td><strong>Residential and Community Context</strong></td>
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<td>Neighborhood deprivation</td>
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<td>Housing</td>
<td>3</td>
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<tr>
<td>Other environmental measures</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Available for use now
2. Available for use now for some outcomes, but research needed for improved, future use
3. Not sufficiently available now; research needed for improved, future use
4. Research needed to better understand relationship with health care outcomes and on how to best collect data
Those ready to be used now might not be the indicators that will be most meaningful in the future, once CMS resolves measurement issues and conducts relevant empirical work.

For example, dual eligibility data are available for use in the short and long term. However, their availability do not reflect whether dual eligibility is a better indicator of SEP compared to individual income, wealth, or education. Conceptually, dual eligibility is a very imperfect proxy of SEP, compared to individual income, wealth, or education for reasons detailed earlier in the chapter. However, its predictive power for any given performance indicator used in VBP in a model that accounts for social risk factors in Medicare quality measurement and payment relative to the predictive power of other indicators of SEP is an empirical question that is beyond the scope of the committee’s task. For example, to determine the extent to which adjustment for dual eligibility accounts for the adjustment that would occur with a broader set of social risk factors not limited to dual eligibility, CMS could compare the variance in scores and payments from a fully adjusted model to the variance of adjustments from a model adjusting only for dual eligibility. If the difference is substantial, accounting for dual eligibility as a sole social risk factor may not be sufficient.

Similarly, lack of data does not indicate low priority. Just as some indicators are available, but have conceptual weaknesses, some indicators are conceptually powerful, but there is currently insufficient evidence of their effect on performance indicators used in VBP. Sexual orientation and gender identity provide another example. Theory suggests that sexual orientation and gender identity may contribute to health disparities experienced by Medicare beneficiaries who identify as gender or sexual minorities (IOM, 2011; NASEM, 2016a,b). However, although there are best practices for collecting data on gender identity and sexual orientation, there are no standards (NASEM, 2016c). Consequently, there remains little information on the effect of sexual orientation and gender identity on performance indicators used in VBP. This is, however, a rapidly evolving area of research. For example, the ONC included capacity to collect sexual orientation and gender identity in EHRs in its stage 3 meaningful use regulations set to begin in 2017 (CMS, 2015b). In October 2016, the National Institutes of Health designated gender and sexual minorities as a disparity population for research purposes (Perez-Stable, 2016). These and other policies may catalyze more research to provide evidence of an empirical association that supports the conceptual relationship between sexual orientation and gender identity and performance indicators used in VBP. Sexual orientation and gender identity questions are also included in some national health surveys (e.g., Behavioral Risk Factor Surveillance System, National Health and Nutrition Examination Survey, National Health Interview Survey) (CDC, 2013, 2015, 2016), and data from these surveys could
be used to examine the effect of sexual orientation and gender identity on indicators of health care use, health care outcomes, and health care costs. The committee recommended that, as such evidence emerges, CMS should revisit inclusion of these indicators in Medicare quality measurement and payment programs.

**Health Literacy**

In addition to the five domains of social risk factors, the committee also considered the influence of health literacy on performance indicators used in Medicare VBP, because it is specifically mentioned in the committee’s task. It is also included in the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, and thus is of interest to Congress. Health literacy is “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (IOM, 2004, p. 23). The committee does not consider health literacy to be a social risk factor, but rather a more proximal risk factor that is influenced by (more distal) social risk factors. Specifically, health literacy can be considered the product of an individual’s skills and abilities (including reading and other critical skills), sociocultural factors, education, health system demands, and the health care context (IOM, 2004). Exclusion of health literacy as a social risk factor and exclusion in the discussions of data sources should not be interpreted as a lack of appreciation for the contribution of health literacy to health and health care outcomes.

**Disability**

The committee considers disability to be a proximal risk factor for poor health care outcomes that is influenced by more distal social risk factors, somewhat like health literacy. The committee recognizes that disability is in part socially determined (IOM, 2007). The World Health Organization’s *International Classification of Functioning, Disability, and Health*, advocated in the 2007 IOM report *The Future of Disability in America* conceives of disability not as an inherent attribute of individuals, but rather the product of individual capacities (health conditions) and social conditions (including social and physical environments) (IOM, 2007; WHO, 2001). Thus, disability may arise in part from social risk factors. Additionally, disability may be a risk factor itself for poor health care outcomes (ODPHP, 2016a). In this conception, disability is not itself a distal social risk factor like SEP, race and ethnicity, gender, social relationships, or residential environments, but rather a mediator of social (and clinical) risk factors and health care outcomes.
Some Medicare beneficiaries with disabilities are systematically different from persons with disabilities more generally and from beneficiaries who qualify because of age. Specifically, to qualify for federal disability benefits, a person must have a clinical condition severe enough to prevent that person from completing substantial gainful activity, regardless of age, education, or work experience (SSA, 2008). Persons who qualify for Social Security disability benefits are eligible for Medicare after a waiting period. In other words, individuals eligible for Medicare on the basis of disability rather than age are by definition persons with certain clinical risk factors or diagnoses who also have at least one social risk factor such as low earnings. Some clinical risk adjustment systems currently include disability as an origin of Medicare entitlement (CMS, 2016c; MedPAC, 2016). Additionally, the clinical risk factors that entitle an individual to Medicare benefits are captured in existing clinical risk adjustments for Medicare VBP programs through major clinical diagnoses associated with disability, such as stroke, schizophrenia, or multiple sclerosis. Similarly, as part of the eligibility criteria, low earnings and inability to work define a beneficiary’s classification as disabled. These and other social risk factors are likely to also contribute to health disparities in beneficiaries with disabilities experience. For example, Medicare beneficiaries under age 65 are more likely to be black or Hispanic than beneficiaries who qualify because of age (Cubanski et al., 2016). Thus, accounting for social risk factors could capture additional risk that is unmeasured by clinical risk factors not currently accounted for in Medicare payment programs, and which contributes to disparities among beneficiaries with disabilities.

The committee acknowledges that the Medicare population is heterogeneous (even among beneficiaries with disabilities and among beneficiaries age 65 and older) and notes that its conceptual framework applies to all Medicare beneficiaries, including those with disabilities. The committee expects the effect of social risk factors to be similar for all Medicare subpopulations and variations in the effect of social risk factors are considered to fall within a continuous spectrum of effects. The committee found no evidence that social risk factors operate differently (i.e., no interactions or effect measure modification) among Medicare beneficiaries with disabilities compared to those without. To the extent that clinical risk adjustment captures clinical elements of disability and accounting for social risk factors captures social elements of disability, disability will be partially if not substantially captured in VBP quality measurement and payment.

Finally, the committee acknowledges that disability can be differentiated from some clinical risk factors for poor health outcomes or other health problems because of increased stigma. However, the committee notes that many health problems have social correlates. Indeed, many clinical and behavioral diagnoses—for example, mental health and substance use
disorders, sexually transmitted infections, and obesity—are also stigmatized. At the same time, stigma as a social correlate of disability is likely to affect this Medicare subpopulation’s ability to access and receive high-quality care, and could contribute to health disparities and poor health care outcomes of beneficiaries with disabilities (Corrigan, 2014). Persons with disabilities experience health and health care disparities, and these may arise from discrimination and stigma, as well as physical barriers (such as inaccessible medical equipment and health care facilities) and communications barriers (such as inadequate materials in Braille or large-print and lack of access to sign-language interpreters) that result from inadequate tailoring (Iezzoni, 2011; Krahn et al, 2015; ODPHP, 2016b). These types of barriers are consequences of the quality of care and therefore are not appropriate adjustors because they reflect true differences in quality. Accounting for these differences such as through risk adjustment would obscure these quality differences and reduce incentives to improve quality and reduce disparities.

REFERENCES


Methods to Account for Social Risk Factors

This chapter returns to the methods of accounting for social risk factors and discusses in more detail how the various methods, individually and together, might be leveraged to help the Centers for Medicare & Medicaid Services (CMS) attain its goals for value-based payment (VBP) relative to the status quo, which generally does not account for social risk factors. The committee’s approach takes as a point of departure the aim to achieve four policy goals:

1. Reducing disparities in access, quality, and outcomes;
2. Quality improvement and efficient care delivery for all patients;
3. Fair and accurate reporting; and
4. Compensating providers fairly.

Arguments in support of accounting for social risk factors in VBP are frequently framed in terms of fairness to providers in performance measurement and payment. Although these are direct policy goals of the 10 methods to account for social risk factors the committee identified in its third report, they are but intermediary goals and means of achieving what the committee views as the indirect, but principal, goals of any approach to accounting for social risk factors—reducing disparities in access, quality, and outcomes and improving quality and efficient care delivery for all patients. In other words, this series of reports aims to inform health care payers and administrators. However, the committee recognized throughout their deliberations that accounting for social risk factors is a technical exercise that can influence the lives of real Medicare beneficiaries, especially those with social risk factors.
Any approach to accounting for social risk factors (including the status quo) will achieve important policy goals but could also have unintended consequences. The committee identified five categories of potential unintended consequences:

1. Avoiding patients with social risk factors
2. Reducing incentives to improve the quality of care for patients or enrollees with social risk factors
3. Underpayment to providers disproportionately serving socially at-risk populations
4. Negative symbolic value: Perceptions of different standards for different populations
5. Obscuring disparities

This chapter begins with a review of the methods CMS could use to account for social risk factors. The committee reviewed literature on a range of methods to account for social risk factors in quality measurement and payment, with the aim to be more inclusive. In its third report (NASEM, 2016a), the committee identified 10 methods in four categories that could be used individually or in combination to account for social risk factors. These categories are

A. Stratified public reporting;
B. Adjustment of performance measure scores;
C. Direct adjustment of payment; and
D. Restructuring payment incentive design.

Three categories of methods—stratified public reporting, adjustment of performance scores, and direct adjustments of payment—build on the existing payment system. Only restructuring incentive design presents entirely new approaches.

In this report, the committee provides specific examples and methods for accounting for social risk factors. In doing so, the committee underscoring the differences in the goals of each approach that guide their applications. For example, the goal of stratified public reporting is to allow a decision maker (e.g., patient) to observe and act on differences in performance for different types of patients. In this context, CMS will have to consider both the reliability of stratified estimates along with what strata are meaningful to patients in order to support informed decision making. Adjustment of performance measure scores, like stratified reporting, affects what patients observe about the performance of a provider or health plan and CMS. On their own (that is, without stratified data), adjusted scores by definition send a single performance signal that accounts for differences
in the mix of patients served but does not make disparities apparent. In contrast, adjusting payment algorithms (through either the third or fourth category of methods) is intended to alter the incentives for the plan or provider directly. The reliability of those measures will affect the balance of incentives and risk inherent in the payment formula: noisy measures impose risk and diminish the returns to improvement efforts.

In its third report (NASEM, 2016a), the committee identified certain advantages and disadvantages for each of the 10 methods (see Table C4-1 in Appendix C). In this report, the committee aligns the advantages with its four policy goals and the disadvantages with the five unintended consequences. In addition, the committee describes how the four categories of methods could be used to achieve the four policy goals, as well as the potential unintended consequences that could result from any method. The trade-offs between policy goals attained and potential unintended consequences should be carefully considered, and, as the committee concluded, any approach should seek to minimize potential unintended consequences, especially those to patients with social risk factors (NASEM, 2016a).1

Thus, the chapter also discusses how CMS could mitigate potential unintended consequences. Finally, any approach to accounting for social risk factors will interact with the underlying incentive design to achieve certain policy goals or produce certain adverse consequences. As the committee concluded, strategies to account for social risk factors for measures of cost and efficiency may differ from strategies for quality measurement, because observed lower resource use may reflect unmet need rather than the absence of waste, and thus lower cost is not always better, while higher quality is always better (NASEM, 2016a).2

Thus, the committee believes that the policy goals achieved and negative consequences that any approach to accounting for social risk factors produces need to be considered for each specific VBP program. To illustrate how CMS might select and combine methods and the benefits and harms that may result from those combinations, the committee presents an example, the Hospital Readmissions Reduction Program (HRRP). The categories of methods, the committee’s policy goals, and the potential unintended consequences are described comprehensively in Appendix C.

A. STRATIFIED PUBLIC REPORTING

Public reporting aims to make quality of care and outcomes visible to consumers, providers, payers, and regulators (IOM, 2007). Provision of quality information to these stakeholders can lead to quality improve-

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1 See Conclusion 4 in the committee’s third report (NASEM, 2016a).
2 See Conclusion 7 in the committee’s third report (NASEM, 2016a).
ment for all beneficiaries through reputational incentives and by increasing market share (i.e., influencing beneficiaries’ choice of provider or plan) for reporting units (e.g., the provider, plan, physician group) with higher performance, especially when linked to behavioral nudges (IOM, 2007). Stratified public reporting provides this information for specific subgroups. To account for social risk factors in Medicare payment, provider and plan performance could be stratified by reporting unit characteristics (e.g., safety-net hospitals, minority-serving institutions, providers with a similar share of patients with social risk factors) or by patient characteristics within reporting units (i.e., by social risk factor) (Casalino et al., 2007; Martino et al., 2013; MedPAC, 2013; NQF, 2014; Price et al., 2015). Such stratified public reporting could lead not only to quality improvement (through similar mechanisms as for publicly reported overall performance), but also to disparities reduction. Just as overall performance can lead to quality improvement for all beneficiaries, publicly reported performance scores stratified by social risk factors could influence beneficiaries’ choice of provider or plan by allowing patients with social risk factors to see which providers or plans provide the best care for patients like them. Similarly, such stratified reporting gives providers and plans reputational incentives to reduce disparities within their organizations. Stratified public reporting by patient characteristics within reporting units could also increase fairness and accuracy in public reporting by allowing “apples to apples” comparison—for example, by comparing performance for low-income patients across different hospitals. Similarly, stratification by reporting unit characteristics allows comparisons to be made within peer groups (e.g., among safety-net providers), who may have differing abilities to achieve targets or improve performance owing to differences in the social composition of their patients and to resource constraints.

Comparisons based on stratified data could also help lower-performing providers and plans to identify top-performing peers and learn from their practices to reduce disparities and improve quality and efficiency. Because public reporting with stratification by patient characteristics is the only method that presents information on subpopulations and can therefore highlight any disparities that may exist, it is also the only category of methods that would allow CMS to monitor disparities. Thus, if monitoring disparities is an important policy goal, any approach to account for social risk factors must include public reporting stratified by patient characteristics within reporting units.

Although stratified reporting can help achieve the goals of reducing disparities for patients with social risk factors, quality improvement and efficient care delivery for all patients, and fair and accurate public reporting, it does not influence provider compensation. Additionally, a potential unintended consequence of the method is that stratification could create
the perception that different patients are entitled to different standards of care. This risk is expected to be minimal when stratifying by patient characteristics within reporting units, because comparisons typically compare performance across different strata (e.g., performance for black patients compared to whites), which tends to highlight disparities. The risk may be slightly greater when stratifying by reporting unit, because comparisons typically compare performance between different reporting units within the same strata (e.g., safety-net hospital to safety-net hospital), which could lead to the perception that certain types of providers are held to lower standards of care. Moreover, stratification by reporting unit characteristics does not reveal differences within units (such as those attributable to patient characteristics or quality of care). Notably, public reporting of unadjusted performance data stratified on reporting unit characteristics but not on patient characteristics does eliminate the incentive for providers to avoid high-risk patients in order to increase their apparent performance.

Finally, practical limitations of stratification may include small sample sizes, which may limit precision. These are limitations of all the methods the committee identified, but are more severe for stratification. However, methods exist to address these limitations—for example, aggregating across multiple years and suppressing estimates with insufficient sample size or reliability. Because subgroups are concentrated in a small subset of providers and because some providers have low volumes of patients, it may only be possible to report the quality of care for certain subgroups for a subset of all Medicare plans/providers, but those providers/plans are likely to contain nearly all of Medicare beneficiaries from that subpopulation (CMS, 2016a).

B. ADJUSTING PERFORMANCE MEASURE SCORES

Adjusting performance measure scores aims to estimate the true quality of reporting units (i.e., the quality a reporting unit would have if all units had the population average patient). In other words, such adjustment aims to statistically minimize the effect of factors that may independently influence performance indicators used in VBP, such as social risk factors that make it difficult for providers disproportionately serving socially at-risk populations to improve or achieve performance benchmarks under the status quo (which does not take these factors into account). Adjustment of performance measure scores can be done for the average disparity within a provider or plan, the average disparity between providers and plans, or both. (Note, the provider or plan refers to the reporting unit so, for example, if the reporting unit is at the hospital level, differences between doctors within a hospital remain within a provider.) Differences within providers or plans are stronger evidence of the effect of social risk factors on performance indicators than differences between
providers or plans, because such between-provider or between-plan differences could reflect the unmeasured influence of the provider or plan (i.e., true differences in quality) (Elliott et al., 2001; Jha and Zaslavsky, 2014; Zaslavsky et al., 2001). Thus, adjustment for within-provider and within-plan differences avoids adjusting for quality differences. Such within-provider and within-plan adjustment would result in more accurate performance measurement, which could better focus behavioral nudges into better providers or plans to reduce disparities and improve quality. Additionally, because social risk factors should no longer have substantial influence on performance measure scores, accurate adjustment would reduce incentives to avoid patients with social risk factors.

Under the status quo, which does not generally account for social risk factors, it is more difficult on average for providers and plans disproportionately serving socially at-risk patients to achieve performance targets owing to the influence of social risk factors. Although incentives to improve care under the status quo may be diminished when performance measure scores are adjusted for within-provider differences, this incentive reflects a disadvantage of these providers under the status quo (the greater average difficulty and greater resources needed to achieve benchmarks) rather than a benefit of not including social risk factors in the existing VBP.

Incorrect adjustment of performance measure scores could also produce several potential unintended consequences. For example, whereas adjusting for within-provider differences accounts for differences between subpopulations within a provider (e.g., subgroups with high and low levels of social risk factors) and is more likely to capture differences arising from patient characteristics, adjusting for between-provider or between-plan differences may result in incorrectly measuring provider performance. This mismeasurement may occur because adjusting for between-provider differences effectively assumes that patients with social risk factors receive care from providers of the same quality as do patients without social risk factors. However, evidence suggests that providers disproportionately serving socially at-risk populations may provide lower-quality care compared to hospitals serving the general population (NASEM, 2016b). Thus, observed differences in quality and outcomes by social risk factors measured at the provider or plan level may capture both differences in patient characteristics as well as an unmeasured influence of a provider or plan characteristics linked to overall quality (such as true differences in quality). By conflating differences owing to social risk factors and true differences in quality, adjusting for between-provider differences would remove incentives to improve care, especially for patients with social risk factors. The risk is greater for threshold-based incentives; incentive schemes with continuous reward functions (e.g., paying for improvement) are less subject to this concern. This is a serious disadvantage that CMS would want to consider care-
fully. Nevertheless, addressing between-provider differences in quality of care is an important part of improving health equity. Improving quality measurement and restructuring incentives may help reduce such disparities, but other policy initiatives may be required in addition.

Importantly, any effects of adjusting performance measure scores on payment are indirect—meaning, they do not affect provider compensation unless payment is adjusted based on performance scores. Additionally, effects on payment require consideration of the particular payment strategy. If the incentive payment is based on adjusted performance scores, this could increase resources to providers serving socially at-risk populations, which these providers could invest in strategies to improve quality of care for all patients and to reduce disparities. Finally, although adjusting performance measure scores for within-provider differences creates an estimate of the average disparity within providers, neither the magnitude of this disparity nor subgroup performance are apparent in the publicly reported performance scores. Even if both adjusted and unadjusted performance scores are publicly reported, only whether a provider is doing better or worse relative to the average disparity is visible. Thus, adjusting performance measure scores does not make disparities visible unless performance scores stratified on patient characteristics within reporting units are also publicly reported.

C. DIRECT ADJUSTMENT OF PAYMENT

Direct adjustment of payment refers to any adjustments in payment that by themselves do not affect performance measure scores. This could be done by adjusting the payment formula for social risk factors directly (without adjusting performance measures) (CMS, 2015b) or by setting different benchmarks for payment for different strata of social risk factors (Damberg et al., 2015). By accounting for the increased resources (i.e., estimated costs) needed to care for socially at-risk populations, directly adjusting payments avoids unintentionally redistributing resources away from (i.e., underpaying) providers who serve patients with social risk factors and reduce incentives to avoid these patients. More favorable allocation of resources to these providers would increase their resources (Damberg et al., 2015), which they could invest in reducing disparities and improving quality and efficiency. However, if the payment formula is adjusted directly, providers could be awarded despite poor performance or poor outcomes, which would reduce incentives to improve care. Finally, because directly adjusting payments does not affect publicly reported measures, this method does not improve the accuracy of performance scores. Therefore, adjustments of payments do not make disparities visible unless this method is coupled with public reporting stratified by patient characteristics within reporting units. Relatedly, if payment is directly adjusted, but performance
is still reported without adjustment, then there could be incentives to avoid patients with social risk factors.

D. RESTRUCTURING PAYMENT INCENTIVE DESIGN

Restructured payment incentive designs do not explicitly incorporate measures of social risk factors, but they do implicitly account for them. In so doing, like directly adjusting for payment, this implicit adjustment accounts for the increased resources needed to care for socially at-risk populations and therefore avoids unintentionally underpaying providers who serve these populations and reduces incentives to avoid patients with social risk factors. Payment incentives can be restructured in several ways. For example, in addition to other rewards and penalties, providers and plans could receive a bonus for having low disparities (Blustein et al., 2011; Casalino et al., 2007). This has the obvious advantage of directly incentivizing disparities reduction. Similarly, providers and plans could receive a bonus for improving quality and efficiency relative to their own benchmark (i.e., paying for improvement) (Casalino et al., 2007; Rosenthal et al., 2004). This would directly incentivize quality improvement and efficiency, but may also reward providers at lower levels of absolute performance. Like directly adjusting payments, restructuring payment incentive design does not affect publicly reported measures and therefore does not improve the accuracy of performance scores. Restructuring incentive design does not make disparities visible unless it is combined with public reporting stratified by patient characteristics within reporting units.

Comprehensive descriptions of the 10 methods, as well as their advantages and disadvantages can be found in Table C4-1 in Appendix C. Table 3-1 summarizes how different categories of methods to account for social risk factors might achieve the committee’s four policy goals. Table 3-2 summarizes how different categories of methods might result in unintended consequences. These tables capture the primary effects of the different methods on policy goals and adverse consequences. Just as any approach will interact with the underlying incentive design, any method to account for social risk factors may interact with other methods when used in combination. In many cases, combinations of methods may help mitigate the risks of any method alone.

GENERAL CONSIDERATIONS FOR MITIGATING UNINTENDED CONSEQUENCES

Approaches that promote equity will tend to reduce disparities in outcomes related to access and quality of care for patient populations between socially disadvantaged versus advantaged populations. As the
committee concluded, any specific approach to accounting for social risk factors requires continuous monitoring with respect to its four policy goals (NASEM, 2016a).³ VBP programs may also risk creating perverse incentives, such as incentives to underdeliver care for patients with social risk factors or to otherwise reduce the provision of beneficial care. These adverse consequences undercut the fundamental objective of equitable health care. Therefore, as the committee concluded, it is also important to minimize potential unintended adverse consequences to patients with social risk factors and to monitor the effect of any specific approach to accounting for social risk factors to ensure the absence of any unanticipated adverse effects on health disparities (NASEM, 2016a).⁴

The committee takes this opportunity to expand on two potential unintended consequences about which some opponents of accounting for social risk factors have raised particular concerns: reducing incentives to improve care for patients with social risk factors and for patients overall, and obscuring disparities. In particular, the committee suggests how these unintended consequences might be mitigated.

Some opponents of accounting for social risk factors worry that by making it easier for providers and plans to reach performance targets or rewarding them at lower levels of absolute performance, accounting for social risk factors may remove incentives to improve quality and efficiency (in particular, to exceed benchmarks) for patients with social risk factors (Bernheim, 2014; Jha and Zaslavsky, 2014; Kertesz, 2014; Krumholz and Bernheim, 2014; O’Kane, 2015). This concern arises from the fact that there is substantial variation in performance among providers and plans disproportionately serving socially at-risk populations, and yet there is evidence that it is possible to provide optimal care and achieve quality benchmarks for socially at-risk populations (NASEM, 2016b). The committee emphasizes that the fact that some providers do well with socially at-risk populations does not mean that it is not more difficult to do so on average. This greater average difficulty arises from the fact that provider actions may be insufficient to overcome the influence of social risk factors on performance indicators used in VBP. Additionally, improving quality of care and achieving good outcomes (i.e., quality benchmarks) for patients with social risk factors may require greater costs, time, and effort compared to doing so for more advantaged populations. Thus, the standard for taking social risk factors into account should not be that it is impossible to provide optimal care, but that it is more difficult and more costly on average. Accounting for social risk factors in quality measurement and payment can be seen as accounting for this greater average difficulty and greater average

³ See Conclusion 9 in the committee’s third report (NASEM, 2016a).
⁴ See Conclusion 4 in the committee’s third report (NASEM, 2016a).
### TABLE 3-1 Policy Goals of Methods to Account for Social Risk Factors

<table>
<thead>
<tr>
<th>Methods to Account for Social Risk Factors</th>
<th>POLICY GOALS</th>
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<tr>
<td></td>
<td>Reducing Disparities in Access, Quality, and Outcomes for Patients with Social Risk Factors</td>
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<tr>
<td></td>
<td>Quality Improvement and Efficient Care Delivery for All Patients</td>
</tr>
<tr>
<td>(A) Stratified public reporting</td>
<td>May influence socially at-risk patients’ choice of provider or plan by showing which providers/plans provide the best care for patients like them.</td>
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<td></td>
<td>May encourage providers and plans to improve the quality of care for socially at-risk populations via reputational incentives.</td>
</tr>
<tr>
<td>(B) Adjustment of performance measure scores</td>
<td>If the incentive payment is based on adjusted performance scores, this could increase resources to providers serving socially at-risk populations to invest in reducing disparities.</td>
</tr>
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<td></td>
<td>If the incentive payment is based on adjusted performance scores, this could increase resources to providers to invest in improving quality and efficiency for all patients.</td>
</tr>
<tr>
<td>(C) Direct adjustment of payment</td>
<td>Differentially rewarding improvement in care (e.g., rewards based on different benchmarks for different subpopulations) allows resources to be allocated in a way that is favorable to providers serving socially at-risk populations. This could increase resources to providers serving socially at-risk populations to invest in reducing disparities.</td>
</tr>
<tr>
<td></td>
<td>Differentially rewarding improvement in care (e.g., rewards based on different benchmarks for different subpopulations) allows resources to be allocated in a way that is favorable to providers serving socially at-risk populations. This could increase resources to providers serving socially at-risk populations to invest in improving quality and efficiency for all patients.</td>
</tr>
<tr>
<td>(D) Restructuring payment incentive design</td>
<td>Incentives can be designed explicitly to encourage this. For example, in addition to other rewards and penalties, providers and plans could receive a bonus for high performance or improvement in performance for subgroups with high levels of social risk factors.</td>
</tr>
<tr>
<td></td>
<td>Incentives can be designed explicitly to encourage this. For example, providers and plans could receive a bonus for improving quality relative to their own benchmark.</td>
</tr>
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**NOTE:** This table pertains to alternative methods to account for social risk factors in Medicare payment. It does not capture the policy goals achieved under the status quo (which generally does not account for social risk factors). Disadvantages of the status quo are described in detail in Chapter 1. This table assumes the base payments to providers and plans are adequate.
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<tr>
<td>Reporting by strata allows “apples to apples” comparisons within strata (e.g., comparing safety-net hospitals to other safety-net hospitals; comparing performance for low-income patients between reporting units). This may be weaker for stratification by reporting unit characteristics (e.g., safety-net hospitals), which can confuse differences associated with patient-specific barriers with differences in the capabilities of the reporting units and thus may or may not result in improved fairness.</td>
<td>If payment is based on strata comparisons, could fairly reward high-performing providers within strata, but would not directly lead to fair compensation between providers in different strata.</td>
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<td>Compared to unadjusted scores, adjustment allows CMS to remove the influence of certain phenomena (e.g., societal-level disparities in quality) from comparisons of performance between providers who predominantly serve populations with social risk factors compared to those who generally do not.</td>
<td>If payment is based on adjusted performance scores, this method could fairly compensate providers for their direct contribution towards performance rather than unadjusted scores that can be influenced by the independent contribution of social risk factors.</td>
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<tr>
<td>No. This method does not affect publicly reported measures.</td>
<td>By accounting for the increased resources needed to care for patients with social risk factors in the payment, this avoids unintentionally redistributing resources away from providers who serve socially at-risk populations.</td>
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<tr>
<td>No. This method does not affect publicly reported measures.</td>
<td>By implicitly accounting for the increased resources needed to care for patients with social risk factors in the payment, this avoids unintentionally redistributing resources away from providers who serve socially at-risk populations.</td>
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TABLE 3-2 Potential Unintended Consequences of Methods to Account for Social Risk Factors

<table>
<thead>
<tr>
<th>Methods to Account for Social Risk Factors</th>
<th>POTENTIAL UNINTENDED CONSEQUENCES</th>
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<tbody>
<tr>
<td></td>
<td>Reducing Incentives to Improve the Quality of Care for Patients or Enrollees with Social Risk Factors</td>
</tr>
<tr>
<td>(A) Stratified public reporting</td>
<td>Avoiding Patients with Social Risk Factors</td>
</tr>
<tr>
<td></td>
<td>No.</td>
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<td></td>
<td>No.</td>
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<tr>
<td>(B) Adjustment of performance measure scores</td>
<td>No, if adjustment is adequate to account for the greater average difficulty of achieving performance benchmarks for socially at-risk populations compared to more advantaged patients.</td>
</tr>
<tr>
<td></td>
<td>Adjustment for within-provider differences may diminish incentives to improve care for providers disproportionately serving socially at-risk populations that reflect their disadvantage (greater average difficulty and greater resources needed to achieve performance targets) under the status quo.</td>
</tr>
<tr>
<td></td>
<td>Risk is greater for adjustment for between-provider differences, which may incorrectly measure provider quality by conflating differences arising from patient characteristics and provider characteristics (including differences in quality).</td>
</tr>
<tr>
<td>(C) Direct adjustment of payment</td>
<td>No, if adjusted incentive payment is adequate to account for the greater resources needed to achieve performance benchmarks for socially at-risk populations compared to more advantaged patients.</td>
</tr>
<tr>
<td></td>
<td>No, if adjusted incentive payment is adequate to account for the greater resources needed to achieve performance benchmarks for socially at-risk populations compared to more advantaged patients.</td>
</tr>
<tr>
<td>Methods to Account for Social Risk Factors</td>
<td>Potential Unintended Consequences</td>
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<tr>
<td>------------------------------------------</td>
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</tr>
<tr>
<td>Avoiding Patients with Social Risk Factors</td>
<td>Reducing Incentives to Improve the Quality of Care for Patients or Enrollees with Social Risk Factors</td>
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<tr>
<td>Stratified public reporting</td>
<td>No. No.</td>
</tr>
<tr>
<td>Adjustment of performance measure scores</td>
<td>No, if adjustment is adequate to account for the greater average difficulty of achieving performance benchmarks for socially at-risk populations compared to more advantaged patients.</td>
</tr>
<tr>
<td>Adjustment for within-provider differences</td>
<td>Adjustment for within-provider differences may diminish incentives to improve care for providers disproportionately serving socially at-risk populations that reflect their disadvantage (greater average difficulty and greater resources needed to achieve performance targets) under the status quo.</td>
</tr>
<tr>
<td>Risk is greater for adjustment for between-provider differences, which may incorrectly measure provider quality by conflating differences arising from patient characteristics and provider characteristics (including differences in quality).</td>
<td></td>
</tr>
<tr>
<td>Direct adjustment of payment</td>
<td>No, if adjusted incentive payment is adequate to account for the greater resources needed to achieve performance benchmarks for socially at-risk populations compared to more advantaged patients.</td>
</tr>
<tr>
<td>No, unless payment is based on adjusted performance scores. Note, adjustment for risk factors alone would not address underpayment that would result if payment for performance were still based on unadjusted measures.</td>
<td>Risk is low for adjustment of patient characteristics and within-provider differences.</td>
</tr>
<tr>
<td>Risk is greater for adjustment of between-provider differences, which may conflate differences arising from patient characteristics and provider characteristics (including differences in quality).</td>
<td></td>
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<tr>
<td>This method does not make disparities visible unless stratified unadjusted scores are also publicly reported.</td>
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No, if adjusted incentive payment is adequate to account for the greater resources needed to achieve performance benchmarks for socially at-risk populations compared to more advantaged patients. No. No. This method does not affect publicly reported measures.
cost to improve quality and achieve performance benchmarks for patients with social risk factors. The committee recognizes that certain methods may diminish (but not entirely remove) incentives to improve quality and reduce disparities, but the committee also suggests that any approach should be sure to include sufficient incentive for quality improvement overall, as well as for socially at-risk populations. As described in prior sections, **achieving this might require a combination of reporting and payment methods.** Critics of adjustment are also concerned that accounting for social risk factors would obscure differences that arise from poor quality care (Krumholz and Bernheim, 2014). It is true that a risk of some methods to account for social risk factors is the perception of different standards for different populations, which could have negative symbolic value, as described above. As intimated earlier, this may be due to the fact that variation in performance arises through multiple mechanisms, including not only the influence of social risk factors, but potentially genuine differences in the quality of care provided. Approaches that adjust for and report by patient characteristics and within-provider differences are less subject to this concern than approaches that adjust for and report by provider characteristics. At the same time, the committee emphasizes that its approach to accounting

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5 See Recommendation 6 in the committee’s third report (NASEM, 2016a).
Methods to Account for Social Risk Factors

POTENTIAL UNINTENDED CONSEQUENCES

Avoiding Patients with Social Risk Factors

Reducing Incentives to Improve the Quality of Care for Patients or Enrollees with Social Risk Factors

Restructuring payment incentive design

No, if incentives are appropriately structured to account for the greater average difficulty and greater resources needed to achieve performance benchmarks for socially at-risk populations compared to more advantaged patients.

Incentives could be explicitly structured to increase such incentives. For example, in addition to other rewards and penalties, providers and plans could receive a bonus for high performance or improvement in performance for subgroups with high levels of social risk factors.

NOTE: This table pertains to alternative methods to account for social risk factors in Medicare payment. It does not capture the potential unintended consequences of the status quo (which generally does not account for social risk factors). Disadvantages of the status quo are described in detail in Chapter 1. This table assumes the base payments to providers and plans are adequate.

<table>
<thead>
<tr>
<th>Underpayment to Providers</th>
<th>Negative Symbolic Value: Perceptions of Different Standards for Different Populations</th>
<th>Obscuring Disparities</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, if incentives are appropriately structured to account for the greater average difficulty and greater resources needed to achieve performance benchmarks for socially at-risk populations compared to more advantaged patients.</td>
<td>No.</td>
<td>No. This method does not affect publicly reported measures.</td>
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for social risk factors is not intended to obscure disparities that do exist and in fact seeks to reveal disparities by social risk factor. For this reason, the committee reiterates that, if CMS's goals for VBP include monitoring and reducing disparities, because only public reporting stratified by patient characteristics within reporting units makes disparities visible by providing quality information for different subgroups, stratified public reporting must be part of any approach to improve on the status quo.

Conclusion: The committee supports four goals of accounting for social risk factors in Medicare payment programs: reducing disparities in access, quality and outcomes; improving quality and efficient care delivery for all patients; fair and accurate reporting; and compensating health plans and providers fairly. These goals would best be achieved through payment based on performance measure scores adjusted for social risk factors (or adjusting payment directly for these risk factors) when combined with public reporting stratified by patient characteristics within reporting units.

The committee notes that some restructuring of payment formulas may still be needed to ensure that there are sufficient incentives for health plans and providers to improve access, quality, and outcomes for groups that are
disadvantaged by high levels of social risk factors. Payment formulas that incentivize improving care for socially at-risk individuals and communities may include paying for performance or change in performance for subgroups with high levels of social risk factors. Furthermore, improving health equity may require both accounting for social risk factors in payment and quality improvement interventions.

HOSPITAL READMISSIONS REDUCTION PROGRAM EXAMPLES

The HRRP requires CMS to reduce a share of the base operating payments to acute care hospitals paid under the Inpatient Prospective Payment System that have the highest readmission rates (CMS, 2016b). CMS implemented the HRRP beginning in fiscal year (FY) 2013 (October 1, 2012). Currently, the program calculates excess readmissions for six conditions: acute myocardial infarction, heart failure, pneumonia, chronic obstructive pulmonary disease, total hip arthroplasty or total knee arthroplasty, and coronary artery bypass graft surgery. To calculate the payment reduction, CMS first calculates a hospital’s excess readmissions. The algorithm used to calculate excess readmissions captures an individual hospital’s performance compared to that of hospitals nationally over a 3-year performance period. The excess readmission measure is then risk adjusted using a methodology endorsed by the National Quality Forum (NQF) to account for differences in patient characteristics; factors currently included in the adjustment include certain demographic characteristics, clinical comorbidities, and patient frailty (NQF, 2014). CMS also accounts for planned readmissions. CMS then uses the adjusted excess readmissions measure to calculate the payment adjustment. For FY 2017, the maximum reduction is 3 percent. According to a Kaiser Family Foundation analysis of CMS data, in FY 2017, based on performance for the period of July 2012 through June 2015, more than half of hospitals nationwide will be penalized under the HRRP (Rau, 2016). The average hospital penalty among penalized hospitals is estimated to be –0.73 percent, totaling approximately $528 million (Rau, 2016).

As described in prior sections, CMS has several options to account for social risk factors (in addition to the existing risk adjustment): (A) stratified public reporting; (B) adjustment of performance measure scores; (C) direct adjustment of payment; and (D) restructuring payment incentive design. One overarching caveat for the following examples is that the committee assumes the social risk factor indicators adopted by any method are measured reliably and with sufficient precision to allow for meaningful applications.
A. Stratified Public Reporting in the HRRP

For the HRRP, stratified public reporting could involve showing readmission rates separately for patients who identify as white, black, Hispanic, or other racial and ethnic groups. In principle, such stratification could be done with any discrete categories of social risk factors including those created from continuous measures such as income (e.g., patients with incomes above and below the median of the observed distribution of all relevant patients). There would be a logical limit to how many strata could be reported and sample-size considerations would also apply.

Stratified reporting would show the public (who now see only a single clinically adjusted rate for a hospital’s overall performance) two important pieces of information: the different composition of patients across hospitals and the readmission rates for the groups shown. It would be possible to see how big the disparities are on average, whether they always exist, and whether a particular institution does better with some groups than others and by how much.

Stratified data will help all patient groups select hospitals with the best readmission rates for someone in their group. They can also help hospitals find peers who perform better for patients with high social risk factors from which the hospitals could learn better practices. Last but not least, stratified public reporting of hospital readmissions would allow CMS to track whether the HRRP is exacerbating disparities as some have worried. As described above, of all the methods of accounting for social risk factors only stratified public reporting can generate these “information” benefits for patients, hospitals, and CMS. If CMS views these mechanisms as important to achieve the policy goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate reporting; and compensating providers fairly, then stratified reporting must be part of any approach to improve on the status quo, where public reporting obscures differences in performance for high- and low-social risk factor groups. For example, CMS could do for the HRRP what it has done for Medicare Advantage and Part D plans for their Healthcare Effectiveness and Data Information Set (HEDIS) and Consumer Assessment of Healthcare Providers and Systems (CAHPS) scores—stratifying performance scores by four racial and ethnic groups (CMS, 2016a).

B. Adjustment of Performance Measure Scores in the HRRP

Adjusting performance scores for social risk factors in the context of the HRRP could be accomplished by adding social risk factor indicators to the adjustment formula presently in use. Imagine for example that race, ethnicity, and income are included in this formula. This would mean that
some hospitals that now receive a penalty but have more patients than average from low-income, racial, and ethnic minority backgrounds would have adjusted performance that is sufficiently good to lower or even eliminate their penalty. Conversely, a hospital that almost incurs a penalty currently with a very affluent patient population might incur a penalty if such adjustments were added.

If the adjustment takes account of the average disparity between high- and low-social risk factor groups (i.e., the marketwide disparity) and leaves the effect of any disparity within a hospital (i.e., the hospital-specific disparity), this adjustment may improve measurement and payment equity. Safety-net hospitals would likely benefit from lower penalties, which might help them better serve their patients. But it would also be true that the incentives to improve care for patients with high social risk factors might be curtailed at lower levels of absolute performance than the incentives to improve care for patients with higher social risk factors—a hospital with patients with high levels of social risk factors gets to the “no-penalty” zone with poorer absolute readmission rates than a hospital with patients with low levels of social risk factors. With accurate adjustment, hospitals serving low-social risk factor patients might see increased penalties and then be appropriately motivated to work on reducing readmissions for all patients. Accurate adjustment would also reduce the awards for avoiding patients with high social risk factors—they should no longer have as big an effect on a hospital’s penalty though they may still be more expensive to treat and manage readmissions effectively. It should be noted that the potential incentive disadvantages of high social risk factor hospitals reaching no-penalty zones as easily as low social risk factor hospitals reflect a trade-off with equity and accuracy of measurement—incentives might be more evenly and equitably distributed. Increasing incentives for high social risk factor hospitals might incorporate additional methods such as those under the categories of direct adjustment of payment and restructuring payment incentive design in combination with those under the categories of stratified public reporting and adjustment of performance measure scores. Notably, this problem is a property of threshold-based incentives; incentive schemes with continuous reward functions are less subject to this concern.

If adjustment accounts for all (within and between) differences in performance that are associated with social risk factors, then it removes any incentive to reduce the disparity in performance for patients with high social risk factors. Such “overadjustment” may also eliminate the incentive to improve readmissions altogether by pushing hospitals into the no-penalty zone although they could still improve their readmission rates. For this reason, adjustment for only within-facility differences has been recommended by NQF (2014).
C. Direct Adjustment of Payment in the HRRP

Adjusting payment only for social risk factors in the context of the HRRP could be accomplished by adjusting the benchmarks for payment rather than the readmission rate itself. For the HRRP, which uses a comparison of actual to predicted readmissions to determine the penalty, this would mean having two different adjusted measures—one for public reporting (without adjustment for social risk factors) and one for payment (with social risk factors). Adjustment of the payment algorithm could also be done not by allowing the benchmarks to reflect social risk factor differences but instead to account for the estimated additional costs of providing care at the same level of performance for patients with high-social risk factors. The policy goals achieved and potential unintended consequences of directly adjusting payment for the HRRP are similar to adjusting performance measure scores except that adjusting payment alone would leave visible in the single reported readmission rate the reduction in average performance associated with patients with social risk factors. Without stratification this adjusted rate may or may not be better than the status quo (a single rate adjusted for clinical risk factors but not for social risk factors) in terms of the information value for consumers choosing a hospital. Likewise a combination of stratified public reporting with adjustment of performance measure scores is not obviously better or worse (but different) than a combination of stratified public reporting and direct adjustment of payment. Because of the informational benefits of stratified public reporting identified above, any type of adjustment (including none) is better when paired with stratified public reporting than not.

D. Restructuring Payment Incentive Design in the HRRP

Finally, the HRRP could be entirely reformulated in a number of ways that account for social risk factors. One simple suggestion would be to reward improvement rather than the level of performance, with the caveat that some kind of “maintenance of high performance” award would be needed. This approach could be combined with any of the other approaches for increased transparency (stratified public reporting) or accuracy/fairness of measurement and payment (either adjustment of performance measure scores or direct adjustment of payment under the conditions noted above). Some novel approaches to the redesign of incentives may stand alone in terms of serving CMS’s goals—they would effectively incorporate stratification and adjustment in some way. Performance on readmission rates (adjusted for clinical factors as now) could be awarded points on a scale from some minimum performance to “best in class” performance as with the Hospital Value-Based Payment program (CMS, 2015a). There could be
two scales, one for patients with high social risk factors and one for patients with low social risk factors, and the points could be added together with or without weighting (where the weights reflect the differential costs of improving care for high-risk populations) or additional points for improvement on one or the other performance scales or for disparity reduction.

REFERENCES


The committee’s first four reports detail what the Assistant Secretary for Planning and Evaluation (ASPE) and the Centers for Medicare & Medicaid Services (CMS) could do if they choose to account for social risk factors in Medicare payment. Recommending what ASPE and CMS should do is beyond the scope of the committee’s task. Thus, the committee’s reports aim to inform analyses the ASPE is conducting to identify appropriate strategies to account for social risk factors in Medicare payment should CMS choose to do so. To that end, throughout the report series, the committee presented an array of optional methods to account for social risk factors as well as a variety of data sources for social risk factor indicators ASPE and CMS could use. At the same time, although Chapter 3 provides some additional guidance on how CMS could use the methods identified individually or in combination to achieve policy goals, the committee recognizes that implementing any approach to accounting for social risk factors in Medicare quality measurement and payment can be complex and will require substantial analyses to identify the best approaches to do so for different Medicare incentive programs. Implementing any approach to accounting for social risk factors in any of Medicare’s many value-based payment (VBP) programs will also require considerable resources—including costs. This final chapter provides some general conclusions and other considerations to guide ASPE and CMS if they choose to begin accounting for social risk factors in Medicare payment programs, and to help them to identify priorities and preferences from among the options presented.
FUTURE RESEARCH

As the committee concluded, it is possible to improve on the status quo with regard to the effect of VBP on patients with social risk factors (NASEM, 2016a).1 Furthermore, the committee found that some social risk factors are already collected by CMS and could be used in the near term to account for social risk factors in Medicare payment, should CMS choose to do so. Three indicators of social risk are readily available in existing CMS data resources for use in the near term: dual eligibility, nativity, and urbanicity/rurality. Other indicators of social risk are available for use in the near term either for some outcomes or with some limitations. These include race and ethnicity, income, education, neighborhood deprivation, and housing. (The committee’s specific recommendations are described in detail in Appendix D.) Other social risk factors might require new data collection efforts, some of which CMS could start collecting in a standardized way in the near term. For example, although area-level education data that could be used as a proxy for individual education are available from census data in the near term, CMS could begin collecting individual education at the time of enrollment for use in the longer term. Similarly, CMS has some existing data on preferred language. However, to improve accuracy, CMS could begin collecting preferred language information in a standardized, consistent way at the time of enrollment.

Existing analyses do not address which of the social risk factors that may influence performance indicators used in VBP must be individually accounted for to ensure adjustments to performance measures and payment are accurate. It may be that some are not adequately measured using current data or data collection techniques. It may also be that a smaller set of indicators is sufficient. If the latter, the literature does not currently indicate which factors should be included. Thus, in order to determine which social risk factors should be incorporated in any given VBP system, their usefulness in explaining variation in outcomes should be investigated. ASPE has already conducted some analyses of the associations of different types of social risk factors with certain outcomes (Filice and Joynt, 2016; Samson et al., 2016; Snyder et al., 2016).

A related consideration pertains to one of the committee’s conclusions about new data collection. As the committee concluded, if there are substantial barriers to collecting social risk factor data (such as high cost) and/or if early pilot testing or modeling in a multivariable model suggests only marginal gains from including any given indicator in any method of accounting for social risk factors in Medicare performance measurement and payment, inclusion of that indicator may not be warranted (NASEM, 2016a).

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1 See Conclusion 4 in the committee’s third report (NASEM, 2016a).
Applying this in practice can be challenging, because determining what constitutes a “marginal gain” can be difficult. Although it can be informed by pilot testing and modeling, a marginal gain does not reflect a strictly quantitative value—indeed, there is unlikely to be a threshold under which the effects of any social risk factor are considered to be “marginal.” Rather, a marginal gain reflects a balance of several competing considerations. These considerations include not only tradeoffs between collection burden and accuracy, but also the extent to which an indicator meets other selection criteria—for example, the extent to which there is a strong conceptual relationship and evidence of an empirical association between the indicator and the outcome(s) of interest. However, certain empirical analyses can help inform decision making about which social risk factors must be included in Medicare VBP and which may not warrant inclusion. Such analyses would be similar to those used to identify the set of clinical adjusters included in the CMS-Hierarchical Condition Category (HCC) clinical risk adjustment model (Pope et al., 2004). For the CMS-HCC model, CMS considered analyses on the predictive power of diagnostic categories individually and together, consulted with clinicians, and weighed the results against other selection criteria for inclusion of diagnostic categories (Pope et al., 2004). Similarly, for social risk factors, ASPE/CMS could conduct analyses on the predictive power of social risk factor indicators individually and together, and then they could weigh these results with advice from technical experts (including clinicians but also those with expertise in the social determinants of health), as well as the selection criteria the committee identified for inclusion of social risk factors in Medicare quality measurement and payment.

Further research could inform ASPE or CMS as it determines the optimal way in which to adjust indicators used in VBP for social risk factors. Specifically, further work would address the following questions:

1. How can ASPE/CMS implement the use of an initial set of social risk factors on a rapid timeline?
   a. Which social risk factors present in claims or enrollment data, and already examined by ASPE/CMS, explain variation in outcomes when added to the clinical variables already included in risk adjustment models?
   b. Are some of these social risk factors so correlated with each other that a more parsimonious set would explain a substantially equivalent amount of variation in outcomes?

2. How can ASPE/CMS implement the use of an expanded set of social risk factors?

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2 See Conclusion 1 in the committee’s fourth report (NASEM, 2016b).
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a. Which of those social risk factors not included in claims or enrollment data, but included in nationally representative surveys that include outcomes such as total costs of care or readmissions (e.g., the Medicare Current Beneficiary Survey, Medical Expenditure Panel Survey), appear to explain the most variation in outcomes (again, above and beyond clinical risk factors and currently available social risk factors)?

b. Which methods of incorporating the promising social risk factors identified through the analyses above are the most feasible, accurate, and valid?

3. How can ASPE/CMS monitor and refine the use of social risk factors in VBP?
   a. Are the methods to account for social risk factors achieving policy goals? What unintended adverse consequences might arise?
   b. What are the distributional effects of adjustment for social risk factors for providers? Which types of providers (e.g., safety-net hospitals or physicians in underserved communities who disproportionately serve Medicare beneficiaries with social risk factors) are the most likely to benefit or lose?
   c. Are there patient subgroups who appear to have benefited or been harmed by adjustment (e.g., through better access to care or information)?

Through research answering these questions, ASPE/CMS can determine the best path for implementing adjustments for social risk factors, and can ensure that doing so furthers the policy goals of VBP.

SYSTEMS PRACTICES FOR THE CARE OF SOCIALLY AT-RISK POPULATIONS

Even if it is appropriate to account for social risk factors in Medicare quality measurement and payment, incentivizing providers to find strategies to improve access, quality, and outcomes for socially at-risk populations is critical to the goal of promoting health equity (NASEM, 2016a). The committee’s second report, *Systems Practices for the Care of Socially At-Risk Populations*, shows that there are strategies health care providers (i.e., hospitals, clinics, and physician groups) and payers (i.e., health plans) can undertake to improve care and health outcomes for socially at-risk populations (NASEM, 2016c). To identify innovations, interventions, and other strategies providers disproportionately serving socially at-risk populations are implementing to improve the quality of care for and health care outcomes of their patients, the committee reviewed case studies from the peer-
reviewed and grey literature. Based on this review, as well as consideration of the peer-reviewed literature on quality improvement and health disparities and, in some cases, committee members’ empirical research or professional experience delivering care to patients with social risk factors, the committee identified a set of commonalities across the strategies identified. These themes describe a set of practices delivered within a health care system, where the system encompasses a set of related actors who collaborate to improve health equity and outcomes for socially at-risk populations. In this approach, the health care system includes not only medical providers, but also partnering public health and social service agencies, community-based organizations, and the community in which those medical providers are embedded. The medical providers may be formally connected to its partners through legal arrangements or informally connected, but all serve the same community or geographic region.

As the committee concluded, six community-informed and patient-centered practices show promise for improving care for socially at-risk populations (NASEM, 2016c). Figure 4-1 illustrates these practices, which are grounded in community-informed and patient-centered care. These practices start with a commitment to health equity and make up an approach by which health care systems can promote equitable health outcomes by using data to identify unmet clinical and social needs and by addressing those needs through collaborative partnerships that coordinate care across time, sites of care, and intensity of needed services. In so doing, health care systems can support patients living in the community to engage in their health care. This systems approach provides a continuous process for improvement.

Complete descriptions of the six systems practices and highlighted case studies can be found in Appendix B. Based on its review of case studies, the committee found that, with adequate resources, providers can feasibly respond to incentives to deliver high-quality care. Some providers disproportionately serving socially at-risk populations achieved performance on par with the highest performers among all providers (NASEM, 2016c). Thus, it is possible to deliver high-quality care to socially at-risk populations, and patients with social risk factors need not experience low-quality care and poor health outcomes (NASEM, 2016c). If accounting for social risk factors in Medicare payment improves fairness in compensating providers disproportionately serving socially at-risk populations, this would increase the resources available to support delivery of high-quality care and quality improvement efforts. Thus, accounting for social risk factors in Medicare payment can be an important and necessary step toward improving health equity. At the same time, adjusting payment mechanisms will not

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3 See the committee’s conclusion in Chapter 2 of their second report (NASEM, 2016c).
reduce health disparities unless providers implement systems that deliver high-quality care to all patients while responding to the particular needs of patients with social risk factors. Accounting for social risk factors in payment and designing and delivering care responsive to social risk factors are therefore complementary approaches to promoting health equity.

CONCLUDING REMARKS

Although accounting for social risk factors in Medicare payment is critical for improving equity among Medicare beneficiaries, the committee
notes the limitations of the scope of its task—and, indeed, any endeavor to account for social risk factors in financial incentive design. In particular, to the extent that accounting for social risk factors in Medicare payment improves fairness in compensating providers disproportionately serving socially at-risk populations, doing so may increase the resources available to these providers. Although the committee’s charge, and therefore its findings, conclusions, and recommendations, are focused on Medicare payment, the approaches the committee identified to account for social risk factors in quality measurement and payment could be applied to other payers. Similar improvements to VBP by other payers could increase resources available to providers disproportionately serving socially at-risk populations via the same mechanisms as under Medicare. However, any policy that modifies incentive payments (as accounting for social risk factors in these payment does) does not (and cannot) fix or, for that matter, substantively address the payment system at large. Thus, accounting for social risk factors does not solve the problem of safety-net financing. Indeed, other payment reforms (for example, direct payments for quality improvement among safety-net providers and direct payments to incentivize collaboration with public health and social service agencies and community-based organizations) may be more effective at incentivizing high-quality care for socially at-risk populations. Accounting for social risk factors is necessary but insufficient by itself to achieve health equity.

The committee urges policymakers to remember that quality measurement and payment policies affect the lives of real patients. In the case of accounting for social risk factors, changes to the current VBP system would especially influence the lives of patients with social risk factors who have historically experienced barriers to accessing high quality health care. Together, accounting for social risk factors in quality measurement and payment in combination with complementary approaches—other payment reforms, implementing strategies to improve the quality of care for patients with social risk factors and to reduce disparities, and further research to identify what drives observed differences in quality and outcomes for patients with social risk factors—may achieve the policy goals of reducing disparities in access, quality, and outcomes, and quality improvement and efficient care delivery for all patients, and thereby promote health equity.

REFERENCES


Appendix A reproduces in its entirety the first report from the Committee on Accounting for Socioeconomic Status in Medicare Payment Programs. The committee made no substantive content changes. This report was originally released on January 12, 2016, as:

Medicare is the government’s health care program for the elderly (individuals age 65 years and older), those with permanent kidney failure (end-stage renal disease [ESRD]), and some individuals with long-term disability. Recent health care payment reforms aim to improve the alignment of Medicare payment strategies with goals to improve the quality of care provided, patient experiences with health care, and health outcomes, while also controlling costs. These efforts move Medicare away from the volume-based payment of traditional fee-for-service models and toward value-based purchasing, in which cost control is an explicit goal in addition to clinical and quality goals (Rosenthal, 2008). Specific strategies include pay-for-performance and other quality incentive programs and risk-based alternative payment models, such as bundled payments and accountable care organizations. In this report, these types of strategies will be referred to broadly as “value-based payment” (VBP). The Patient Protection and Affordable Care Act of 2010 (ACA) prompted widespread adoption of VBP at the federal level by directing the Centers for Medicare & Medicaid Services (CMS) to implement payment reforms in the Medicare program and by establishing a number of tools CMS can use to achieve VBP goals. The Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine (IOM) was commissioned to provide input into whether socioeconomic status (SES) and other social risk factors could be accounted for in Medicare payment and quality programs. The IOM convened an ad hoc committee to conduct a series of five reports related to this task, of which this is the first report.
CURRENT STATUS OF VALUE-BASED PAYMENT IN MEDICARE

The ACA and subsequent legislation, including the Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act) and Medicare and CHIP [Children’s Health Insurance Program] Reauthorization Act of 2015, require CMS to implement VBP programs for Medicare inpatient hospital care, ambulatory care, health plans, and post-acute care. Currently, there are eight VBP programs in Medicare, with two post-acute care programs in proposal or planning:

1. Hospital Readmission Reductions Program
2. Hospital-Acquired Condition Payment Reduction
3. Hospital Value-Based Purchasing
4. Medicare Shared Savings Program
5. Physician Value-Based Modifier
6. End-Stage Renal Disease Quality Incentive Program
7. Medicare Advantage/Part C
8. Medicare Part D
9. Skilled Nursing Facility Value-Based Purchasing (in planning)
10. Home Health Value-Based Purchasing (in planning)

POTENTIAL UNINTENDED CONSEQUENCES OF VALUE-BASED PAYMENT ON VULNERABLE POPULATIONS AND HEALTH DISPARITIES

Improving Value-Based Payment to Address Unintended Consequences

While the impact of VBP strategies on providers serving vulnerable populations and on health disparities continues to be monitored both under Medicare and more widely, and because more VBP programs are

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1 The committee included Medicare Part C and Part D because the study sponsor, the Office of the Assistant Secretary for Planning and Evaluation of the Department of Health and Human Services, included them as relevant payment models in its presentation to the committee at the first meeting (Epstein, 2015), and thus the program is of interest to them. Additionally, the committee considers Part C and Part D to have important design features through which quality and cost performance affect payment and market share. As described in more detail in Chapter 1, Part C and Part D are both risk-sharing models of payment, which necessitates consideration of risk adjustment for the capitation amount or global spending target, and also include other VBP mechanisms, such as bonus payments (Part C) and risk corridors (Part D).

2 This report does not discuss innovation models conducted under the CMS Innovation Center and other demonstration programs, such as the Maryland all-payer model, the Nursing Home Value-Based Purchasing Demonstration, and the Bundled Payments for Care Improvement (BPCI) Initiative.
being implemented and existing programs are expanding, some methods have been proposed to improve these payment programs to address the potential unintended consequences on vulnerable populations and disparities. Chief among methods to improve VBP to address these unintended consequences is accounting for differences in patient characteristics when measuring quality and calculating payments, sometimes referred to as risk adjustment or payment adjustment. Most emerging VBP strategies recognize that differences in patient characteristics may affect health care outcomes and costs independently of variations in the provision of care, and that these must be accounted for when measuring quality and calculating payments (Rosenthal, 2008). Currently, patient characteristics included in these adjustments typically only include certain demographic and clinical characteristics (e.g., age, sex, and clinical comorbidities).

**Accounting for Social Risk Factors in Value-Based Payment**

The primary method proposed to account for social risk factors in value-based payment has been to include them in risk adjustment of performance measures used as the basis for payment. Risk adjustment primarily aims to improve measurement accuracy, such as for the purposes of quality assessment and public reporting, but becomes a method of payment adjustment when measures that are risk adjusted are used as the basis for payment. In this context, proposed adjustments have implications for health equity and fairness of provider reimbursement, and the proposal has become controversial.

Critics of including social factors in risk adjustment argue that what may appear as differences by social groups may be genuinely attributed to quality differences and not the social factors themselves. In this case adjusting for the social factor would obscure genuine disparities and make it more difficult to hold those providing lower-quality care accountable (Jha and Zaslavsky, 2014; Kertesz, 2014; Krumholz and Bernheim, 2014; O’Kane, 2015). They further argue that so doing implicitly accepts a lower standard for vulnerable patients (Bernheim, 2014; Jha and Zaslavsky, 2014). This would not only enable lower-quality care for disadvantaged persons, but it would also reduce incentives for improvement (Bernheim, 2014; Kertesz, 2014).

Proponents argue that certain social factors lie outside the control of providers and thus hospitals should not be accountable for them (Jha and Zaslavsky, 2014; Joynt and Jha, 2013; Pollack, 2013; Renacci, 2014). In this way of thinking, social factors are confounders masking true performance and adjusting for them provides more accurate measurement (Fiscella et al., 2014; Jha and Zaslavsky, 2014). If this is the case, risk adjusting for social factors would ensure that hospitals are being fairly assessed and that pro-
viders caring for more disadvantaged patients are not punished precisely for caring for these patients (Girotti et al., 2014). Indeed, if serving disadvantaged patients results in disproportionate penalties, this may disincentivize providers from caring for them (Joynt and Jha, 2013). Others also raise concerns that because disproportionate penalties will further reduce the already limited resources of providers serving greater shares of disadvantaged patients with even fewer financial resources, quality in these providers will likely worsen (Grealy, 2014; Ryan, 2013), and the organizations could potentially fail, leaving fewer providers to care for disadvantaged patients (Lipstein and Dunagan, 2014). In both cases, this would widen disparities.

In light of this debate, two expert panels have previously examined whether to include social risk factors in risk adjustment for Medicare payment models and offered recommendations. In its June 2013 Report to the Congress, the Medicare Payment Advisory Commission (MedPAC) recommended that CMS use two methods of adjustment, one for public reporting (i.e., quality measurement) and another for financial incentives. Readmissions rates for public reporting would remain unadjusted for socioeconomic disparities so as not to mask potential disparities in quality of care. However, when calculating penalties, hospitals would be compared not to all other hospitals as is currently done, but to hospitals with a similar patient mix (MedPAC, 2013). In 2014, an expert panel convened by the National Quality Forum (NQF) released a technical report reversing the NQF’s previous position to exclude “sociodemographic factors”3 in risk-adjustment of performance measures used in “accountability applications” (i.e., as a basis of payment or public reporting). The panel recommended that sociodemographic factors should be included in risk adjustment if there is a conceptual relationship between a given factor and specific quality metrics as well as empirical evidence of that association (NQF, 2014).

Congress has also taken up the issue. While authorizing the establishment of several VBP programs in Medicare, the IMPACT Act also required that the Secretary of Health and Human Services submit a report to Congress by October 2016 that assesses the impact of SES on quality and resource use in Medicare using measures such as poverty and rurality from existing Medicare data. It also required a report to Congress by October 2019 on the impact of SES on quality and resource use in Medicare using measures (e.g., education and health literacy) from other data sources. It also required qualitative analysis of potential SES data sources and Secretarial recommendations on obtaining access to necessary data on SES and accounting for SES in determining payment adjustments (Epstein, 2015).

3 Sociodemographic factors are defined as a “variety of socioeconomic (e.g., income, education, occupation) and demographic factors (e.g., age, race, ethnicity, primary language)” (NQF, 2014, p. 14).
STATEMENT OF TASK

As input to the analyses to be included in the 2016 and 2019 reports to Congress, the Department of Health and Human Services (HHS), acting through the Office of the Assistant Secretary for Planning and Evaluation, asked the IOM to convene an ad hoc committee to provide a definition of SES for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Further, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports (see Box A1-1 in Appendix A1). In this first report, the committee will focus on the definition of SES and other social factors that have been shown to influence health outcomes of Medicare beneficiaries, as reflected in current Medicare payment and quality programs.

The statement of task for this report includes several key words that drove the committee’s work. The task refers to identifying “SES factors” that “have been shown” to “impact” “health outcomes” of “Medicare beneficiaries.” This project is intended to provide very practical and targeted input to HHS and Congress as they consider whether to adjust Medicare payment programs for social risk factors. This project builds on decades of research assessing the social determinants of health; it does not reinvent or redefine that field of scholarship. The committee is narrowly focused on how social risk factors affect health care use and outcomes of a specific group of people—Medicare beneficiaries—in response to encounters with the health care system, not how social factors affect health status generally.

The committee identified five social risk factors that are conceptually likely to be of importance to health outcomes of Medicare beneficiaries:

1. Socioeconomic position;
2. Race, ethnicity, and cultural context;
3. Gender;
4. Social relationships; and
5. Residential and community context.

Although an independent risk factor and not a social factor, the committee included health literacy as another important factor.

Although the statement of task specifies only examining the impact of these social risk factors on “health outcomes,” it also specifies that the social
risk factors should be targeted “for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.” Thus, given the importance that Medicare VBP programs have placed on this broader set of measures and given that Medicare applies these measures when calculating payments, the committee interpreted “health outcomes” as encompassing measures of health care use, health care outcomes, and resource use. Hence, the committee included the following domains of measures: health care utilization, clinical processes of care, health (clinical care) outcomes, patient experience, patient safety, and cost.

Figure AS-1 illustrates the committee’s conceptual framework, which illustrates the primary hypothesized relationships by which social risk factors may affect the broad set of health outcomes at issue. The framework is not intended to illustrate the entire universe of potential causes and risks. The framework applies to all Medicare beneficiaries, including disabled beneficiaries and beneficiaries with ESRD, because although the committee acknowledges that the Medicare population is heterogeneous (even among beneficiaries age 65 and older), the committee expects the effect of social risk factors to be similar for all Medicare subpopulations (beneficiaries with disabilities, those with ESRD, and older adults). The committee will revisit this assumption in subsequent reports. Additionally, Medicare coverage and the measures used to assess health care quality and outcomes do not differ for Medicare beneficiaries by origin of entitlement, except for certain measures of ESRD care and outcomes, and thus the health outcomes in the framework are also equally applicable.

Current Medicare quality measures fall within each of the domains embraced by the committee in the expanded definition of “health outcomes.” Table AS-1 contains examples of Medicare quality measures currently in use in each of the health care use and outcome domains embraced by the committee in the expanded definition of “health outcomes.”

COMMITTEE PROCESS AND OVERVIEW OF THIS REPORT

The committee comprises expertise in health disparities, social determinants of health, risk adjustment, Medicare programs, health care quality, health system administration, clinical medicine, and health services research. The committee will meet five times over 12 months and issue five brief consensus reports. In this report, the committee outlines a conceptual framework for how social risk factors could influence health care outcomes and quality measures of relevance to Medicare programs. The committee then presents the results of a literature search to identify those social risk factors that have been shown to influence broad categories of relevant health care outcomes and quality measures. The relevant literature is described generally without an assessment of the quality of each individual study and with no
FIGURE AS-1  Conceptual framework of social risk factors for health care use, outcomes, and cost. NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships.
<table>
<thead>
<tr>
<th>Health Care Use or Outcome Domain</th>
<th>Example Medicare Quality Measures</th>
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</thead>
<tbody>
<tr>
<td><strong>Health Care Use</strong></td>
<td></td>
</tr>
<tr>
<td>Clinical Processes of Care</td>
<td>• HbA1c testing for beneficiaries with diabetes</td>
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<td></td>
<td>• Influenza and pneumonia vaccination</td>
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<td></td>
<td>• Primary percutaneous coronary intervention received within 90 minutes of hospital arrival for patients with AMI</td>
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<td></td>
<td>• Blood cultures performed in the emergency department prior to initial antibiotic received in hospital for patients with pneumonia</td>
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<td></td>
<td>• Anemia management for kidney disease patients</td>
</tr>
<tr>
<td>Utilization</td>
<td>• Hospital admissions for COPD exacerbations</td>
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<td></td>
<td>• Heart failure admissions</td>
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<td></td>
<td>• 30-day readmissions after hospital discharge for AMI, heart failure, pneumonia, COPD, or total hip arthroplasty/total knee arthroplasty</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Resource Use (Costs)</td>
<td>• Medicare spending per beneficiary</td>
</tr>
<tr>
<td>Health (Clinical Care)</td>
<td>• Diabetes composite quality indicator (controlled diabetes, short- and long-term diabetes complications, lower-extremity amputation for diabetes)</td>
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<td></td>
<td>• 30-day mortality after hospital discharge for AMI, heart failure, or pneumonia</td>
</tr>
<tr>
<td>Patient Safety</td>
<td>• AHRQ Patient Safety Indicator composite (pressure ulcer, iatrogenic pneumothorax, central venous catheter-related bloodstream infections, postoperative hip fracture, perioperative pulmonary embolism or deep vein thrombosis, postoperative sepsis, postoperative wound dehiscence, accidental puncture or laceration)</td>
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<td></td>
<td>• Central line-acquired bloodstream infection</td>
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<td></td>
<td>• Catheter-acquired urinary tract infection</td>
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<td></td>
<td>• Surgical site infection</td>
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<td></td>
<td>• Incidence of major falls for post-acute care patients</td>
</tr>
<tr>
<td>Patient Experience</td>
<td>• Communication with nurses</td>
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<td></td>
<td>• Communication with doctors</td>
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<tr>
<td></td>
<td>• Getting timely appointments, care, and information</td>
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<td></td>
<td>• Getting information from Part D drug plan</td>
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<td></td>
<td>• Helpful, courteous, and respectful office staff</td>
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<td></td>
<td>• Responsiveness of hospital staff</td>
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<td>• Care coordination</td>
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<td>• Pain management</td>
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<td>• Communication about medications</td>
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<td></td>
<td>• Cleanliness and quietness</td>
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<td></td>
<td>• Overall rating of hospital</td>
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<tr>
<td></td>
<td>• Rating of Medicare Advantage health plan</td>
</tr>
</tbody>
</table>

**NOTE:** AHRQ = Agency for Healthcare Research and Quality; AMI = acute myocardial infarction; COPD = chronic obstructive pulmonary disease.
attempt at data integration, such as in a meta-analysis. The identification and description of the literature should not be mistaken for a systematic review that uses a formal system for weighing and describing evidence, such as those used in clinical or public health guideline development. In its findings, the committee uses the term “influence” to describe an association between a social risk factor and a health care use or outcome measure without implying a causal association. Future work of the committee will address the question of whether a specific social factor could be incorporated into Medicare payment programs, the methods to do so, and data needs to accomplish the task.

DEFINITIONS AND FINDINGS FROM THE LITERATURE SEARCH

In this section, the committee defines each of the five social factor domains, as well as health literacy, and summarizes the results of the literature search linking effects of each domain on health care outcomes and quality measures.

Socioeconomic Position

Socioeconomic position (SEP) is an indicator of an individual’s absolute and relative position in a socially stratified society. SEP captures a combination of access to material and social resources as well as relative status, meaning prestige- or rank-related characteristics, and is commonly measured through indicators such as income and wealth (with wealth being of special relevance in older individuals), education, and occupation (including occupational history and employment status). To that end, the committee employs the term socioeconomic position, rather than the more commonly used phrase socioeconomic status, because socioeconomic status blurs distinctions between two different aspects of socioeconomic position (actual resources and status) and privileges status over actual resources (Adler et al., 1994; Krieger et al., 1997; Lynch and Kaplan, 2000). SEP over one’s lifetime is a powerful predictor of many health-related processes and outcomes and is often related to outcomes in a dose–response manner. In the medical field, insurance status is also used as a proxy for SEP—for example, dual Medicare–Medicaid eligibility among the Medicare population is often used as a proxy for low income. However, insurance status is generally a very imperfect proxy, because (1) it does not capture the continuum of SEP, (2) it may capture dimensions of health status unmeasured by other data sources, and (3) because it represents insurance status itself, which is distinct from SEP. The committee made the following findings:
The committee identified literature indicating that income may influence health care utilization, clinical processes of care, costs, health outcomes, and patient experience.

The committee also identified literature indicating that when measured by a proxy of insurance status, income may influence health care utilization, clinical processes of care, and patient experience.

The committee identified literature indicating that education may influence health care utilization, health outcomes, and patient experience.

The committee identified literature indicating that occupation may influence health care utilization, health outcomes, and patient experience.

The committee identified no literature indicating that socioeconomic position may influence patient safety outcomes.

**Race, Ethnicity, and Cultural Context**

Race and ethnicity are another key social factor. Race and ethnicity are dimensions of a society’s stratification system by which resources, risks, and rewards are distributed. As such, racial and ethnic categories capture a range of dimensions relevant to health, especially those related to social disadvantage (IOM, 2014a; Williams, 1997). These dimensions include access to key social institutions and rewards; behavioral norms and other sociocultural factors; inequality and injustice in the distribution of power, status, and material resources; and psychosocial exposures such as discrimination (Williams, 1997). It is well established that race and ethnic background is often predictive of health care and health outcomes even after accounting for such traditional measures of SEP as income and education (Krieger, 2000; LaVeist, 2005; Williams, 1999; Williams et al., 2010).

A number of factors likely contribute to this “independent” effect of race and ethnicity, including

- lack of comparability of a given SEP measure across race/ethnic groups (e.g., income returns to education are well known to vary by race, and income is differentially correlated with wealth by race);
- importance of other exposures such as neighborhood environments that are patterned differently by race even among individuals of apparently similar SEP;
- the importance of race or ethnic specific factors such as discrimination and immigration related factors, including time living in the United States and language proficiency; and
- measurement error in SEP.
Although race and ethnicity reflect many different social circumstances, there can also be important heterogeneity in health within race and ethnic groups, driven for example by SEP heterogeneity or heterogeneity in English language proficiency, country of origin, time in the United States, or other cultural dimensions. The committee made the following findings:

- The committee identified literature indicating that race and ethnicity may influence health care utilization, clinical processes of care, costs, health outcomes, patient safety, and patient experience.
- The committee identified literature indicating that language may influence health care utilization, clinical processes of care, health outcomes, and patient experience.
- The committee identified literature indicating that nativity may influence clinical processes of care and patient experience.

**Gender**

Gender is known to be related to many health and health care–related outcomes. The committee uses the term gender broadly to capture the social dimensions of gender and distinguish these from biological effects of sex. Gender is known to affect a number of health outcomes as well as interactions with the health care system, health care–related processes, and outcomes of health care. Gender or sexual minorities, including individuals who identify as lesbian, gay, bisexual, transgender, intersex, queer, and questioning, may also experience differences in health and health care. These disparities may be related to exposure to stigma, discrimination, and violence on the basis of their non-normative identity; barriers to accessing health care, including fear of discrimination from providers; and unhealthy behaviors, especially increased rates of smoking, alcohol use, and substance (IOM, 2011). The committee made the following finding:

- The committee identified literature indicating that gender may influence clinical processes of care and patient experience.

**Social Relationships**

Social relationships are another important social risk factor. It is well established that many dimensions of social relationships including access to social networks that can provide access to resources (including material and instrumental support) as well as the emotional support available through social relationships can be important to health (Berkman and Glass, 2000; Cohen, 2004; Eng et al., 2002; House et al., 1988). Likewise, social isolation and loneliness have been shown to have important consequences for
health (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988; Wilson et al., 2007). Social relationships may be of special importance to health care access, process and outcomes among older individuals (Cornwell and Waite, 2009; Hawton et al., 2011; Seeman et al., 2001; Tomaka et al., 2006) and persons with ADL and IADL limitations (AARP Public Policy Institute, 2010). Social relationships are most frequently assessed in the health care and health services research literature with three constructs: marital status, living alone, and social support. The committee made the following findings:

- The committee identified literature indicating that marital status may influence health care utilization, clinical processes of care, costs, health outcomes, and patient experience.
- The committee identified literature indicating that social support may influence health care utilization, clinical processes of care, health outcomes, and patient experience.
- The committee identified literature indicating that living alone may influence health care utilization, clinical processes of care, and health outcomes.
- The committee identified no literature indicating that social relationships may influence patient safety.

**Residential and Community Context**

The committee uses the term community context to refer to a set of broadly defined characteristics of residential environments that could be important to health and the health care process and its outcomes. Dimensions include the physical environments (e.g., housing, walkability, transportation options, and proximity to services) as well as the social environment (e.g., safety and violence, social disorder, presence of social organizations, and social cohesion) (Diez Roux, 2001; Diez Roux and Mair, 2010). Community context also references the policies, infrastructural resources and opportunity structures that influence individuals’ everyday lives. The SEP or racial and ethnic composition of an area is sometimes used as a proxy for some of these attributes, although it is an imperfect proxy and can also capture unmeasured or imperfectly measured individual-level SEP. Community context may also have special relevance for older persons owing to decreases in mobility with age and for persons with mobility disabilities (Yen et al., 2009). The committee made the following findings:

- The committee identified literature indicating that community composition may influence health care utilization, clinical processes of care, health outcomes, and patient safety.
• The committee identified literature indicating that community context may influence health care utilization, health outcomes, and patient experience.
• The committee identified literature indicating that urbanization may influence health care utilization, clinical processes of care, costs, and patient experience.

Health Literacy

Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (NASEM, 2015). Although an individual risk factor and not a social factor, the committee includes health literacy in the framework, because it is specifically mentioned in the IMPACT Act, and is thus of interest to Congress, is affected by social risk factors, and because the literature supports a role for health literacy in health care outcomes and quality measures. The committee also included the related concept of numeracy, the ability to understand information presented in mathematical terms and to use mathematical knowledge and skills in a variety of applications across different settings (IOM, 2014b). The committee made the following finding:

• The committee identified literature indicating that health literacy may influence health care utilization, clinical processes of care, cost, and patient experience.

CONCLUDING REMARKS

What is clear at this point is that health literacy and social risk factors (SEP; race, ethnicity, and cultural context; gender; social relationships; and residential and community context) have been shown to influence health care use, costs, and health care outcomes in Medicare beneficiaries. However, some specific factors were found not to influence one or more outcomes. The committee has not yet evaluated the literature for the purpose of identifying the factors that could be incorporated into measures used in Medicare payment programs; that is the focus of the third report from the committee.

REFERENCES


Epstein, A. 2015. Accounting for socioeconomic status in Medicare payment programs: ASPE's work under the IMPACT Act. Presented to the Committee on Accounting for Socioeconomic Status in Medicare Payment Programs, Washington, DC, October 6, 2015.


Recent health care payment reforms aim to improve the alignment of Medicare payment strategies with goals to improve the quality of care provided, patient experiences with health care, and health outcomes, while also controlling costs. These efforts move Medicare away from the volume-based payment of traditional fee-for-service models and toward value-based purchasing, in which cost control is an explicit goal in addition to clinical and quality goals (Rosenthal, 2008). Specific payment strategies include pay-for-performance and other quality incentive programs that tie financial rewards and sanctions to the quality and efficiency of care provided, and risk-based alternative payment models (APMs) such as bundled (episode-based) payments and accountable care organizations (ACOs) in which health care providers are held accountable for both the quality and cost of the care they deliver (Burwell, 2015; Rosenthal, 2008). In this report, these types of strategies, including both incentive programs and APMs, will be referred to broadly as “value-based payment” (VBP). The Patient Protection and Affordable Care Act of 2010 (ACA) prompted widespread adoption of VBP at the federal level by directing the Centers for Medicare & Medicaid Services (CMS) to implement payment reforms in the Medicare program and by establishing a number of tools CMS can use to achieve VBP goals.

OVERVIEW OF THE MEDICARE PROGRAM

Medicare is the government’s health care program for individuals age 65 and older, those with permanent kidney failure (end-stage renal disease [ESRD]), and some individuals with long-term disability (Medicare.gov,
n.d.-a). Medicare beneficiaries must be U.S. citizens or permanent legal residents. Medicare consists of four programs:

- Part A, the hospital insurance program that pays fee-for-service for inpatient hospital care, skilled nursing facility care, hospice care, and home health care;
- Part B, the medical insurance program that pays fee-for-service for outpatient care (physician services), home health care, durable medical equipment, and some preventive services;
- Part C, or Medicare Advantage (MA), are insurance programs run by Medicare-certified private companies that cover all the benefits and services covered under Part A and Part B, often include Part D pharmaceutical drug coverage, and may also cover additional benefits and services at extra cost; and
- Part D, the pharmaceutical drug reimbursement program that is also run by Medicare-approved private companies and for which Medicare pays approximately 75 percent of the cost (CMS, 2015h; MedPAC, 2014).

Persons under age 65 years receiving Social Security disability insurance benefits1 or who have permanent kidney failure (ESRD) and qualify for Social Security benefits also qualify for Medicare. Those with amyotrophic lateral sclerosis (ALS; Lou Gehrig’s disease) qualify for Medicare immediately upon receiving Social Security disability insurance and persons with ESRD receive Medicare benefits on the fourth month of dialysis treatment or the month the patient enters a qualifying hospital for a kidney transplant. All others receive coverage after a 24-month waiting period.

As with private health insurance, Medicare premiums and care are not free (Medicare.gov, n.d.-c). However, Medicare Part A is premium-free for Medicare beneficiaries 65 years of age or older who qualify for Social Security (requiring 40 quarters of work in which a threshold amount of Social Security taxes were paid).2 Part A premiums for those 65 years or older who do not meet the Social Security eligibility cost up to $407 per month in 2015. Monthly Medicare Part B premiums generally cost $104.90 (in 2015) but higher-income individuals pay more, up to $335.70 in 2015. Help with the cost of Medicare premiums is available to low-income beneficiaries meeting specific eligibility requirements through Medicaid. These beneficiaries are

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1 Persons under age 65 years receiving certain Railroad Retirement Board disability benefits also may qualify.

2 Government employees who did not pay into Social Security but paid Medicare payroll taxes and those who receive railroad retirement benefits also qualify for premium-free Part A at age 65 years.
frequently referred to as “dual-eligibles.” Persons who chose to enroll in MA (Medicare Part C) plans pay the Part B premium and any additional premium costs imposed by the plan provider. Medicare Part D premium costs vary based on level of coverage and the specific provider chosen by the beneficiary.

As with private insurance, Medicare Parts A and B include deductibles and coinsurance, and Part D also includes an out-of-pocket threshold ($4,700). Many Medicare beneficiaries have some sort of supplemental coverage for cost-sharing expenses under Medicare. Some enrollees in Parts A and B purchase what is known as Medicare Supplement Insurance (Medigap) policy, sold by private companies. In 2010, 14 percent of Medicare beneficiaries had no supplemental coverage (Cubanski et al., 2015).

Medicare is financed through beneficiary premiums, federal general revenue, and payroll taxes (Medicare.gov, n.d.-b). In 2014, Medicare benefit payments totaled $597 billion, among which 45 percent was for Part A benefits, 44 percent was for Part B benefits, and 11 percent was for Part D benefits (CBO, 2015).

In 2012, the program covered more than 37 million Americans among whom 30.3 million were 65 years of age or older and 6.9 million were disabled and under 65 years of age (CMS, 2013). The health status of Medicare beneficiaries, even within those who began Medicare coverage on the basis of age, varies widely. Medicare coverage is the same for all Medicare beneficiaries, regardless of the basis for original enrollment. That is, a 40-year-old beneficiary enrolled due to ESRD provisions or on the basis of Social Security Disability determination and who requires hospitalization for any Medicare-covered condition receives the same coverage at the same costs as an 85-year-old beneficiary who enrolled on the basis of age 20 years prior.

CURRENT STATUS OF VALUE-BASED PAYMENT IN MEDICARE

The ACA and subsequent legislation, including the Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act) and the Medicare Access and CHIP (Children’s Health Insurance Program) Reauthorization Act of 2015 require CMS to implement VBP programs for Medicare inpatient hospital care, ambulatory care, health plans, and post-acute care. Currently, there are eight VBP programs in Medicare, with two post-acute care programs in proposal or planning.³ These programs are summarized below and in Table A1-1. Appendix AA contains more detailed descriptions of the programs.

³ This report does not discuss innovation models conducted under the CMS Innovation Center and other demonstration programs, such as the Maryland all-payer model, the Nursing Home Value-Based Purchasing Demonstration, and the Bundled Payments for Care Improvement (BPCI) Initiative.
### TABLE A1-1 Summary of Medicare Value-Based Payment Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Incentive Design, Including Maximum Adjustment</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Readmissions Reduction Program&lt;sup&gt;b&lt;/sup&gt;</td>
<td>–1% 2013</td>
<td>Excess readmissions for AMI, HF, PN, COPD, total hip or knee arthroplasty</td>
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<tr>
<td></td>
<td>–2% 2014</td>
<td></td>
</tr>
<tr>
<td></td>
<td>–3% 2015</td>
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<tr>
<td>Hospital-Acquired Condition (HAC) Payment Reduction&lt;sup&gt;c&lt;/sup&gt;</td>
<td>Top 25% worst performing hospitals receive a reduction of 1% of all discharge payments</td>
<td>AHRQ Patient Safety Indicator 90 CDC NHSN infection measures&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hospital Value-Based Purchasing&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Only hospital program to offer sanctions and rewards; it is a zero-sum program; 1% in 2013, increasing 0.25% each year until 2%</td>
<td>Clinical process measures (i.e., measures related to getting appropriate treatments in a timely manner) Patient experience (taken from the Hospital Consumer Assessment of Healthcare Providers and Suppliers Survey) Clinical outcomes (30-day mortality for AMI, HF, and PN, as well as certain patient safety measures from AHRQ PSI 90 Composite and CDC NHSN CLABSI) Efficiency (Medicare spending per beneficiary [MSPB])</td>
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<tr>
<td>Medicare Shared Savings Program&lt;sup&gt;k&lt;/sup&gt;</td>
<td>ACO expenditures above/below benchmarks</td>
<td></td>
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<tr>
<td>Program</td>
<td>Comments</td>
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<tr>
<td>Hospital Readmissions Reduction Program</td>
<td>In FY 2015, more than 700 hospitals received payment reductions under the HAC reduction program.</td>
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</tr>
<tr>
<td>Excess readmissions for AMI, HF, PN, COPD, total hip or knee arthroplasty</td>
<td>In FY 2016, an estimated 78% of hospitals will be penalized, and 1.2% of hospitals will be penalized the maximum rate of 3%. The average hospital penalty among penalized hospitals is estimated to be -0.63%, totaling approximately $428 million.</td>
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<tr>
<td>Hospital–Acquired Condition (HAC) Payment Reduction Program</td>
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<td>Top 25% worst performing hospitals receive a reduction of 1% of all discharge payments.</td>
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<td>AHRQ Patient Safety Indicator 90 CDC NHSN infection measures</td>
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<tr>
<td>Hospital Value-Based Purchasing Program</td>
<td>Clinical and efficiency measures: demographics and comorbidities</td>
<td></td>
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<tr>
<td>Only hospital program to offer sanctions and rewards; it is a zero-sum program; 1% in 2013, increasing 0.25% each year until 2%</td>
<td>For FY 2015, 74% of hospitals had payment adjustments (bonuses or penalties) of less than 0.5%; only 8 percent of hospitals received bonuses of 0.5% or greater, and 18 percent of hospitals received penalties of 0.5% or greater.</td>
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<tr>
<td>Clinical process measures (i.e., measures related to getting appropriate treatments in a timely manner)</td>
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<tr>
<td>Patient experience (taken from the Hospital Consumer Assessment of Healthcare Providers and Suppliers Survey)</td>
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<tr>
<td>Clinical outcomes (30-day mortality for AMI, HF, and PN, as well as certain patient safety measures from AHRQ PSI 90 Composite and CDC NHSN CLABSI)</td>
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<tr>
<td>Efficiency (Medicare spending per beneficiary [MSPB])</td>
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<tr>
<td>Medicare Shared Savings Program</td>
<td>Demographics; case-mix; disease severity</td>
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<tr>
<td>ACO expenditures above/below benchmarks</td>
<td>For performance year 2014, 92 MSSP ACOs held spending to $806 million below their benchmarks, resulting in $341 million in payments to the ACOs and a net savings of $465 for the Medicare Trust Funds. No ACOs owed losses.</td>
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<td>APPENDIX A 129 Risk-Adjustment Included Comments</td>
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<tr>
<td>Demographic characteristics, clinical comorbidities, patient frailty</td>
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<td></td>
<td>In FY 2016, an estimated 78% of hospitals will be penalized, and 1.2% of hospitals will be penalized the maximum rate of 3%. The average hospital penalty among penalized hospitals is estimated to be -0.63%, totaling approximately $428 million.</td>
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<tr>
<td>Age, sex, comorbidities, complications§</td>
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<td></td>
<td>In FY 2015, more than 700 hospitals received payment reductions under the HAC reduction program.</td>
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<tr>
<td>Clinical and efficiency measures: demographics and comorbidities</td>
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<tr>
<td>Patient experience: education, self-rated health, response percentile, primary language other than English, age, service line (maternity/surgical/medical), interactions (surgical line* age, maternity line* age)§</td>
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<tr>
<td>MSPB: price-standardized</td>
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<tr>
<td>Demographics; case-mix; disease severity</td>
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<td></td>
<td>For performance year 2014, 92 MSSP ACOs held spending to $806 million below their benchmarks, resulting in $341 million in payments to the ACOs and a net savings of $465 for the Medicare Trust Funds. No ACOs owed losses.</td>
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### TABLE A1-1  Continued

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<thead>
<tr>
<th>Program</th>
<th>Incentive Design, Including Maximum Adjustment</th>
<th>Measures</th>
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<tbody>
<tr>
<td>Physician Value-Based Modifier*</td>
<td>Budget neutral; rewards and penalties</td>
<td>Quality: composite score covering six domains (effective clinical care; person and caregiver-centered experience and outcomes; community/population health; patient safety; communication and care coordination; and efficiency and cost reduction)**</td>
</tr>
<tr>
<td></td>
<td>Category 1 (have met minimum reporting requirements): Value modifier calculated using CMS quality tiering methodology (or, in 2015, groups could choose a neutral modifier)</td>
<td>Cost: composite score covering two domains (per capita costs for all attributed beneficiaries and per capita costs for beneficiaries with specific conditions)</td>
</tr>
<tr>
<td></td>
<td>Category 2 (have not met minimum reporting requirements): fixed negative adjustment of −1% in 2015 and −2% in 2016</td>
<td></td>
</tr>
<tr>
<td>End-Stage Renal Disease Quality Incentive Program†</td>
<td>−2%</td>
<td>Quality: clinical measures (anemia management, dialysis adequacy, iron management, bone mineral metabolism, vascular access, patient mineral metabolism, vascular access, patient satisfaction) and reporting measures</td>
</tr>
</tbody>
</table>
### Program Incentive Design, Including Maximum Adjustment Measures

**Physician Value-Based Modifier**

- **Budget neutral; rewards and penalties**
  - **Category 1** (have met minimum reporting requirements): Value modifier calculated using CMS quality tiering methodology (or, in 2015, groups could choose a neutral modifier)
  - **Category 2** (have not met minimum reporting requirements): fixed negative adjustment of –1% in 2015 and –2% in 2016

**Quality: composite score covering six domains** (effective clinical care; person and caregiver-centered experience and outcomes; community/population health; patient safety; communication and care coordination; and efficiency and cost reduction)

**Cost: composite score covering two domains** (per capita costs for all attributed beneficiaries and per capita costs for beneficiaries with specific conditions)

### End-Stage Renal Disease Quality Incentive Program

- **Quality measures:** anemia management, dialysis adequacy, iron management, bone mineral metabolism, vascular access, patient satisfaction and reporting measures

### Risk-Adjustment Included

<table>
<thead>
<tr>
<th>Quality measures: age, sex</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient experience: age, education, general health status, mental health status, Medicaid status, low-income subsidy, Asian language survey (Cantonese/Korean/Mandarin/Vietnamese), survey mode (proxy helped or answered)</td>
<td></td>
</tr>
<tr>
<td>Cost measures: age, sex, original reason for Medicare entitlement, disability status, Medicaid enrollment, clinical comorbidities</td>
<td></td>
</tr>
</tbody>
</table>

In 2015, 691 groups fell into Category 1 and 319 were designated to Category 2. Of Category 1 groups, 127 groups elected to have their Value Modifier calculated using quality tiering. Among these, 14 groups received upward adjustments for performance, 81 received no adjustments, 11 received negative adjustments, and 21 received no adjustment due to insufficient data to determine quality and cost performance. A total of $11.4 million was distributed from groups receiving negative adjustments to those receiving positive adjustments.

This program expires in 2018 and will be replaced in 2019 by the Merit-based Incentive Payment System.

### Adults patients: Age, dialysis onset, body surface, body mass, comorbidities

### Pediatric patients: age, dialysis method

**Patient experience:** survey mode; overall health; overall mental health; heart disease; deaf or serious difficulty hearing; blind or serious difficulty seeing; difficulty concentrating, remembering, or making decisions; difficulty dressing or bathing; age; sex; education; speaks language other than English at home; did someone help the patient complete the survey; total years on dialysis

Also adjusted for volume, geographic factors, wage index

69.1% of facilities were expected to have no payment reduction in 2012. 16.6% of facilities were expected to receive a 0.5% reduction, 6.0% a 1.0% reduction, 7.7% a 1.5% reduction, and 0.6% a 2.0% reduction.

Also adjusted for volume, geographic factors, wage index
### TABLE A1-1 Continued

<table>
<thead>
<tr>
<th>Program</th>
<th>Incentive Design, Including Maximum Adjustment Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare Advantage (MA)</td>
<td>Confidentiality and transparency measures for MA plans, Part D Star Rating contributes to overall plan rating</td>
</tr>
<tr>
<td>(Part C)</td>
<td>Star Quality ratings</td>
</tr>
<tr>
<td></td>
<td><strong>Skilled Nursing Facility Value-Based Purchasing</strong></td>
</tr>
<tr>
<td></td>
<td>Incentive program begins in 2019</td>
</tr>
<tr>
<td></td>
<td>Star Quality Ratings (for MA Part D plans, Part D Star Rating contributes to overall plan rating)</td>
</tr>
<tr>
<td></td>
<td>For 2018, quality domains include skin integrity and changes in skin integrity; incidence of major falls; functional status, cognitive function, and changes in function or cognitive function. CMS proposed the NQF-endorsed, 30-day all-cause readmission measures for the incentive program</td>
</tr>
<tr>
<td></td>
<td><strong>Home Health Value-Based Purchasing</strong></td>
</tr>
<tr>
<td></td>
<td>Incremental increase in maximum penalties or rewards of 5% in 2018, 6% in 2020, 8% in 2021</td>
</tr>
<tr>
<td></td>
<td>Proposed measures to cover clinical processes, clinical outcomes, patient safety, patient and caregiver experience, population/community health, efficiency, and cost reduction</td>
</tr>
</tbody>
</table>

**NOTE:** ACO = accountable care organization; AHRQ = Agency for Healthcare Research and Quality; AMI = acute myocardial infarction; CDC = Centers for Disease Control and Prevention; CMS = Centers for Medicare & Medicaid Services; CLABSI = Central Line-associated Bloodstream Infection; COPD = chronic obstructive pulmonary disease; FY = fiscal year; HCC = hierarchical condition categories; HF = heart failure; MSSP = Medicare Shared Savings Program; NHSN = National Healthcare Safety Network; NQF = National Quality Forum; PN = pneumonia; PSI = patient safety indicator.
<table>
<thead>
<tr>
<th>Risk-Adjustment Included</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality measures: CMS–HCC model, which includes age, sex, clinical comorbidities, Medicaid status, disabled status, and working aged status</td>
<td>Nearly 75% of plans pay a portion of their profits to Medicare each year under risk corridors; between 2010 and 2012, total annual payments ranged between $900 million and $1 billion</td>
</tr>
<tr>
<td>Patient experience: age, education, general health status, mental health status, survey mode (proxy helped or answered), Medicaid status, low-income subsidy, and Chinese language survey</td>
<td></td>
</tr>
<tr>
<td>Age, education, general health status, mental health status, survey mode (proxy helped or answered), Medicaid status, low-income subsidy, and Chinese language survey</td>
<td></td>
</tr>
</tbody>
</table>
TABLE A1-1  Continued

/ CMS, 2015e.
/ HHS, 2014b.
/ Unless indicated otherwise, the information in this row is from MLN, 2013.
/ HCAHPS, 2013.
/ GAO, 2015.
/ Unless indicated otherwise, the information in this row is from CMS, 2014c.
/ CMS, 2015i.
/ Unless indicated otherwise, the information in this row is from CMS, n.d.-c.
/ CMS, 2015b.
/ CMS, 2015a.
/ CMS, n.d.-a.
/ CMS, 2015k.
/ Unless indicated otherwise, information in this row is from CMS, 2015c.
/ CMS, 2015f.
/ MedPAC, 2015c.
/ Mullin, 2012.
/ Unless indicated otherwise, information in this row is from MedPAC, 2015b.
/ CMS, 2015g.
/ Unless indicated otherwise, information in this row is from MedPAC, 2014.
/ Medicare.gov, n.d.-d.
/ CMS, 2015g.
/ Unless indicated otherwise, information in this row is from CMS, 2015j.
/ Unless indicated otherwise, information in this row is from HHS, 2015.

Medicare Value-Based Payment Programs for Hospital Inpatient Care

Hospital Readmissions Reduction Program

The Hospital Readmissions Reduction Program (HRRP) requires CMS to reduce a share of the base operating payments to acute care hospitals paid under the Inpatient Prospective Payment System (IPPS) that have the highest readmission rates (CMS, 2014d). For fiscal years (FY) 2013 and 2014, CMS adopted measures to calculate excess readmissions for three conditions: acute myocardial infarction (AMI), heart failure, and pneumonia. In FY 2014, CMS refined the measure to account for planned readmissions, and in FY 2015, CMS expanded the program to include excess readmissions from two additional conditions: chronic obstructive pulmonary disease (COPD) and total hip arthroplasty or total knee arthroplasty. For FY 2013, the maximum reduction was 1 percent of a hospital’s base operating payment; for FY 2014, the maximum reduction was 2 percent; and for FY 2015, the maximum reduction is 3 percent (CMS, 2014d).
Hospital-Acquired Condition Payment Reduction

The Hospital-Acquired Condition Payment Reduction program requires the Secretary of Health and Human Services to reduce payments to acute care hospitals paid under the IPPS based on their performance on select risk-adjusted hospital-acquired condition quality measures beginning in FY 2015 (discharges beginning October 1, 2014) (CMS, 2015e). Performance measures include the Agency for Healthcare Research and Quality Patient Safety Indicator 90 and the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) infection measures. The top 25 percent worst performing hospitals receive a payment reduction of 1 percent for all discharges in those hospitals (CMS, 2014b).

Hospital Value-Based Purchasing

The Hospital Value-Based Purchasing program is a pay-for-performance program also for acute care hospitals paid under the IPPS and implemented by CMS beginning FY 2013 (MLN, 2013). In this program, hospitals are eligible for either incentive payments (rewards) or penalties for their performance; it is the only Medicare hospital incentive program that offers both rewards and sanctions. In FY 2013, performance measures included clinical process measures and patient experience measures. CMS added clinical outcome measures to the total performance measures in FY 2014. In FY 2015, CMS also added an efficiency measure, Medicare spending per beneficiary (MSPB). Clinical and efficiency measures are currently risk adjusted for patient demographics and comorbidities; MSPB is also price standardized (MLN, 2013).

Maximum rewards and penalties can equal up to a total of 1 to 2 percent of a hospital’s base operating payment: 1 percent in FY 2013 and increasing in 0.25 percent increments annually to 2 percent in FY 2017 and future years (MLN, 2013). The program is a zero-sum program, so the total incentive payments must equal the total reduced payments (penalties).

Medicare Value-Based Payment Programs for Ambulatory Care

Medicare Shared Savings Program

The Medicare Shared Savings Program (MSSP) is a key payment and delivery system reform program of the ACA, implemented beginning in 2014 (CMS, 2015l). MSSP reforms payments to ACOs and aims to motivate delivery and organizational reforms that improve care coordination across providers, as well as the quality and efficiency of care (CMS, 2015l).
To calculate shared savings and losses, CMS first establishes a benchmark for each performance year based on 3 years of per-beneficiary costs for traditional, fee-for-service Medicare Part A and Part B for the beneficiaries enrolled in the ACO. The benchmark is also adjusted at the beginning of each agreement period for “beneficiary characteristics and such other factors as the Secretary [of Health and Human Services] determines appropriate” (CMS, 2014c; MLN, 2014). This risk adjustment is currently performed using the CMS–hierarchical condition categories model originally developed for MA, and includes certain demographic characteristics, case-mix, and disease severity (CMS, 2014c, n.d.-d; MedPAC, 2015a). The benchmark reflects the expected per-beneficiary costs for the performance period.

At the end of each performance period, CMS compares MSSP ACOs’ actual spending to the calculated benchmark. As of January 1, 2015, 404 ACOs covering 7.92 million Medicare beneficiaries in 49 states; Washington, DC; and Puerto Rico entered into a Shared Savings Program agreement with CMS (CMS, 2015d).

**Physician Value-Based Modifier**

The Physician Value-Based Modifier is a budget-neutral pay-for-performance program required by the ACA and established by CMS beginning in 2015. Under this program, physicians can receive incentive payments for high-quality, efficient care and penalties for poor performance (CMS, n.d.-c).

CMS divides eligible physicians into two categories based on whether they meet minimum reporting requirements using the Physician Quality Reporting System (Category 1) or not (Category 2). In general, physicians in Category 1 are subject to value modifier payment adjustments based on the quality and cost of the care they provided during the performance period, while those in Category 2 are subject to a value modifier payment set at a fixed downward adjustment (CMS, 2015b, n.d.-c). Quality measures are adjusted for patient demographics (age and sex), and cost measures are adjusted for patient demographics (e.g., age, sex, original reason for Medicare entitlement, disability status, Medicaid enrollment) and clinical comorbidities (CMS, n.d.-c). The program is budget neutral; total upward adjustments for Category 1 must equal total downward adjustments for Categories 1 and 2 combined (CMS, 2015b). In other words, funds from the worst performing physician groups are redistributed to the best performing groups.

**End-Stage Renal Disease Quality Improvement Program**

The End-Stage Renal Disease Quality Improvement Program is authorized under the Medicare Improvements for Patients and Providers Act,
which requires CMS to reduce payments to outpatient dialysis facilities treating patients with ESRD based on quality of care (CMS, 2015c). Beginning in 2012, CMS reduced the bundled payment rate to ESRD facilities that perform poorly by up to 2 percent. CMS groups its quality measures into two groups: clinical measures, which reflect a facility’s clinical performance, and reporting measures, which assess whether facilities have met reporting requirements (CMS, 2015c). CMS then calculates both an achievement score and an improvement score for each clinical measure (except the CDC NHSN Bloodstream Infection in Hemodialysis Outpatients measure, which is given only an achievement score) (CMS, 2014a). Facilities that meet a minimum total performance score will receive full payment, while those that fall under it may receive a reduction between 0.5 percent and 2.0 percent (CMS, 2014a, n.d.-b).

**Medicare Value-Based Payment Programs for Health Plans**

**Medicare Advantage/Part C**

As described in the previous section, MA or Medicare Part C is the insurance program that covers the Part A and Part B benefits, typically offers Part D prescription drug coverage, and may offer additional benefits and services at additional cost (MedPAC, 2015b). Compared to traditional, fee-for-service Medicare (i.e., Part A and Part B), MA plans can limit providers, provide supplemental benefits (e.g., additional coverage or reduced cost sharing), and charge a premium for the supplemental benefits (MedPAC, 2015b). In 2015, roughly 30 percent of Medicare beneficiaries were enrolled in MA plans (MedPAC, 2015b). Medicare pays private insurance companies to run the insurance programs. In 2014, these payments totaled $159 billion. Plans with higher-quality ratings have bonus payments added to their benchmark through the Medicare Five-Star Rating System. Payments are also risk adjusted for patient characteristics (MedPAC, 2015b).

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4 The committee included Medicare Part C and Part D, because the study sponsor, the Office of the Assistant Secretary for Planning and Evaluation of the Department of Health and Human Services, included them as relevant payment models in its presentation to the committee at the first meeting (Epstein, 2015), and thus the program is of interest to them. Additionally, the committee considers Part C and Part D to have important design features through which quality and cost performance affect payment and market share. As described in more detail below, Part C and Part D are both risk-sharing models of payment, which necessitates consideration of risk adjustment for the capitation amount or global spending target, and also include other value-based payment mechanisms, such as bonus payments (Part C) and risk corridors (Part D).
Medicare Part D

Medicare Part D is a reimbursement program for pharmaceutical drugs. In calendar year (CY) 2013, 35.7 million Americans were enrolled in Medicare Part D, and in FY 2014, expenditures totaled $73.3 billion (HHS, 2014a). Although CMS administers Part D, the individual plans are run by Medicare-approved private insurance plans that submit annual bids to CMS to cover expected benefit and administrative costs (MedPAC, 2015d). These plans are paid through several mechanisms. CMS pays plans direct subsidies, which take the form of a monthly prospective payment and cover approximately 75 percent of an enrollee’s premium (MedPAC, 2015d). CMS then subtracts the cost of an enrollee’s premium (calculated as the difference between a plan’s bid for basic benefits and the national average bid) from the risk-adjusted payment to calculate the final direct subsidy payment. For low-income enrollees, Medicare pays plans an additional low-income subsidy to cover most of the cost sharing and premiums (i.e., costs above the direct subsidy otherwise paid for by the enrollee out of pocket) (MedPAC, 2015d). Medicare also pays plans through two risk-sharing mechanisms: individual reinsurance and risk corridor adjustments.

Medicare Value-Based Payment Programs for Post-Acute Care

Skilled Nursing Facility Value-Based Purchasing

The IMPACT Act requires CMS to implement a quality-reporting program for Skilled Nursing Facilities (SNFs) and the Protecting Access to Medicare Act of 2014 authorizes an SNF incentive program (CMS, 2015j). Beginning 2018 and in accordance with the IMPACT Act, SNFs will be required to report quality data on three quality domains to CMS or face a payment reduction of 2 percent (CMS, 2015j).

Home Health Value-Based Purchasing

CMS proposed a Home Health Value-Based Purchasing model and included program details in the CY 2016 Home Health Prospective Payment Final Rule (HHS, 2015). Under this program, home health agencies would be subject to upward or downward payment adjustments based on quality measured over 5 performance years. Proposed maximum adjustments would increase incrementally from 5 percent in 2018 and 2019, to 6 percent in 2020, and 8 percent in 2021 and 2022 (HHS, 2015). In its proposal, CMS identified possible quality measures covering clinical processes, clinical outcomes, patient safety, patient and caregiver experience, population/community health, and efficiency and cost reduction for use in
the program. Additionally, CMS sought public comment on constructing the initial set of quality measures for the program (HHS, 2015).

Future Directions for Medicare Value-Based Payment

VBP is a key goal of the Department of Health and Human Services (HHS) and is likely to be taken up more widely in the future. In 2015, Secretary of HHS Sylvia Burwell announced three primary strategies by which HHS aims to achieve VBP goals (Burwell, 2015). These strategies build on the initiatives described throughout this section as well as a number of demonstration and pilot programs, and include using financial incentives, implementing delivery system and organizational reforms that promote better care coordination across providers and settings, and improving the information available to both providers and patients to help them make informed decisions (Burwell, 2015). Whether VBP and these strategies are successful at improving quality and patient experiences and reducing costs in the long run remains to be seen. However, based on early results, policymakers, health care researchers, advocates, and other stakeholders have begun to raise concerns about potential unintended consequences VBP may have on health disparities.

POTENTIAL UNINTENDED CONSEQUENCES OF VALUE-BASED PAYMENT ON VULNERABLE POPULATIONS AND HEALTH DISPARITIES

Impact of Value-Based Payment on Providers Serving Vulnerable Populations

A wide range of stakeholders representing government, academia, providers, advocates, and others have raised concerns that some of Medicare’s VBP programs, especially the HRRP, may be disproportionately penalizing hospitals serving the most vulnerable patients. This concern is grounded in part in an understanding of health outcomes as emerging from the interaction between patients and the health care system rather than being properties of either in isolation. When outcomes depend on both provider and consumer, provider inputs may differ according to consumer needs, with implications for provider reimbursement. In other words, resources required to care for patients may differ depending on the patient’s life circumstances, symptoms, needs, and abilities to interact with the health care system, and whether a health system’s processes and programs support these patient differences (Batalden et al., 2015; Loeffler et al., 2013). Because providers serving vulnerable populations are likely to have fewer resources to begin with (e.g., lower operating margins, fewer board-certified
physicians) and because more vulnerable and complex patients may require more resources to achieve certain health outcomes, providers serving these patients may be more likely to fare poorly on quality rankings and receive financial penalties and less likely to receive incentive payments (Chien et al., 2007; Joynt and Rosenthal, 2012; Ryan, 2013).

Several studies have shown that larger hospitals, teaching hospitals, and safety-net hospitals, which traditionally serve more disadvantaged patients, are more likely to rank poorly on quality measures and therefore are more likely to be penalized under Medicare VBP programs (Berenson and Shih, 2012; Gilman et al., 2014, 2015; Joynt and Jha, 2013; Rajaram et al., 2015). An analysis by the Medicare Payment Advisory Commission (MedPAC) found that not only were hospitals serving the most low-income patients more likely to be penalized under the HRRP, but also their average penalty was double that of those serving the fewest low-income patients (MedPAC, 2013). Studies have also shown that hospitals serving more racial and ethnic minorities and those in metropolitan areas may be more likely to be penalized under Medicare VBP reforms (Shih et al., 2015; Williams et al., 2014). Other studies have found that these types of hospitals would similarly rank poorly and be more likely to be penalized under potential expansions of Medicare VBP programs to include other conditions (Ly et al., 2010; Sjoding and Cooke, 2014). Likewise, earlier studies found that hospitals serving greater proportions of racial and ethnic minorities were more likely to have low quality rankings, less likely to be eligible for bonus payments, and more likely to be penalized (Karve et al., 2008; Mehta et al., 2008). An analysis of the impact of implementing pay-for-performance in primary care in Massachusetts found that primary care practices with more vulnerable populations would receive less per practice compared to practices with fewer vulnerable patients (Friedberg et al., 2010).

Studies have also looked at the neighborhoods in which providers are located. Blustein and colleagues (2010) found that neighborhood resources (poverty, unemployment, health care provider shortages, and low educational achievement) were associated with hospital performance on health care process measures proposed for Medicare’s Hospital Value-Based Purchasing Program. Specifically, hospitals located in areas with fewer college graduates in the workforce or higher levels of chronic poverty and those located in counties that were partly or entirely designated health professional shortage areas had significantly worse performance scores for AMI and HF. Chien and colleagues (2012) found that in the Integrated Healthcare Association’s pay-for-performance program provider organizations located in neighborhoods with higher socioeconomic status (SES) were more likely to have above average performance rankings.
Impact of Value-Based Payment on Health Disparities

That providers serving vulnerable populations may be disproportionately penalized under Medicare’s VBP programs has raised concerns that these programs have the potential to increase health disparities (Casalino et al., 2007; Friedberg et al., 2010; Ryan, 2013). If providers serving vulnerable populations are likely to have fewer resources to begin with and providers serving these patients may be more likely to receive financial penalties and less likely to receive incentive payments, as is suggested above, value-based purchasing programs may be taking resources from the organizations who need it most (Chien et al., 2007; Ryan, 2013). In so doing, value-based purchasing would widen the resource gap between providers serving vulnerable populations and those serving patients who are better off (Chien et al., 2007). Moreover, because more vulnerable patients may need more resources to achieve certain health outcomes, widening the resource gap may also lead to widening health disparities (Bhalla and Kalkut, 2010; Ryan, 2013). Two studies of the Medicare Premier Hospital Quality Incentive Demonstration found no evidence that pay-for-performance widened racial disparities in performance (clinical processes or outcomes) (Epstein et al., 2014), nor did incentives widen disparities between hospitals serving more poor patients compared to those serving fewer poor patients (Jha et al., 2010). However, because hospital participation in the demonstration program was voluntary, effects may not be generalizable.

Improving Value-Based Payment to Address Unintended Consequences

While the impact of value-based purchasing strategies on providers serving vulnerable populations and on health disparities continues to be monitored both under Medicare and more widely, and because more VBP programs are being implemented and existing programs are expanding, some methods have been proposed to improve these payment programs to address the potential unintended consequences on vulnerable populations and disparities. Chief among methods proposed to improve VBP to address these unintended consequences is accounting for differences in patient characteristics when measuring quality and calculating payments, sometimes referred to as risk adjustment or payment adjustment. Most emerging VBP strategies recognize that differences in patient characteristics may impact health care outcomes and costs independently of variations in the provision of care, and that these must be accounted for when measuring quality and calculating payments (Rosenthal, 2008). Currently, and as detailed in the Medicare payment program descriptions earlier in the chapter in Table A1-1 and in Appendix AA, patient characteristics included in these adjustments typically include only certain demographic and
Clinical characteristics (e.g., age, sex, and clinical comorbidities). If patient characteristics beyond demographic and clinical information contribute to differences in underlying risk that cause differences in health care outcomes and costs, certain policymakers, researchers, health care providers, and other stakeholders have proposed that these other characteristics should also be accounted for when measuring quality and calculating payments (Boozary et al., 2015; Feemster and Au, 2014; Fiscella et al., 2014; Girotti et al., 2014a; Jha and Zaslavsky, 2014; Joynt and Jha, 2013; Lipstein and Dunagan, 2014). Specific characteristics proposed for inclusion when calculating payments include SES and other social determinants of health (e.g., race or ethnicity, health literacy, and English language proficiency).

Accounting for Social Risk Factors in Value-Based Payment

The primary method proposed to account for social risk factors in value-based payment has been to include them in risk adjustment of performance measures used as the basis for payment. To that end, it is important to separate two different methods—risk adjustment and payment adjustment. Risk adjustment primarily aims to improve measurement accuracy, such as for the purposes of quality assessment and public reporting, but becomes a method of payment adjustment when measures that are risk adjusted are used as the basis for payment. In other words, risk adjustment can include social factors for the purposes of measurement accuracy without affecting payment. Similarly, payment adjustment can be done by basing payment on measures that are risk adjusted or through other methods, such as directly funding programs to improve the quality of care for disadvantaged patients (Berenson and Shih, 2012). However, because recent discussions about including SES and other social determinants of health in risk adjustment occurs in the latter context of value-based purchasing, these two issues have been conflated, proposed adjustments have implications for health equity and fairness of provider reimbursement, and the proposal has controversial.

Critics of including social factors in risk adjustment argue that what may appear as differences by social groups may be genuinely attributed to quality differences and not the social factors themselves. In this case adjusting for the social factor would obscure genuine disparities and make it more difficult to hold those providing lower-quality care accountable (Jha and Zaslavsky, 2014; Kertesz, 2014; Krumholz and Bernheim, 2014; O’Kane, 2015). They further argue that so doing implicitly accepts a lower standard for vulnerable patients (Bernheim, 2014; Jha and Zaslavsky, 2014). This would not only enable lower quality care for disadvantaged persons, but would also reduce incentives for improvement (Bernheim, 2014; Kertesz, 2014). Additionally, critics note that social factors account for very
little variance in performance measurement, so including social factors in risk adjustment models would not substantially change quality rankings (Bernheim, 2014; Krumholz and Bernheim, 2014). Finally, they suggest that other ways of accounting for social factors such as directly funding programs for vulnerable patients, providing incentives based on improvement and not achievement, adjusting payment rather than performance measurement, and phasing in penalties to disadvantaged providers more slowly may be more appropriate (Bernheim, 2014).

Proponents argue that certain social factors lie outside the control of providers and thus hospitals should not be accountable for them (Jha and Zaslavsky, 2014; Joynt and Jha, 2013; Pollack, 2013; Renacci, 2014). In this way of thinking, social factors are confounders masking true performance, and adjusting for them provides more accurate measurement (Fiscella et al., 2014; Jha and Zaslavsky, 2014). If this is the case, risk adjusting for social factors would ensure that hospitals are being fairly assessed and that providers caring for more disadvantaged patients are not punished precisely for caring for these patients (Girotti et al., 2014b). Indeed, if serving disadvantaged patients results in disproportionate penalties, this may disincentivize providers from caring for them (Joynt and Jha, 2013). Others also raise concerns that because disproportionate penalties will further reduce the already limited resources of providers serving greater shares of disadvantaged patients with even fewer financial resources, quality in these providers will likely worsen (Grealy, 2014; Ryan, 2013), and the organizations could potentially fail, leaving fewer providers to care for disadvantaged patients (Lipstein and Dunagan, 2014). In both cases, this would widen disparities.

Operating under the assumption that social factors do impact health care quality and efficiency outcomes independently of variations in the provision of health care, a small number of analyses have included SES and other social determinants of health in risk adjustment of provider performance profiles to estimate the effect of including social factors in measuring quality, but findings have been mixed. Three studies found that including these social determinants had no impact on risk adjustment models, and thus hospital rankings (Blum et al., 2014; Eapen et al., 2015; Keyhani et al., 2014). One study found that including social determinants had little impact on most providers’ quality scores, but a substantial impact on a few (Zaslavsky and Epstein, 2005). Five studies found that including SES and other social determinants substantially altered provider quality rankings (Fiscella and Franks, 1999, 2001; Franks and Fiscella, 2002; Maney et al., 2007; Nagasako et al., 2014). One study found that including patient characteristics in adjusting payments rather than quality measures would reduce payment disparities (Damberg et al., 2015). Similarly, several studies have found that inclusion of SES in predictive models improves the models’
predictive ability (Amarasingham et al., 2010; Fleming et al., 2014; Han et al., 2012; Kansagara et al., 2011).

Previous Recommendations for Accounting for Social Risk Factors in Medicare Payment Programs

In light of this debate, two expert panels have previously examined whether to include social risk factors in risk adjustment for Medicare payment models and offered recommendations. In its June 2013 Report to the Congress, MedPAC recommended that CMS use two methods of adjustment, one for public reporting (i.e., quality measurement) and another for financial incentives. Readmissions rates for public reporting would remain unadjusted for socioeconomic disparities so as not to mask potential disparities in quality of care. However, when calculating penalties, hospitals would be compared not to all other hospitals as is currently done, but to hospitals with a similar patient mix (MedPAC, 2013). Their methodology would not only reduce the number of penalties to hospitals serving the most poor, but also the size of the penalty.

The National Quality Forum (NQF) is a nonprofit, membership-based organization that endorses standards for performance measurement. In 2013, NQF convened an expert panel, including representatives of health care providers, advocacy groups, government, industry, and academia to make recommendations about including SES and other social factors in risk adjustment for performance measures. In 2014, the panel released a technical report reversing NQF’s previous position to exclude “sociodemographic factors” in risk adjustment of performance measures used in “accountability applications” (i.e., as a basis of payment or public reporting). The panel recommended that sociodemographic factors should be included in risk adjustment if there is a conceptual relationship between a given factor and specific quality metrics as well as empirical evidence of that association (NQF, 2014). It also mentioned that the performance metric should specify risk adjustment methods to include the factor (NQF, 2014). Congress has also taken up the issue. Two bills proposed that CMS risk adjust readmissions measures used in the HRRP for patient SES and other related measures. Additionally, while authorizing the establishment of several VBP programs in Medicare, the IMPACT Act also required the Secretary

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5 Socioeconomic factors are defined as “a variety of socioeconomic (e.g., income, education, occupation) and demographic factors (e.g., race, ethnicity, primary language)” (NQF, 2014, p. 4).
of HHS submit a report to Congress by October 2016 that assesses the impact of SES on quality and resource use in Medicare using measures such as poverty and rurality from existing Medicare data. The IMPACT Act also required a report to Congress by October 2019 on the impact of SES on quality and resource use in Medicare using measures (e.g., education and health literacy) from other data sources. It also required qualitative analysis of potential SES data sources and secretarial recommendations on obtaining access to necessary data on SES and accounting for SES in determining payment adjustments (Epstein, 2015).

STATEMENT OF TASK

As input to the analyses to be included in the 2016 and 2019 reports to Congress, HHS, acting through the Office of the Assistant Secretary for Planning and Evaluation, asked the Institute of Medicine (IOM) to convene an ad hoc committee to provide a definition of SES for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Furthermore, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports. Details of the statement of task and the sequence of reports can be found in Box A1-1. In this first report, the committee will focus on the definition of SES and other social factors relevant to the health outcomes of Medicare beneficiaries. Reports will be released every 3 months, addressing each item in the statement of task in turn. It is important to note that the committee has been tasked with providing recommendations only in the fourth report.

Interpreting the Statement of Task

The statement of task for this report includes several key words that drove the committee’s work. The statement of task refers to identifying “SES factors” that “have been shown” to “impact” “health outcomes” of “Medicare beneficiaries.” This project is intended to provide very practical and targeted input to HHS and Congress as they consider whether to adjust Medicare payment programs for social risk factors. This project builds on decades of research assessing the social determinants of health; it does not reinvent or redefine that field of scholarship. The committee is narrowly
BOX A1-1
Statement of Task

An ad hoc committee will provide a definition of socioeconomic status (SES) for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Further, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports, which build on the Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine’s previous studies relevant to this study.

The first report will:
- Define socioeconomic status for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.
- Identify SES factors and other social factors (such as race, health literacy, limited English proficiency) that have been shown to impact health outcomes of Medicare beneficiaries.

The second report will:
- Identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations.

The third report will:
- Specify criteria (along with their strengths and weaknesses) that could potentially be used to determine whether an SES factor or other social factor should be accounted for in Medicare quality, resource use, or other measures used in Medicare payment programs.
- Identify SES factors or other social factors that could be incorporated into quality, resource use, or other measures used in Medicare payment programs.
- Identify methods that could be used in the application of SES factors and other social factors to quality, resource use, or other measures used in Medicare payment programs.

The fourth report will:
- For each of the SES factors or other social factors described above, recommend existing or new sources of data on these factors and/or strategies for data collection, while also identifying challenges to obtaining appropriate data and strategies for overcoming these challenges.

In the fifth report:
- The committee will synthesize and interpret the four brief reports issued as described above into one report that will include comprehensive project findings, conclusion, and recommendations based on the four previous reports.
focused on how social risk factors affect health care use and outcomes of a specific group of people—Medicare beneficiaries—in response to encounters with the health care system, not how social factors affect health status generally.

As will be defined in Chapter 2, the committee identified five social risk factors that are conceptually likely to be of importance to health outcomes of Medicare beneficiaries: socioeconomic position; race, ethnicity, and cultural context; gender; social relationships; and residential and community context. Although an independent risk factor and not a social factor, the committee included health literacy as another important factor, because it is specifically mentioned in the IMPACT Act and thus is of interest to Congress, and because it is affected by social factors. Additionally, although the statement of task specifies only examining the impact of these social risk factors on “health outcomes,” it also specifies that the social risk factors should be targeted “for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.” Thus, given the importance that Medicare VBP programs has placed on this broader set of measures and given that Medicare applies these measures when calculating payments, the committee interpreted “health outcomes” as encompassing measures of health care use, health care outcomes, and resource use. Hence, the committee included two domains of health care use measures (health care utilization and clinical processes of care) and one measure of resource use (costs) in the literature search. In addition to health (clinical care) outcomes, the committee also included related outcomes of patient experience and patient safety.

Figure A1-1 illustrates the committee’s conceptual framework. The framework illustrates the primary hypothesized relationships by which social risk factors may directly or indirectly affect health care use, health care outcomes, and resource use outcomes among Medicare beneficiaries. In the figure, dotted arrows represent feedback mechanisms and bold lettering highlights social risk factors plus health literacy and the domains included in the expanded definition of “health outcomes” that are at issue in this report. The framework is not intended to illustrate the entire universe of potential causes and risks.

The conceptual framework applies to all Medicare beneficiaries, including disabled beneficiaries and beneficiaries with ESRD, because although the committee acknowledges that the Medicare population is heterogeneous (even among beneficiaries age 65 and older), the committee expects the effect of social risk factors to be similar for all Medicare subpopulations (beneficiaries with disabilities, those with ESRD, and older adults). Any variation in the effect of social risk factors among disabled Medicare beneficiaries under age 65, Medicare beneficiaries age 65 and older, and beneficiaries with ESRD is considered to fall within a continuous spectrum of effects. The committee
FIGURE A1-1 Conceptual framework of social risk factors for health care use, outcomes, and cost. NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships.
will revisit this assumption in subsequent reports. It is important to note that disabled Medicare beneficiaries are systematically different from persons with disabilities more generally, because in order to be eligible for federal disability benefits, a person must be unable to work, have a low income, and meet certain medical criteria (SSA, n.d.). As such, they are by definition a more socially vulnerable group for which social risk factors may be particularly salient, similar to older adults. Finally, Medicare coverage and the quality measures used to assess health care and health outcomes do not differ for Medicare beneficiaries by origin of entitlement (i.e., whether an individual qualified because of disability, age, or ESRD), except for certain measures of ESRD care and outcomes, and thus the health outcomes in the framework are also equally applicable.

Current Medicare quality measures fall within each of the domains embraced by the committee in the expanded definition of “health outcomes”—health care use, health care outcomes, and resource use outcomes. The committee expects that quality measures will change over time, but developed a framework that will remain stable regardless of the specific measures used to assess the theoretical constructs. Thus, it is important to note that what Medicare currently considers a quality “outcome” may not necessarily align with the committee’s definition of a health care outcome. For example, Medicare and health care quality experts frequently consider readmissions to be an outcome of care. However, in the committee’s conceptual framework, readmissions are more theoretically consonant as a measure of utilization that is given a quality interpretation. Table A1-2 contains examples of Medicare quality measures currently in use in each of the health care use and outcome domains.

COMMITTEE PROCESS AND OVERVIEW OF THIS REPORT

The committee comprises expertise in health disparities, social determinants of health, risk adjustment, Medicare programs, health care quality, clinical medicine, and health services research. Appendix F contains biographical sketches for the committee members. The committee will meet five times over 12 months and issue five brief, consensus reports. The committee met in open, public session at its first meeting to discuss the charge to the committee with the leadership of the Office of the Assistant Secretary for Planning and Evaluation. In the next (and final) chapter of this report, the committee presents the results of a literature search to identify those social risk factors that have been shown to influence health care use, costs, and health care outcomes.

The literature search was conducted by a professional librarian available to committees of the IOM. The committee limited its search to studies on patients in the United States, and to review articles published from
### TABLE A1-2 Health Care Use and Outcome Domains and Example Medicare Quality Measures

<table>
<thead>
<tr>
<th>Health Care Use or Outcome Domain</th>
<th>Example Medicare Quality Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health Care Use</strong></td>
<td></td>
</tr>
<tr>
<td>Clinical Processes of Care</td>
<td>• HbA1c testing for beneficiaries with diabetes</td>
</tr>
<tr>
<td></td>
<td>• Influenza and pneumonia vaccination</td>
</tr>
<tr>
<td></td>
<td>• Primary percutaneous coronary intervention received within 90 minutes of hospital arrival for patients with AMI</td>
</tr>
<tr>
<td></td>
<td>• Blood cultures performed in the emergency department prior to initial antibiotic received in hospital for patients with pneumonia</td>
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<tr>
<td></td>
<td>• Anemia management for kidney disease patients</td>
</tr>
<tr>
<td>Utilization</td>
<td>• Hospital admissions for COPD exacerbations</td>
</tr>
<tr>
<td></td>
<td>• Heart failure admissions</td>
</tr>
<tr>
<td></td>
<td>• 30-day readmissions after hospital discharge for AMI, heart failure, pneumonia, COPD, or total hip arthroplasty/total knee arthroplasty</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td></td>
</tr>
<tr>
<td>Resource Use (costs)</td>
<td>• Medicare spending per beneficiary</td>
</tr>
<tr>
<td>Health (Clinical Care)</td>
<td>• Diabetes composite quality indicator (controlled diabetes, short- and long-term diabetes complications, lower-extremity amputation for diabetes)</td>
</tr>
<tr>
<td></td>
<td>• 30-day mortality after hospital discharge for AMI, heart failure, or pneumonia</td>
</tr>
<tr>
<td>Patient Safety</td>
<td>• AHRQ Patient Safety Indicator composite (pressure ulcer, iatrogenic pneumothorax, central venous catheter-related bloodstream infections, postoperative hip fracture, perioperative pulmonary embolism or deep vein thrombosis, postoperative sepsis, postoperative wound dehiscence, accidental puncture or laceration)</td>
</tr>
<tr>
<td></td>
<td>• Central line-acquired bloodstream infection</td>
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<tr>
<td></td>
<td>• Catheter-acquired urinary tract infection</td>
</tr>
<tr>
<td></td>
<td>• Surgical site infection</td>
</tr>
<tr>
<td></td>
<td>• Incidence of major falls for post-acute care patients</td>
</tr>
<tr>
<td>Patient Experience</td>
<td>• Communication with nurses</td>
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<tr>
<td></td>
<td>• Communication with doctors</td>
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<tr>
<td></td>
<td>• Getting timely appointments, care, and information</td>
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<td></td>
<td>• Getting information from Part D drug plan</td>
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<tr>
<td></td>
<td>• Helpful, courteous, and respectful office staff</td>
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<tr>
<td></td>
<td>• Responsiveness of hospital staff</td>
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<tr>
<td></td>
<td>• Care coordination</td>
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<td></td>
<td>• Pain management</td>
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<td></td>
<td>• Communication about medications</td>
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<tr>
<td></td>
<td>• Cleanliness and quietness</td>
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<tr>
<td></td>
<td>• Overall rating of hospital</td>
</tr>
<tr>
<td></td>
<td>• Overall rating of Medicare Advantage health plan</td>
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</tbody>
</table>

**NOTE:** AHRQ = Agency for Healthcare Research and Quality; AMI = acute myocardial infarction; COPD = chronic obstructive pulmonary disease.
1995–2015 and original research published from 2005–2015. The searches included both searches targeting publications relating to Medicare beneficiaries, disabled populations, and patients with ESRD and broader searches not specifically targeting these populations. The literature search focused on social risk factors identified by the committee (as described in Appendix A2) and on health care use and outcomes such as those used in Medicare VBP programs. The relevant literature retrieved is described generally without an assessment of the quality of each individual study and with no attempt at data integration, such as in a meta-analysis. However, research that did not control for covariates and evidence pertaining to pediatric populations were not included. Because the committee expects social risk factors to affect subpopulations similarly, where variations in effect fall within a continuous range of effects, in describing the evidence, the committee did not systematically distinguish between the adult subpopulations to which articles refer. The identification and description of the literature should not be mistaken for a systematic review that uses a formal system for weighing and describing evidence, such as those used in clinical or public health guideline development.

The committee’s interpretation of the task for report one was to define SES for the purposes of application to Medicare payment programs and to identify whether there exists literature showing an influence of one or more social risk factors on one or more measures of relevant health care use or outcomes. In its findings, the committee uses the term “influence” to describe an association between a social risk factor and a health care use or outcome measure without implying a causal association. Future work of the committee will address the question of whether a specific social factor could be incorporated into Medicare payment programs, the methods to do so, and data needs to accomplish the task.

REFERENCES


HHS. 2014b. Medicare program; hospital Inpatient Prospective Payment Systems for acute care hospitals and the long-term care hospital Prospective Payment System and fiscal year 2015 rates; quality reporting requirements for specific providers; reasonable compensation equivalents for physician services in excluded hospitals and certain teaching hospitals; provider administrative appeals and judicial review; enforcement provisions for organ transplant centers; and electronic health record (EHR) incentive program. Federal Register 79(163):50094.

HHS. 2015. Medicare and Medicaid programs; CY 2016 Home Health Prospective Payment System rate update; Home Health Value-Based Purchasing model; and home health quality reporting requirements. Federal Register 80:39840.


As noted in Appendix A1, the committee developed a conceptual framework to guide its approach to the inclusion of social risk factors in Medicare payment programs. The committee agreed to employ the phrase social risk factors to broadly characterize a set of constructs that capture the key ways in which social processes and social relationships could influence key health-related outcomes in Medicare beneficiaries. The conceptual model is broadly grounded in many models articulating the social determinants of health, but it is also tailored and made specific to the health-related processes and outcomes that are of interest in understanding and evaluating the performance of the health care system among Medicare beneficiaries.

The five domains of social risk factors are

1. Socioeconomic position (SEP);
2. Race, ethnicity, and cultural context;
3. Gender;
4. Social relationships; and
5. Residential and community context.

The five social risk factors may influence health care and health through a number of potential pathways. These include (1) direct effects of social risk factors on behavioral and clinical disease risk factors (as well as on the prevalence and development of disease), (2) direct effects of social risk factors on access to care and on the process of care, and (3) direct
effects of social risk factors on the quality of health care received and on the outcomes of this care. These social risk factors may also directly affect satisfaction with care and adverse health care effects, as well as the cost of care if, for example, additional effort on the part of the health care system is required to achieve a given outcome.

The five social risk factors may also influence health literacy, the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (NASEM, 2015). Health literacy in turn has an important impact on the patients’ interaction with the health care system and may affect access to care and the process of care, which in turn has consequences for quality of care, outcomes of care, satisfaction and patient safety, and cost. Health literacy may also directly affect quality of care, outcomes of care, adverse effects, satisfaction, and cost.

It is important to note that social risk factors may affect the outcomes of interest through many interrelated pathways, some of which may be indirect or mediated through clinical or behavioral risk factors, disease prevalence, and behaviors or mediated through access to care and the process of care (e.g., the types of facilities and providers where patients are seen and the processes followed in the health care system). In addition, social risk factors may affect the outcomes of care through direct pathways by influencing the outcomes of the care received independently of effects on clinical or behavioral risk factors, access to care, or the process of care (e.g., the effectiveness of a blood pressure control using a certain drug may be modified by the person’s social context even if the treatment is high quality and appropriate). Feedback loops may also be present.

DEFINITIONS AND LITERATURE SEARCH

In this section, the committee defines each of these five social risk factor domains, as well as health literacy, and summarizes the results of the literature search linking effects of each domain on health care outcomes and quality measures. Within each factor, results of review articles are discussed first, followed by results from individual studies. Individual studies are organized by outcome domain (e.g., health care use), subdomain (e.g., clinical processes of care), and measure (e.g., receipt of recommended care).

**Socioeconomic Position**

Socioeconomic position (SEP) is an indicator of an individual’s absolute and relative position in a society’s stratification system. SEP captures a combination of access to material and social resources as well as relative status, meaning prestige- or rank-related characteristics (Krieger et al., 1997). To
that end, the committee employs the term *socioeconomic position*, rather than the more commonly used phrase *socioeconomic status*, because *socioeconomic status* blurs distinctions between the two different aspects of SEP (actual resources and status), and privileges status over the material and social resources (Krieger et al., 1997; Lynch and Kaplan, 2000).

SEP is commonly measured through indicators such as income and wealth (with wealth being of special relevance for older individuals and disabled persons out of the paid workforce), education, and occupation (including occupational history and employment status) (Braveman et al., 2005; Krieger et al., 1997; Lynch and Kaplan, 2000). SEP over the life course is a powerful predictor of many health-related processes and outcomes and is often related to outcomes in a dose–response manner (Adler et al., 1994; Krieger et al., 1997; Lynch and Kaplan, 2000). In the medical field, insurance status (whether an individual has insurance and insurance type) is also used as a proxy for SEP—for example, dual Medicare–Medicaid eligibility among the Medicare population is often used as a proxy for low income. However, insurance status is generally a very imperfect proxy, because it does not capture the continuum of SEP, may capture dimensions of health status unmeasured by other data sources, and because it represents insurance status itself, which is distinct from SEP.

Several review articles examined the influence of SEP on health care use and health care outcomes, but each found only a small number of studies. Two reviews examined the effect of SEP on readmissions, one of which found no association between education and readmissions after acute myocardial infarction (AMI) and insufficient but suggestive evidence that income negatively affects readmissions (Damiani et al., 2015). By contrast, the other study found substantial inconsistencies about which patient characteristics, including indicators of SEP and other measures, were predictive of readmissions for heart failure and no patterns emerged (Ross et al., 2008). Three articles examined the effect of SEP on outcomes after surgery. A review of socioeconomic factors and kidney transplant outcomes reported that higher educational attainment, higher income, and being employed are associated with better outcomes after kidney transplantation (Hod and Goldfarb-Rumyantzev, 2014). A review of patient characteristics and outcome after hip replacement surgery (Young et al., 1998) reported that education and employment were likely to influence outcomes, although the review was limited by few studies with inconsistent findings. A review examining patient factors and outcomes after orthopedic surgery involving implantable devices found only one study examining SEP and outcomes, and this study found that only individual income was associated with better outcomes (Waheeb et al., 2015).
Income

Individual income is strongly associated with morbidity and mortality (Ecob and Smith, 1999). Moreover, this relationship is graded such that increases in income are associated with increases in health status even above a threshold of material deprivation (Adler et al., 1994). Income can affect health outcomes directly as a means of purchasing health care and indirectly as a means of acquiring health promoting resources, such as better education, housing, and nutrition (Adler and Newman, 2002). Relative income may also affect health through psychosocial mechanisms (Marmot and Wilkinson, 2001). Wealth can affect health in similar ways, although it is less frequently studied (Braveman et al., 2005). Wealth can also provide economic resources during periods of low income, and as such may be more relevant for older adults and persons with disabilities who are out of the paid labor force (Braveman et al., 2005). A number of articles examined the independent effect of individual-level income (typically measured by annual household income) on health care use, health care outcomes, and costs. Most studies examined utilization and clinical processes of care.

In terms of utilization, studies examined the influence of income on readmissions and hospitalizations. With regard to readmissions, one study found a significant income gradient in which lower income was associated with increased readmissions (Philbin et al., 2001), while others reported that low income was not significantly associated with readmission within 30 days (Maniar et al., 2014; Moore et al., 2015), 60 days (Arbaje et al., 2008), or 1 year (Bernheim et al., 2007). With regard to other types of hospitalizations, one study found that lower income was associated with significantly greater preventable hospitalizations for ambulatory care–sensitive conditions (Blustein et al., 1998), one study found that low income was significantly associated with chronic obstructive pulmonary disease (COPD) exacerbations requiring hospitalization or an emergency department (ED) visit (Eisner et al., 2011), and one study examining hospital admissions (including readmissions) found no association with income (Sattler et al., 2015). In terms of clinical processes of care, one study found that patients with the highest incomes had significantly higher overall quality scores, and when examined by type of care, wealthier patients had significantly higher scores for preventive care and screenings compared to those with the lowest income (Asch et al., 2006). Another study found that low-income patients were significantly less likely to get recommended rheumatoid arthritis therapy (Yazdany et al., 2014). One study examining medication adherence found that low income was associated with poorer adherence related to cost (Billimek and August, 2014).

Fewer articles examined health care outcomes, including health outcomes and patient experiences. No studies examining the effect of income
on inpatient safety were identified. In terms of health outcomes, one study reported a significant income gradient where functional health outcomes increased with higher income (Bierman et al., 2001), one study found that low income was not associated with 1-year mortality after AMI (Bernheim et al., 2007) and another study found no significant differences in health outcomes after lower-limb revascularization by income (Durham et al., 2010). In terms of patient experience, one study found that excellent ratings of care were significantly lower among colorectal cancer patients, but not among lung cancer patients, and also reported no differences in experiences of interpersonal care by income (Ayanian et al., 2010). Another study found that income was not significantly associated with perceived care coordination or patient satisfaction among breast cancer patients (Hawley et al., 2010). Two studies found that low income was associated with significantly higher costs from lower-limb revascularization (Durham et al., 2010) and from cardiovascular disease (Shaw et al., 2008).

**Insurance**

Although numerous studies have examined the impact of insurance coverage on health outcomes (e.g., IOM, 2009), this literature search restricted studies to those examining insurance as a proxy for income. As with income and education, most articles on insurance as a proxy for income assessed health care utilization, of which most also focused on hospital readmissions. Three articles found that patients on Medicaid (as a proxy for low income) had significantly higher odds of readmissions (Aujesky et al., 2009; Jiang et al., 2003; Oronce et al., 2015), while one found that among low-income elderly adults (those with incomes under 200 percent of the federal poverty level), not having Medicaid coverage was significantly associated with increased early readmissions (Iloabuchi et al., 2014). One study found that Medicare beneficiaries in need of food assistance with managed care were more likely to be readmitted compared to those without managed care, but that there was no association among Part D coverage, Medicare–Medicaid dual eligibility status, and other subsidies and readmissions (Sattler et al., 2015).

One study reported a significant interaction between Medicaid coverage and comorbidities, such that Medicaid recipients with a low level of comorbidities had increased risk of 1-year readmissions compared to non-Medicaid recipients with a low level of comorbidities (Foraker et al., 2011). One study reported no significant differences in time to readmission or death by insurance status among patients with left ventricular assist devices (Smith et al., 2014), and one study reported no association between Medicaid coverage or uninsured status and 30-day readmissions for community-acquired pneumonia (Jasti et al., 2008). One article looked
at treatment differences and found that Medicaid patients with myocardial infarction were significantly less likely to receive revascularizations regardless of the availability of the service in their neighborhood, but if available, revascularization rates were slightly higher among Medicaid patients (Fang and Alderman, 2003).

Several articles looked at other utilization measures, and one that found that Medicaid patients had significantly longer lengths of stay for incident heart failure compared to non-Medicaid patients (Foraker et al., 2014). One found no association between public insurance (excluding Medicare) and avoidable hospitalizations among patients with lupus (Ward, 2008), and one that found that among Medicare beneficiaries, Medicare–Medicaid dual eligible beneficiaries were less likely to have a follow-up visit and more likely to have either an ED visit or a readmission after hospital discharge compared to those without Medicaid coverage (DeLia et al., 2014). One study reported no association between Medicaid or other state insurance coverage and perceptions of care coordination or patient satisfaction among breast cancer patients (Hawley et al., 2010). The committee made the following findings:

- The committee identified literature indicating that income may influence health care utilization, clinical processes of care, costs, health outcomes, and patient experience.
- The committee also identified literature indicating that when measured by a proxy of insurance status, income may influence health care utilization, clinical processes of care, and patient experience.

**Education**

Education is important for health, because it shapes future economic resources, including income and occupation (Adler and Newman, 2002; IOM, 2014a). Education level has been shown to have a strong relationship with health behaviors, health status, morbidity, and mortality—in particular, life expectancy (IOM, 2014a). Literature on the independent effects of education on health care utilization, health care outcomes, and costs typically measures education using categories of educational attainment (e.g., years of schooling or credentials achieved). As with the literature on income, most of the literature on education and health care focuses on utilization outcomes.

Several studies examined the influence of education on readmissions, among which two found that low education was associated with increased readmissions (Arbaje et al., 2008; Jasti et al., 2008), one found that higher education was associated with decreased readmissions (Maniar et al., 2014), and three found that low education was not associated with readmissions.
(Bernheim et al., 2007; Iloabuchi et al., 2014; Sattler et al., 2015). One study found that education was not significantly associated with preventable hospitalizations for ambulatory care-sensitive conditions (Blustein et al., 1998) and one found that low education was associated with significantly increased COPD exacerbations requiring hospitalization or an ED visit (Eisner et al., 2011). With regard to health outcomes, one study found that high education was associated with better glycemic control among diabetes patients (Maney et al., 2007) and one found a strong, consistent, and significant gradient where functional health outcomes improved with increasing educational attainment (Bierman et al., 2001). Finally, several articles examined patient experience, among which one found no difference in the likelihood of excellent ratings of care or in experiences with interpersonal care by education among lung and colorectal cancer patients (Ayanian et al., 2010), one reported that low education was significantly associated with better experiences reported through Consumer Assessment of Healthcare Providers and Systems (CAHPS) (O’Malley et al., 2005), and one found a significant inverse gradient between education and ratings of care coordination among breast cancer patients (Hawley et al., 2010). The committee made the following finding:

- The committee identified literature indicating that education may influence health care utilization, health outcomes, and patient experience.

**Occupation**

Occupation covers both employment status (i.e., whether or not and to what degree an individual participates in the paid labor force) as well as the type of occupation among the employed (Adler and Newman, 2002). Occupation can affect health by exposing workers to hazardous health exposures as well as through psychosocial risks related to job strain, lack of control, and increased stress (Kasl and Jones, 2000; Theorell, 2000). Among Medicare beneficiaries, relatively fewer of whom remain in the work force, employment status may be more salient than occupational type. While a large literature has demonstrated the negative health effects of unemployment, job insecurity, and flexible employment on unhealthy behaviors, morbidity (including physical and mental health), and mortality (IOM, 2014a), fewer studies were identified that examined the influence of employment on health care utilization and outcomes. One article found that unemployment significantly increased odds of 30-day readmissions among patients hospitalized with community-acquired pneumonia (Jasti et al., 2008). One article reported that being retired was significantly associated with variations in glycemic control among diabetes patients across medi-
cal centers, but it did not specify the direction of the association (Maney et al., 2007). One article found that unemployment was associated with lower orthopedic outpatient satisfaction, but this association was no longer significant after adjustment (Abtahi et al., 2015). The committee made the following finding:

- The committee identified literature indicating that occupation may influence health care utilization, health outcomes, and patient experience.

**Other Measures of SEP**

Given the challenge of measuring income, a small number of studies examined access to economic resources through other types of measures. For example, two studies examined the effect of food sufficiency as a proxy. One found that being worried about food sufficiency was significantly associated in variations in glycemic control among diabetes patients across medical centers, but it did not specify the direction of the association (Maney et al., 2007), while the other reported that food insecurity was not associated with hospital admissions among Medicare beneficiaries in need of food assistance (Sattler et al., 2015). A third study examined the effect of self-reported financial burden among cancer patients and found that it was associated with some but not other measures of patient experience (Chino et al., 2014). Similarly, one study reported that individuals who reported financial barriers to medication were more likely to report poorer self-rated health and have higher hazard for readmissions at 1-year follow up after AMI (Rahimi et al., 2007).

The committee made the following finding:

- The committee identified no literature indicating that socioeconomic position may influence patient safety outcomes.

**Race, Ethnicity, and Community Context**

Race and ethnicity are another key social factor. Race and ethnicity are dimensions of a society’s stratification system by which resources, risks, and rewards are distributed. As such, racial/ethnic categories capture a range of dimensions relevant to health, especially those related to social disadvantage (IOM, 2014a; Williams, 1997). These dimensions include access to key social institutions and rewards; behavioral norms and other sociocultural factors; inequality and injustice in the distribution of power, status, and material resources; and psychosocial exposures like discrimination (Williams, 1997). In the health care setting, salient psychosocial mechanisms may
include both provider discrimination and trust or mistrust between patients and providers (IOM, 2003). It is well established that race and ethnic background is often predictive of health care and health outcomes even after accounting for traditional measures of SEP like income and education (Krieger, 2000; LaVeist, 2005; Williams, 1999; Williams et al., 2010).

A number of factors likely contribute to this “independent” effect of race/ethnicity, including the following:

1. Lack of comparability of a given SEP measure across race/ethnic groups (e.g., income returns to education are well known to vary by race, and income is differentially correlated with wealth by race)
2. Importance of other exposures such as neighborhood environments that are patterned differently by race even among individuals of apparently similar SEP
3. The importance of race- or ethnic-specific factors such as discrimination and immigration-related factors, including time living in the United States and language proficiency
4. Measurement error in SEP

Although race and ethnicity reflect many different social circumstances, there can also be important heterogeneity in health within racial and ethnic groups, driven for example by SEP heterogeneity or heterogeneity in English language proficiency, country of origin, time in the United States, or other cultural dimensions.

**Race and Ethnicity**

Race and ethnicity are typically identified through self-reported categories. Although race and ethnicity are conceptually distinct and federal standards recommend using separate items for collecting the two (whitehouse.gov, 1995), investigators use different classifications for both collecting and analyzing race and ethnicity. In health services research, Hispanic ethnicity is frequently combined with racial categories, such that the most frequently used “racial” categories are non-Hispanic white, non-Hispanic black, Hispanic, and Asian. This scheme conceals tremendous heterogeneity across Asian groups from different countries, as well as heterogeneity within the Hispanic group with regard to country of origin and racial classifications from other countries that represent different sociopolitical constructs. Given these measurement issues, it can be challenging to compare studies on race and ethnicity. Nevertheless, vast literature shows substantial racial and ethnic health disparities and health care disparities (Escarce and Goodell, 2007; IOM, 2003). Several review articles examined race and ethnicity effects on health care use and health care outcomes. One overarch-
ing review of racial and ethnic disparities in access to and quality of health care found that blacks and Hispanics are much less likely to have had an ambulatory care visit within the year and less likely to receive certain preventive services (e.g., flu shots among the elderly). Of three review articles examining effects of race and ethnicity on readmissions, one reported that non-whites had higher readmission rates for both pneumonia and heart failure (Calvillo-King et al., 2013), one reported that studies suggest race/ethnicity is positively related to readmission in the short term (30 days and 90 days) and suggestive but inconclusive for the longer term (6 months and 1 year) (Damiani et al., 2015), and one found substantial inconsistencies (Ross et al., 2008).

With respect to health care outcomes, three reviews examined surgical outcomes. One found that blacks are more likely to have poor surgical outcomes and Hispanics have comparable or better mortality outcomes compared to whites but inconsistent evidence on other outcomes (Haider et al., 2013). The study also reported comparable or better outcomes among Asians compared with whites, but noted that potential disparities within the heterogeneous Asian population remained unexplored. One review found that black women were more likely to die or suffer an adverse cardiac event after undergoing a percutaneous coronary intervention (Kamble and Boyd, 2008), and found only one study assessing race and postsurgical outcomes, which found no association between race and patient-reported outcomes after orthopedic surgery involving implantable devices (Waheeb et al., 2015).

Two reviews found that blacks were more likely to experience complications (Haider et al., 2013; Kamble and Boyd, 2008). One review examining patient experience outcomes found that the magnitude of racial and ethnic disparities in pain management was small, despite also finding problematic classification and lack of definition of racial and ethnic groups (Ezenwa et al., 2006).

A relatively substantial literature examined effects of race and ethnicity on health care use, health care outcomes, and costs. Much of the literature focuses on health care utilization and processes of care. In terms of utilization, many studies focused on readmissions. Five studies found that race was not associated with readmissions—two for all causes (Iloabuchi et al., 2014; Moore et al., 2013), one for pneumonia (Jasti et al., 2008), one for heart failure (Vaccarino et al., 2002), and one for orthopedic surgery (Hunter et al., 2015). Eleven studies found a significant association between black race and readmissions, among which 10 found that blacks had higher risk of readmission (Aujesky et al., 2009; Girotti et al., 2014; Joynt et al., 2011; Kim et al., 2010; Kroch et al., 2015; McHugh et al., 2010; Oronce et al., 2015; Silber et al., 2015; Tsai et al., 2014; Vivo et al., 2014), while one found that blacks had lower risk of readmission (Spertus et al., 2009). Three studies
found that Hispanics had higher risk of readmission compared to whites (Rodriguez et al., 2011; Stahler et al., 2009; Vivo et al., 2014), while one did not (Oronce et al., 2015). One study reported mixed results and interactions between payer and black race or Hispanic ethnicity: Hispanic Medicare patients had significantly higher 30-day readmissions and Hispanics of all payers had significantly higher 180-day readmissions compared to whites. Black Medicare patients had significantly higher 180-day readmissions compared to whites (Jiang et al., 2005). One study reported that Asians did not have significantly different odds of readmission compared to whites (Oronce et al., 2015). One study found that there were no significant differences in readmissions among whites compared to non-whites (Kennedy et al., 2007), while another study found that non-white race was slightly significantly protective against readmissions (Singh et al., 2014). In terms of other utilization outcomes, one study found that blacks had significantly increased all-cause hospitalization over 2.5 year follow up of heart failure patients (Mentz et al., 2013).

A number of studies also examined differences in clinical process of care by race and ethnicity. Among articles investigating receipt of recommended preventive care, one study found no significant differences in the likelihood of having a prostate-specific antigen (PSA) screening in the past year between blacks and whites (Thomas et al., 2010). Three studies found that blacks were less likely to get recommended preventive care (Schneider et al., 2002; Trivedi et al., 2005, 2006), among which one found that racial disparities had decreased over time (Trivedi et al., 2005). One study found a significant interaction between race/ethnicity and comorbidity among Medicare beneficiaries, where lower rates of flu and pneumonia immunization among racial/ethnic minorities decreases relative to white beneficiaries as the burden of comorbidity increases (Orr et al., 2013) One study of socially-assigned race (Macintosh et al., 2013) reported mixed results. Contrasted with self-identified race/ethnicity, socially-assigned race/ethnicity describes the racial/ethnic categories others ascribe to a person through social interactions (Macintosh et al., 2013). The authors found that whites socially-assigned as whites and minorities socially-assigned as whites had significantly higher odds of having flu and pneumonia vaccinations, compared to minorities socially-assigned as minorities, no differences in cancer screening by socially-assigned race. Whites socially-assigned as whites were significantly less likely to receive cancer screenings compared with minorities socially-assigned as minorities (Macintosh et al., 2013). Two studies found that blacks had significantly higher odds of receiving recommended ambulatory care (Asch et al., 2006; Thorpe et al., 2013), among which one also reported that Hispanics also received more recommended care (Asch et al., 2006).

Among articles about clinical processes in the inpatient setting, one article reported that non-white stroke patients had significantly higher rates of
inappropriate surgery (carotid endarterectomy) and significantly lower rates of appropriate surgery compared to whites (Halm et al., 2009). Another study found that blacks were significantly less likely to receive laparoscopy for appendicitis compared to whites (Lee et al., 2011a). Three studies found that blacks were significantly less likely to receive invasive cardiac procedures compared to whites (Fang and Alderman, 2003; Popescu et al., 2007; Shen et al., 2007). With regard to differences among Hispanics, one article reported that Hispanics were significantly more likely to receive laparoscopy for appendicitis compared to whites (Lee et al., 2011a), while three found that Hispanics were less likely to undergo invasive cardiac procedures (Fang and Alderman, 2003; Parikh et al., 2009; Shen et al., 2007).

One article reported that whites received more recombinant tissue plasminogen activator therapy after stroke compared to blacks and Hispanics, and to Asians under age 65 but not age 65 and older (Nasr et al., 2013). One study found no association between race and recommended AMI treatment (Shah et al., 2007), and another found no association between race and colorectal cancer treatment (Zullig et al., 2013). One study of clinical processes in the nursing home setting reported that having a higher proportion of black nursing home residents was protective against restraint use and receipt of antipsychotic medications, although this effect was attenuated for nursing home facilities in counties with a high proportion of black residents (Miller et al., 2006).

Most of the literature on race and ethnicity and health care outcomes examined differences in mortality, while several other studies also looked at functional outcomes and ambulatory care outcomes. As with other areas, much of the literature investigated mortality differences in blacks compared to whites. Several articles found no significant differences between blacks and whites in in-hospital mortality (Khambatta et al., 2013; Silber et al., 2015), 30-day mortality (Silber et al., 2015; Stamou et al., 2012), 1-year mortality (Stamou et al., 2012), and in time from surgery for colorectal cancer to death (Zullig et al., 2013). One article found no association between black race and 2-year mortality after AMI (Spertus et al., 2009) and another found no differences between blacks and whites in 2.5-year follow up after ischemic heart disease treatment (Cromwell et al., 2005), while one found that blacks had significantly increased mortality over 2.5-year follow up of heart failure patients (Mentz et al., 2013). Several studies reported significantly higher odds of in-hospital mortality (Nietert et al., 2005), 30-day mortality (Halm et al., 2009), 6-month mortality (Vaccarino et al., 2002), and 1-year mortality (Popescu et al., 2007), while others found that blacks had significantly lower odds of in-hospital mortality (LaPar et al., 2011; Shen et al., 2007), 30-day mortality (Barnato et al., 2005; Popescu et al., 2007; Vivo et al., 2014), and 1-year mortality (Barnato et al., 2005; Popescu et al., 2007; Vivo et al., 2014). One article found that white
patients but not black patients had significantly lower odds of death at teaching hospitals compared to non-teaching hospitals, suggesting a benefit accrued by whites but not blacks (Silber et al., 2009).

In terms of differences in mortality among Hispanics, several articles found no significant association between Hispanic ethnicity and in-hospital mortality (LaPar et al., 2011; Shen et al., 2007), 30-day mortality (Stamou et al., 2012; Vivo et al., 2014), or 1-year mortality (Parikh et al., 2009; Stamou et al., 2012; Vivo et al., 2014), while two articles found that Hispanics had significantly higher odds of mortality in hospital (Nasr et al., 2013) and at 30 days (Halm et al., 2009). One article found significantly higher rates of 2.5-year mortality among Hispanic patients undergoing medical management for ischemic heart disease compared to whites, but there were no differences by race for patients who underwent revascularization (Cromwell et al., 2005). Three articles reported no association between Asians and mortality in hospital (LaPar et al., 2011; Nasr et al., 2013) or at 30 days or 1 year (Vivo et al., 2014). One article found significantly higher rates of 2.5-year mortality among Asian patients undergoing medical management for ischemic heart disease compared to whites, but no differences by race for patients who underwent revascularization (Cromwell et al., 2005).

A small number of articles examined mortality differences among whites compared to non-whites. Of these, one article reported significantly higher risk of both in-hospital and 30-day mortality among non-whites compared to whites (Rangrass et al., 2014), while another found that non-whites had significantly lower rates of in-hospital death (Zacharia et al., 2010). One article reported no association between whites and non-whites and in-hospital, 30-day, 1-year, or 3-year mortality after AMI among Medicare beneficiaries 65 years or older (Shah et al., 2007), and another reported no significant difference between whites and non-whites in in-hospital mortality (Kennedy et al., 2007).

Studies examining racial and ethnic differences in functional outcomes examined differences after acute care or surgery and among the elderly. In terms of post-acute outcomes, one study reported that blacks, Hispanics, and other non-whites had significantly worse functional outcomes after stroke (Ottenbacher et al., 2008), but another study found no significant differences in functional status at discharge between black and whites after a moderate or severe stroke (Putman et al., 2010). One study reported that non-whites, especially blacks, had worse functional outcomes after primary total joint arthroplasty (hip and knee) (Lavernia et al., 2011). One article reported that after acute illness hospitalization, there were no differences in activities of daily living (ADLs) improvement by discharge and by 90 days between blacks and whites, but blacks were significantly less likely to improve instrumental activities of daily living (IADLs) functioning by discharge and 90 days compared to white patients (Sands et al., 2005).
In terms of functional outcomes among the elderly, one study of home health care patients age 65 and older reported mixed findings, where whites experienced significantly better outcomes compared to patients of other races, and this effect was especially pronounced compared to black patients (Brega et al., 2005). Another study of older Medicare managed care beneficiaries reported that blacks, American Indians/Alaskan Natives, and multiracial individuals had significantly greater ADL impairment compared to whites (Ng et al., 2014). Whites were also significantly more likely to experience positive change in ADLs than African Americans; differences between whites and Hispanics on change in functional outcomes were not significant. Another study reported no differences in functional decline between blacks and whites among community-dwelling adults age 70 and older, except among those age 80 and older, among whom blacks had significantly lower risk of ADL decline (Moody-Ayers et al., 2005).

With respect to ambulatory care outcomes, two studies found that blacks had worse control of cardiovascular disease risk factors (Rooks et al., 2008; Wendel et al., 2006). Of these, one also found interactions by income, such that there were no differences in hypertension among those with low income, but blacks with higher income had greater odds of hypertension, while the reverse was true for left ventricular hypertrophy (Rooks et al., 2008). The other study examined both cardiovascular disease and type 2 diabetes risk factors and found that both Hispanics and blacks had significantly lower daily insulin doses but no differences in lipid or blood control (Wendel et al., 2006).

Several studies examined the relationship between race and patient experience using CAHPS data. In terms of inpatient care, one study reported that black and Asian lung and colorectal cancer patients and Hispanic colorectal cancer (but not lung cancer) patients were significantly less likely to report excellent care compared to white patients (Ayanian et al., 2010). One study reported that Hispanics and Asians consistently reported less positive ratings compared to non-Hispanic whites, and blacks and American Indians had some more positive and some more negative ratings compared to non-Hispanic whites, but after adjusting for hospital differences, Hispanics and blacks reported significantly more positive ratings than whites and Asians consistently reported less positive ratings (Goldstein et al., 2010). American Indian ratings were not substantially different compared to whites. Consistent with this study, another study found that blacks and Hispanics reported more positive overall experiences in U.S. Department of Veterans Affairs (VA) hospitals (Hausmann et al., 2014). One study found that only non-Hispanic black race was predictive of overall nurse, physician, and hospital ratings (O’Malley et al., 2005). Hispanic, Asian, and Native American race/ethnicity was not predictive of provider ratings. In terms of ambulatory care, one study reported that blacks and Hispanics
reported more positive patient experiences at VA facilities compared to whites (Hausmann et al., 2013), and another found that patients reporting discrimination on the basis of race or ethnicity reported significantly poorer experiences of care (Weech-Maldonado et al., 2012). One study found that black, Hispanic, and Asian/Pacific Islander Medicare beneficiaries reported significantly poorer experiences with Part D prescription drug plans (Haviland et al., 2012). While some of these differences in patient experiences may be genuine, some evidence also suggests that differences in experience may be artefactual and due to differences in scale use by race (Elliott et al., 2009; Mayer et al., 2016; Weech-Maldonado et al., 2008; Weinick et al., 2011).

A small number of articles examined patient safety outcomes. Compared to whites, blacks were found to have significantly higher rates of complications after general surgery (Silber et al., 2009, 2015) and prostate cancer surgery (Jayadevappa et al., 2011), but significantly decreased rates of complications after lung cancer resections (LaPar et al., 2011). One study reported no significant differences between blacks and whites in complications after percutaneous coronary intervention (Khambatta et al., 2013), and another reported no significant differences in complications from appendicitis treatment across white, black, Hispanic, or Asian patients (Lee et al., 2011b).

Several articles examined effects of race and ethnicity on costs. In terms of inpatient hospital costs, two studies found that blacks had higher total charges compared to whites (Jayadevappa et al., 2011; Shen et al., 2007), whereas one study found that blacks had low costs (Dowell et al., 2004). One study found that Hispanics had higher costs compared to whites (Shen et al., 2007), but two found that Hispanics had significantly lower costs compared to whites (Dowell et al., 2004; Jayadevappa et al., 2011). One study reported that Native Americans incurred the highest costs of all racial groups (Dowell et al., 2004). One study examining renal dialysis costs found that black patients had significantly higher costs compared to non-black patients (Roach et al., 2010). The committee made the following finding:

- The committee identified literature indicating that race and ethnicity may influence health care utilization, clinical processes of care, costs, health outcomes, patient safety, and patient experience.

Language

Language typically represents language barriers, such as speaking a primary language other than English, having limited English proficiency (LEP), and otherwise needing interpreter services. Language barriers have been shown to be associated with poorer health care access; poorer health
status; poorer quality care, including less recommended care (e.g., preventive services) and more adverse health effects (e.g., drug complications); and higher rates of diagnostic testing (Flores, 2005). One review found that use of professional interpreters improved clinical care, especially processes of care, among patients with a language barrier compared to patients with language-concordant care (Karliner et al., 2007). Another review similarly found that professional interpreter services are associated with increased office visits and prescriptions being written and refilled, while patients with no interpreter or an ad hoc interpreter have more tests resulting in more test costs and a higher risk of hospitalization (Flores, 2005). This review also found that interpreter services improve care processes, although whether interpreter use is associated with increased duration of visits remains unclear (Flores, 2005).

Individual studies echo review findings of generally worse outcomes for patients with language barriers. One study reported that deaf American Sign Language (ASL) users reporting concordant providers (i.e., providers who sign) were more likely to receive an influenza vaccination but not a colon or cholesterol screening compared to deaf ASL users reporting discordant providers (McKee et al., 2011). Regarding health outcomes, one study found that among patients on warfarin, LEP was associated with less time in therapeutic range, but had no differences in risk of spending time in danger range. There was also a significant interaction with use of a communication surrogate, such that both LEP and non-LEP patients who used a surrogate spent less time in therapeutic range and more time in danger range (Rodriguez et al., 2013). A study of Latino diabetes patients found that LEP Latinos with language-discordant physicians had greater odds of poor glycemic control compared to Latino English speakers, but there were no differences between LEP Latinos with language-concordant physicians and Latino English speakers (Fernandez et al., 2011). Another study found that having English as the primary language spoken was associated with significantly lower risk of in-hospital, 30-day, 90-day, and 1-year mortality among critically ill patients (Mendu et al., 2013).

Several studies examined language and patient experiences of care. Among studies examining Spanish language, one study found that Spanish language was associated with significantly lower CAHPS ratings of nurses, doctors, and hospitals (O'Malley et al., 2005) one found that English-speaking Hispanics reported greater satisfaction with provider communication compared to Spanish-speaking Hispanics (Villani and Mortensen, 2014), and one reported no significant differences in provider ratings by Spanish language (Ayanian et al., 2010). Among studies examining experiences of Asian-language-speaking patients, one study found that there were significantly fewer excellent and excellent or very good ratings of providers among Chinese-speaking lung and colorectal patients compared
to whites (Ayanian et al., 2010), and another reported that among LEP Asian Americans (Chinese and Vietnamese immigrants) there were no differences in provider communication or overall satisfaction with care between patients who used an interpreter compared to those who had language-concordant care (Green et al., 2005). However, significantly more patients who used interpreters reported having questions about their care and questions about their mental health that they wanted to ask but did not. Two studies examined patient experience among Asian language–speaking patients. In terms of utilization, one study found that patients needing interpreter services had significantly higher risk of at least one ED visit and of at least one hospitalization during the 12-month study period compared to patients not needing interpreter services (Njeru et al., 2015) and a study of Russian immigrants found that language difficulty was not significantly associated with health care use compared to non-immigrants (Aroian and Vander Wal, 2007). The committee made the following finding:

- The committee identified literature indicating that language may influence health care utilization, clinical processes of care, health outcomes, and patient experience.

Nativity

Nativity covers country of origin, immigration status (including refugee and documentation status), duration in the United States, as well as acculturation, or the extent to which an individual adheres to the social norms, values, and practices of his own ethnic group or home country or to those of the United States (IOM, 2014a). Nativity may affect health status through access to health care, language barriers (as described in the previous section), and deleterious health exposures such as communicable diseases from an individual’s country of origin (IOM, 2014a). The relationship between immigration and health is complex, in particular due to the heterogeneity across immigrant communities, but studies have shown that country of origin and immigration status are associated with health behaviors, morbidity, and mortality (Abraido-Lanza et al., 1999; IOM, 2014a; Singh and Hiatt, 2006). One review of immigrants and health care found that most studies of immigrants and quality of health examined predominantly self-reported outcomes, in particular related to patient experience (Derose et al., 2009). In terms of health care outcomes, the review found that foreign-born Americans generally report poorer experiences with health care, including poorer satisfaction, although experiences may differ by immigrant subgroup. The review also found that immigrant adults had substantially lower overall health care costs.
A small number of studies examined effects of nativity and health care utilization and outcomes. In terms of utilization, one study of Latino adults found that foreign-born citizens, foreign-born permanent residents, and undocumented Latinos were significantly less likely to receive preventive care compared to U.S.-born Latinos (Rodriguez et al., 2009), and one found that nativity was not associated with lung or colorectal cancer treatment after adjusting for language (Nielsen et al., 2010). One study reported that Russian immigrants had significantly higher health service use compared to non-immigrants (Aroian and Vander Wal, 2007). Regarding health care outcomes, one small study of Mexican and Mexican American adults with type 2 diabetes reported intermediate health outcomes, finding that acculturation was not significantly related to glycemic control (Ross et al., 2011). Several articles examined nativity and patient experience. One study found that non-immigrants reported a significantly greater number of problems with providers than Russian immigrants (Aroian and Vander Wal, 2007). Another study found that, after adjusting for language, being foreign born increased odds of reporting poorer interactions with physicians in some areas but not others (Dalio et al., 2008). For example, all foreign-born individuals had greater odds of reporting that their physician did not involve them in their care as much as they would have liked, but there were no significant differences in other areas of patient–physician interaction (e.g., physician not listening or understanding, distrust in physician, patient treated with respect, patient had unanswered questions).

By contrast, Nielsen et al. (2010) found that foreign-born patients were less likely than U.S.-born patients to report excellent quality of care, but after adjustment for language, the effect attenuated for the overall foreign-born sample and for Hispanic foreign-born patients and was no longer significant. However, this was not true of Asians, who still had significantly lower odds of reporting excellent care. Finally, one article reported that foreign-born citizens, foreign-born permanent residents, and undocumented Latinos were more likely to report that they received no health care information from doctors compared to U.S.-born patients (Rodriguez et al., 2009). Foreign-born citizens and permanent residents but not undocumented Latinos were also less likely to report receiving care in their language of preference, and undocumented Latinos were less likely to report excellent or good quality care. The committee made the following finding:

- The committee identified literature indicating that nativity may influence clinical processes of care and patient experience.
Gender

Gender is associated with many health and health care–related outcomes (IOM, 2014a). The committee used the term gender broadly to capture the social dimensions of gender and distinguish these from biological effects of sex. Gender is known to affect a number of health outcomes as well as interactions with the health care system, health care–related processes, and outcomes of health care.

Parsing the effects of gender from sex is challenging because investigators frequently do not specify which construct they are measuring, they use the terms interchangeably (often erroneously referring to sex differences as gender differences), and because gender differences and sex-linked biology may interact to produce health outcomes (Krieger, 2003). A small number of articles examined effects of gender on patient experience. Gender may affect patient experience because men and women presenting the same symptoms may behave differently and because providers may act differently toward men and women (Elliott et al., 2012). Several studies reported that, compared to men, women reported significantly worse experiences of care—in the inpatient setting (Elliott et al., 2012), at VA hospitals (Hausmann et al., 2014), and for COPD (Martinez et al., 2012). Among these, one study also found a significant interaction with age, where women age 18 to 24 report significantly better experiences of inpatient care than men, but women age 85 and older report significantly worse experiences than men (Elliott et al., 2012). One study found that men gave significantly more positive ratings of nurses and hospitals compared to women, but there were no significant differences in physician ratings by gender (O’Malley et al., 2005). One study reported no significant differences between men and women in reported pain or in the satisfaction with pain management and response to pain among ED staff (Patel et al., 2014).

Gender or sexual minorities may also experience differences in health and health care. Gender and sexual minorities include individuals who identify as lesbian, gay, bisexual, transgender, intersex, queer, and questioning. Health disparities among gender and sexual minorities may be related to exposure to stigma, discrimination, and violence on the basis of their non-normative identity; barriers to accessing health care, including fear of discrimination from providers; and unhealthy behaviors, especially increased rates of smoking, alcohol use, and substances (IOM, 2011). Conducting research on gender and sexual minority populations can be challenging with respect to defining sexual orientation and gender nonconformity operationally, collecting sensitive information, and due to the relatively small size of these populations (IOM, 2011). Despite these challenges, some evidence
suggests that lesbians and bisexual women may be less likely to receive preventive services (e.g., breast cancer screenings and Pap tests) compared to heterosexual women (Buchmueller and Carpenter, 2010; IOM, 2011). The committee made the following finding:

- The committee identified literature indicating that gender may influence clinical processes of care and patient experience.

### Social Relationships

Social relationships are another important social risk factor. It is well established that many dimensions of social relationships, including access to social networks that can provide access to resources (including material and instrumental support), as well as the emotional support available through social relationships, can be important to health, health care use, and outcomes of care (Berkman and Glass, 2000; Cohen, 2004; Eng et al., 2002; House et al., 1988a). Social isolation and loneliness have been shown to have important consequences for health (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988a; Wilson et al., 2007). Social relationships may be of special importance to health care access, processes, and outcomes among older individuals (Cornwell and Waite, 2009; Hawton et al., 2011; Seeman et al., 2001; Tomaka et al., 2006) and persons with ADL and IADL limitations (AARP Public Policy Institute, 2010). Social relationships are most frequently assessed in the health care and health services research literature with three constructs: marital status, living alone, and social support.

### Marital Status

Marriage is a foundational structural element of social relationships that can convey substantial health benefits among the elderly. For example, marriage has been shown to be protective against injury (e.g., osteoporotic fractures, which mostly occur in the elderly) (Brennan et al., 2009) and mortality (Manzoli et al., 2007). Given demographic shifts in household composition and marriage in the past several decades, indicators assessing marital status not only include dichotomous measures of whether someone is married or not, but sometimes also include other measures of partnership (e.g., partnered or lacks a partner), as well as individuals who are single, widowed, or divorced. Several review articles each assessing a small number of articles found that being married is associated with better health care outcomes, including better outcomes after hip replacement surgery (Young
et al., 1998), and lower rates of readmissions (Calvillo-King et al., 2013). Similarly, being unmarried, widowed, or otherwise lacking a partner is associated with worse outcomes, such as graft loss after heart transplantation (Coglianese et al., 2015) and increased risk of readmissions (Damiani et al., 2015). One review found that marriage was also associated with better medication adherence (Wu et al., 2008). Looking at individual studies, the effect of marital status on health care use and health care outcomes is somewhat more mixed.

Regarding utilization, several studies found an association between marital status and readmissions (Arbaje et al., 2008; Garrison et al., 2013; Howie-Esquivel and Spicer, 2012; Hu et al., 2014; Moore et al., 2013), while others did not (Iwashyna and Christakis, 2003; Jasti et al., 2008; Metersky et al., 2012; Watkins et al., 2013). Two studies found that marital status was significantly associated with hospital length of stay (Iwashyna and Christakis, 2003; Metersky et al., 2012). In terms of health outcomes, one study found that marital status was associated with both in-hospital and 90-day mortality among pneumonia patients, while another found that it was not associated with in-hospital mortality among heart failure patients (Watkins et al., 2013). Another study (Maney et al., 2007) found that marital status was significantly associated with the variance in glycemic control among diabetes patients, but it was not specifically associated with high or low control. One study found that there were significantly fewer excellent ratings of care among unmarried lung and colon cancer patients (Ayanian et al., 2010). The committee made the following finding:

- The committee identified literature indicating that marital status may influence health care utilization, clinical processes of care, costs, health outcomes, and patient experience.

Living Alone

Living alone is a structural element of social relationships and an indicator of social isolation or loneliness in health care and health services research. Living alone can be a dichotomous measure (living alone or not) or cover more finely graded household composition (e.g., living alone, living with one other, living with two others, and so on). Literature examining the influence of living alone on health care outcomes is sparse. Two reviews examining the relationship between living alone and health outcomes found just one article each. In a review of psychological variables that may affect recovery after surgery, Mavros and colleagues (2011) found one study that showed no association between loneliness and wound healing. In a review
of literature on medication adherence among heart failure patients, Wu and colleagues (2008) identified just one meta-analysis, which found that living alone was positively associated with nonadherence. One slightly older review identified living alone as a risk factor for poor outcomes of elderly patients presenting to EDs (Aminzadeh and Dalziel, 2002).

A small number of individual studies examined the influence of living alone on health care use. In terms of utilization, two studies found that living alone significantly increased risk of readmissions (Hamner and Ellison, 2005; Iloabuchi et al., 2014). One study found that living alone was significantly associated with getting a flu shot but not getting a pneumonia vaccination among adults age 85 and older (Farmer et al., 2010). Another study found that living alone was not significantly associated with hospitalization, except among adults age 85 and older for whom living alone was protective against hospitalization (Ennis et al., 2014). The authors suggested that living alone among this older population may be a sign of healthy aging in place, rather than isolation. The committee made the following finding:

- The committee identified literature indicating that living alone may influence health care utilization, clinical processes of care, and health outcomes.

**Social Support**

Social support is a key function of social relationships and includes the provision of emotional and appraisal support through caring and concern, as well as more tangible instrumental and informational support such as the provision of material or other practical support (House et al., 1988b). Reviews examining the relationship between social support and health care outcomes mostly supports a positive effect of social support on health, finding that higher levels of social support are associated with better medication adherence (Dunbar et al., 2008; Wu et al., 2008), fewer readmissions (Calvillo-King et al., 2013; Dunbar et al., 2008; Luttik et al., 2005), better diabetes outcomes (Strom and Egede, 2012), and better outcomes after hip replacement surgery (Young et al., 1998). One review (Pelle et al., 2008) reported mixed evidence about the effect of social support on both inpatient and outpatient mortality among heart failure patients, while another (Mookadam and Arthur, 2004) reported a significant association between social support and both 6-month and 6-year mortality among patients after AMI. The reviews are limited by a small number of studies.

Individual articles looking at the influence of social support on other health care use and health care outcomes is mixed. With respect to health outcomes, Theiss and colleagues (2011) reported a significant association between social support and outcomes after joint operations. Platinga
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and colleagues (2010) reported no association between social support and mortality among chronic kidney disease patients. In terms of utilization, Platinga and colleagues (2010) found that more social support decreased likelihood of hospital admissions, while Perry and colleagues (2008) found no association between social support and health services use. Thomas and colleagues (2010) found that informational support in the form of a family member having cancer was associated with lower likelihood of having a PSA test, while other measures of informational and instrumental support were not significant. Regarding patient experiences, Platinga and colleagues (2010) found that higher levels of social support were associated with better quality of care ratings and increased likelihood that patients would recommend their dialysis center, and Rosland et al. (2011) found that patients who had a regular companion participate in primary care visits were more likely to have high satisfaction with their primary care provider. On the other hand, Perry and colleagues (2008) found that social support was not associated with satisfaction with care or the quality of provider communication among low-income individuals. One explanation for mixed findings is that because social support covers multiple, heterogeneous types of support, these different types of social support may have different effects on patient experiences, which may not be well captured using a global social support measure. To that end, Han and colleagues (2005) found that among breast cancer patients some types of social support but not others were associated with satisfaction with their physician and problems interacting with their medical team. The committee made the following findings:

- The committee identified literature indicating that social support may influence health care utilization, clinical processes of care, health outcomes, and patient experience.
- The committee did not identify literature indicating that social relationships may influence patient safety.

Residential and Community Context

The committee uses the term community context to refer to a set of broadly defined characteristics of residential environments that could be important to health and the health care process and its outcomes. Dimensions include the physical environment (e.g., housing, walkability, transportation options, and proximity to services) as well as the social environment (e.g., safety and violence, social disorder, presence of social organizations, and social cohesion) (Diez Roux, 2001; Diez Roux and Mair, 2010). Community context also references the policies, infrastructural resources, and opportunity structures that influence individuals’ everyday lives. The SEP or racial and ethnic composition of an area is sometimes used as a proxy.
for some of these attributes, although it is an imperfect proxy and can also capture unmeasured or imperfectly measured individual-level SEP. Community context may also have special relevance for older persons due to decreases in mobility with age and for persons with mobility disabilities. One review found “limited evidence” that neighborhood environment is a primary influence on older adults health and functioning (Yen et al., 2009).

Community Socioeconomic Composition

A community’s compositional characteristics may include dimensions of SEP (income, poverty, educational attainment, and employment), as well as the proportion of racial/ethnic minority residents, foreign-born residents, single parent households, or English language–proficient residents. Studies may examine individual characteristics or composite indices covering multiple characteristics grouped into an overall measure, such as a deprivation index or segregation index. Community composition has been shown to affect health behaviors and other risk factors, morbidity, and mortality (Diez Roux and Mair, 2010; IOM, 2014a). As described above, community composition can be used to measure both group- and individual-level effects. Although measured in similar ways, the literature described below makes a conceptual distinction between studies that use community composition as a proxy for individual-level effects and those that use community composition as a genuine group-level exposure.

Community composition as a proxy for individual-level effects

Income Studies examined effects of neighborhood-level income, typically assessed using median household income of a patient’s residence’s zip code, as a proxy for individual income on utilization, health outcomes, patient safety, and costs. In terms of utilization, median household income has been associated with both treatment differences and readmissions. Regarding the former, one article found that high and middle income was significantly associated with higher use of laparoscopic appendectomy compared to low-income patients (Lee et al., 2011a), while another found that low-income elderly patients were less likely to get timely care for AMI (Agarwal et al., 2014). Four studies found that low income was associated with significantly increased odds of readmission (Jiang et al., 2005; Kim et al., 2010; Kroch et al., 2015; Oronce et al., 2015), while one found no association between household income and readmissions (Hunter et al., 2015). With respect to health outcomes, three articles found that median household income was inversely related to in-hospital mortality (Agarwal et al., 2014; Bennett et al., 2010; LaPar et al., 2011). Two studies examined patient safety outcomes, among which one found that income was
not significantly associated with complications after lung cancer resections (LaPar et al., 2011), whereas the other found that higher incomes were protective against complications after elective ventral hernia repair (Novitsky and Orenstein, 2013). One article reported that the higher three income quartiles had significantly higher ST-segment elevation myocardial infarction (STEMI) costs compared to the lowest income quartile (Agarwal et al., 2014).

In addition to income, some studies use alternative measures of economic resources. For example, one study assessed area-level poverty relative to the federal poverty level and the type or rheumatoid arthritis therapy received, and found no significant differences (Yazdany et al., 2014). Another study found that the percent of residents receiving public assistance was significantly associated with receipt of certain preventive services (Zaslavsky and Epstein, 2005).

**Education** Few studies examined the influence of neighborhood educational attainment as a proxy for individual education on health care utilization and health care outcomes. One study found that areas with medium educational attainment (areas where 50 to 75 percent of households had individuals who achieved greater than a high school education) was significantly associated with a longer length of stay compared to areas with low levels of educational attainment (areas where less than 50 percent of households had an individual who achieved greater than a high school education) (Lee et al., 2011a). Interestingly, this study found no differences in length of stay among high education areas (more than 75 percent of households with someone who achieved greater than a high school education) compared to low education areas. One study reported no differences in the use of laparoscopic appendectomy among adults with appendicitis by education (Lee et al., 2011b).

**Composite measures** A small number of articles used neighborhood compositional measures as a proxy for individual SEP to examine health care utilization and health care outcomes. One study found that low neighborhood SEP was associated with significantly greater odds of operative death (Birkmeyer et al., 2008), and another found that below-average neighborhood SEP composition was associated with increased mortality 1-year after heart failure, but not with 30-day mortality (Rathore et al., 2006). Regarding utilization, one study found that lupus patients in the lowest SEP quartile had a higher risk of avoidable hospitalizations, but there were no differences in the higher three SEP quartiles (Ward, 2008). One article found that neighborhood SEP was associated with decreased likelihood of undergoing left ventricular systolic function assessment for heart failure, but not with prescription of angiotensin-converting-enzyme (ACE) inhibitors or 30-day readmissions (Rathore et al., 2006). Another article reported that neighborhood deprivation was significantly associated
with medication non-adherence due to beliefs, but not with non-adherence due to costs among Mexican Americans with type 2 diabetes (Billimek and August, 2014).

Community composition as a measure of group-level effects

*Income*  A number of studies examined the effects of area-level income, measured using median household income, and poverty, measured as relative to the federal poverty level, on health care utilization and health care outcomes. Of articles examining median household income and health care use, one study found that area-level income was not significantly associated with getting recommended rheumatoid arthritis therapy (Yazdany et al., 2014). Among studies examining readmissions outcomes, one found that income was not associated with readmissions (Hu et al., 2014), one found that medium but not high-median household income was associated with a lower hazard of readmission (Smith et al., 2014), and one reported a significant interaction between comorbidity and neighborhood income, such that patients with high comorbidity burden living in low-income areas had significantly higher rehospitalizations for all causes compared to those with a high comorbidity burden living in high-income areas (Foraker et al., 2011). This study reported similar effects for death and rehospitalization or death. In a separate study, these investigators also found a significant interaction between race and income, where blacks living in low-income neighborhoods had significantly higher 28-day and 1-year mortality compared to whites living in high-income neighborhoods (Foraker et al., 2013). On the other hand, Smith and colleagues (2014) found that income was not significantly associated with death over 6-year follow up.

Among studies that examined the effect of poverty on health care use and health care outcomes, one reported that poverty level was not significantly associated with mortality in hospital, or within 30 days, 90 days, or 1 year among patients receiving critical care (Villanueva and Aggarwal, 2013; Zager et al., 2011). A slightly greater number of studies examined health care utilization outcomes, among which one found that high poverty was associated with increased 30-day readmissions (Hu et al., 2014), while one found that poverty level was not significantly associated with either 30-day or 1-year readmission (Villanueva and Aggarwal, 2013). One study found that town-level poverty was predictive of AMI and heart failure hospitalizations (Harris et al., 2008). Of three studies examining clinical processes of care, one reported that higher poverty areas were associated with decreased odds of colon and rectal cancer treatments (Hines et al., 2014), and one found that poverty level was not significantly associated with receipt of recommended rheumatoid arthritis therapy (Yazdany et al., 2014). One study reported no association between county-level poverty and receipt
of antipsychotic drugs among black or white nursing home residents, no association between poverty level and restraint use on black nursing home patients, and a small but significant protective effect of poverty on restraint use among white nursing home residents (Miller et al., 2006).

Two studies found that the proportion of households on public assistance was associated with decreased likelihood of getting recommended preventive care (Zaslavsky and Epstein, 2005; Zaslavsky et al., 2000).

Education Several articles examined the relationship between neighborhood education and health care use. Two articles found that neighborhood education was the strongest predictor of getting recommended preventive care (Zaslavsky and Epstein, 2005; Zaslavsky et al., 2000). Three articles examining readmissions reported inconsistent findings, with one finding that residing in a low education area was associated with significantly higher readmissions for AMI, heart failure, or pneumonia (Herrin et al., 2015), and one study reported increased likelihood of 30-day or 1-year readmission among patients living in an area with low educational attainment with comorbid mental health and substance use disorders who had been discharged from acute patient care (Stahler et al., 2009). One study reported no significant association between neighborhood education and 30-day all-cause readmissions (Hu et al., 2014). One article also found no association between neighborhood educational attainment and keeping a follow-up appointment after discharge (Stahler et al., 2009). One article found that educational attainment was not associated with hospitalization for heart failure or AMI (Harris et al., 2008).

Occupation Two articles examined area-level employment and health care utilization. One found that being in a retirement area significantly decreased risk of readmission (Herrin et al., 2015), and the other found that high unemployment was predictive of hospitalizations for AMI and heart failure (Harris et al., 2008).

Racial/ethnic composition Two articles examined neighborhood racial/ethnic composition and health care utilization. Zaslavsky and colleagues (2000) found that the proportion of black residents was negatively associated with getting recommended preventive care, while the proportion of Asian residents was positively associated, and the proportion of Hispanic residents was not significantly associated. Another study found that county-level racial composition may interact with nursing home facility-level racial composition on nursing home quality outcomes, blunting the protective effect of having a higher proportion of black residents on restraint use and receipt of antipsychotic drugs (Miller et al., 2006).

Composite measures A small number of articles examined composite measures of community composition and health care use and health care outcomes. Two studies found that low area-level SEP was associated with increased readmissions from heart failure (Bikdeli et al., 2014) from all
causes (Kind et al., 2014). One study found that lower area-level SEP was associated with poorer glycemic control even after controlling for individual SEP, but there was no association between area-level SEP and lipid control (Geraghty et al., 2010). One study reported a significant interaction between individual SEP and area-level SEP (Taylor et al., 2006). Specifically, the authors found that individuals with low SEP residing in high-SEP areas had shorter time to hospitalization, higher rates of hospitalization, and higher rates of uncontrolled blood pressure after accounting for other individual and neighborhood SEP factors, and compared to individuals of low SEP in low- or moderate-SEP areas, and moderate- or high-SEP individuals from all-level SEP areas.

**Other compositional factors** Two studies examined the effect of other compositional factors on health care use. One article found that the percent of residents never married, the number of Medicare beneficiaries per capita, the number of nursing home residents with pressure sores, and the number of nursing home residents with increased need for help were associated with increased readmissions for AMI, heart failure, and pneumonia, whereas the number of nursing home patients who were depressed or anxious was associated with decreased risk of readmission (Herrin et al., 2015). Another study found no association between the county-level nursing home occupancy rate and receipt of antipsychotic drugs among black and white nursing home patients. No significant association between the county-level nursing home occupancy rate and restraint use on black nursing home patients was found, but a small, significant protective effect on white nursing home residents was observed (Miller et al., 2006). The committee made the following finding:

- The committee identified literature indicating that neighborhood composition may influence health care utilization, clinical processes of care, health outcomes, and patient safety.

**Contextual Community Effects**

Contextual community effects include a variety of heterogeneous elements of a community’s physical and social environments. Unlike compositional characteristics that aggregate individual-level characteristics, contextual characteristics cannot be disaggregated into individual-level characteristics, but are rather emergent properties of the place or the community itself. Evidence suggests that both physical and social environments may affect health behaviors (in particular, nutrition and physical activity), morbidity, and mortality (Diez Roux and Mair, 2010; IOM, 2002).
**Built environment**  The built environment encompasses man-made aspects of the physical environment and may include transportation, walkability, sanitation, buildings and housing, and other elements of infrastructure and urban planning (IOM, 2002). Transportation and walkability may be especially relevant for the health outcomes of older adults and persons with mobility disabilities.

**Housing**  Elements of housing include housing stability, homelessness, and quality and safety. Homelessness and housing instability are associated with poor health care access, increased physical and mental morbidity, and mortality (Fazel et al., 2008, 2014; Kushel et al., 2006). Poor housing can negatively affect health through exposure to environmental hazards such as lead or poor air quality, infectious disease, poor sanitation, and injury (IOM, 2002; Krieger and Higgins, 2002). Studies examining the association between housing status (namely, post-discharge residence—e.g., private residence, institutional residence such as skilled care or assisted living) found no association with readmissions in either the short term (30 days) or longer term (1 year) (Garrison et al., 2013; Jasti et al., 2008; Stahler et al., 2009).

**Transportation**  Transportation can be a barrier to health care access and may include both availability of public transportation and travel distance; identified studies examining the influence of transport on health care utilization and health care outcomes focused on the latter. One study found no association between distance traveled and readmissions (Chou et al., 2014), while another reported that distance traveled relative to the patient mean distance was significantly associated with increased likelihood of 30-day readmission (Kroch et al., 2015). One article examined influence on patient experience and found that patients with a smaller travel distance were less satisfied with their care compared to patients living farther away (Abtahi et al., 2015).

Two articles examined influence of travel distance on mortality. One found that patients traveling further were significantly more likely to die in surgery (Chou et al., 2014). There was a significant interaction with disease severity such that travel distance had no effect on mortality among healthier patients, but high-severity patients traveling further had significantly higher rates of operative mortality compared to patients traveling less far. One article found no effect of travel distance measured by both point distance and driving distance and survival to discharge (Cudnik et al., 2010). However, the authors also reported that survival to discharge was higher in patients taken to a further, more specialized hospital, bypassing closer, but less specialized facilities, compared to those simply taken to the closest hospital (Cudnik et al., 2010).

**Health care resources**  The availability of health care services is not evenly distributed in either number or quality. This uneven distribution
has consequences for health care access and ultimately health status. Two studies examined the influence of area-level health care resources and health care use and outcomes. Herrin and colleagues (2015) found that a higher number of specialists per capita and the number of hospital beds per capita significantly increased risk of readmissions, while designation as a retirement area, the number of general practitioners per capita, and having more nursing homes per capita was associated with decreased risk of readmission. Nyweide and colleagues (2011) found that physician supply was not associated with Medicare beneficiaries' satisfaction with care.

**Other elements of the built environment** One study reported that, for patients diagnosed with comorbid mental health and substance use disorders discharged from acute inpatient care, living in an area with high levels of vacant housing and living relatively far from an Alcoholics Anonymous meeting location significantly decreased likelihood of keeping a 30-day follow-up appointment (Stahler et al., 2009). Another study reported that towns closer to a hospital had significantly higher hospitalization rates for heart failure (Harris et al., 2008).

**Social environment** While many elements of a social environment are compositional, or derived from the individuals who make up a social group, other elements such as economic inequality, urbanization, safety and violence, and social mobility are emergent properties of the groups as a whole (IOM, 2002).

**Income inequality** Income inequality, or the distribution of income across societies, has been shown to be associated with worse population health (e.g., Kawachi and Kennedy, 1999; Lynch and Kaplan, 2000; Subramanian and Kawachi, 2004; Wilkinson and Pickett, 2006). One study examined income inequality and found that it was associated with increased 30-day readmissions for AMI, heart failure, and pneumonia, even after adjustment of individual patient SEP (Lindenauer et al., 2013). The authors reported no association with 30-day mortality for any condition.

**Neighborhood disadvantage** One study reported that disadvantaged neighborhoods had both lower availability of and reduced use of revascularization services for AMI (Fang and Alderman, 2003). While the selected disadvantaged neighborhoods were more likely to have residents living under the poverty line, who were unemployed, had lower incomes, and less education compared to residents in other neighborhoods of the city under study, the authors did not assess “neighborhood disadvantage” using a specified measure.

**Urbanization** Urbanization describes where a place falls on the spectrum from urban to rural. Many studies categorize urbanization as dichotomous (i.e., urban or rural) or trichotomous (e.g., urban, suburban,
or rural), while some use a more graded spectrum (e.g., percent urban). Rural areas present challenges related to health care access due to both the availability and distance to health care resources and may also increase risks from environmental hazards associated with rural industries, such as pesticides from farming (IOM, 2002). Individuals in urban areas may also experience negative environmental exposures such as air pollution and safety hazards of old buildings. Furthermore, urban areas may have concentrated areas of disadvantage that may expose residents to negative health effects of poverty and decay, as well as unique social, political, and economic contexts that converge with a city’s physical attributes to shape health behaviors (e.g., physical activity and healthy eating) (IOM, 2002).

A review of the influence of social factors on readmission and mortality among pneumonia and heart failure patients found only a small number of studies that examine the effect of urban or rural residence (Calvillo-King et al., 2013). The review found that rural residence was associated with significantly fewer readmissions for heart failure, but not associated with readmission for pneumonia, and that urban residence was not significantly associated with increased mortality for either condition. Most studies of health care use and health care outcomes focused on utilization. One study found that rural residence was associated with decreased risk of readmission (Herrin et al., 2015), and another study found that urban residence was associated with increased risk of unscheduled readmission but not scheduled readmissions (Kim et al., 2010). Njeru and colleagues (2015) reported a significant interaction between rural residence and need for an interpreter, such that patients in need of interpreter services from rural areas had significantly increased risk of hospitalization. Ward (2008) reported no association between urban–rural status and avoidable hospitalization among lupus patients. In terms of treatment differences, one study reported that among colorectal cancer patients, rural residents were significantly less likely to receive chemotherapy and suburban patients were significantly less likely to receive radiotherapy (Hines et al., 2014). Another study found that percent urban was associated with receiving recommended childhood and adolescent immunizations, but no recommended care for adults (Zaslavsky et al., 2000). One study reported that urban residents reported significantly worse provider communication (Wallace et al., 2008). The committee made the following findings:

- The committee identified literature indicating that community context may influence health care utilization, health outcomes, and patient experience.
- The committee identified literature indicating that urbanization may influence health care utilization, clinical processes of care, costs, and patient experience.
Health Literacy

Although an individual risk factor and not a social factor, the committee includes health literacy in the framework. It does so because it is specifically mentioned in the Improving Medicare Post-Acute Care Transformation Act of 2014, and is thus of interest to Congress. It does so also because it is affected by social risk factors, and the literature supports a role for health literacy in health care outcomes and quality measures. The committee also included numeracy as a related concept. Numeracy is the ability to understand information presented in mathematical terms, as health and medical information often is, and to use mathematical knowledge and skills in a variety of applications across different settings (IOM, 2014b). Adults with limited health literacy have lower levels of knowledge about health, poorer health status, and may receive fewer preventive services but have higher rates of ED use and hospitalizations, which may be associated with higher costs (IOM, 2004). Health literacy can be especially relevant for adults with certain disabilities, such as individuals who are deaf, hard of hearing, blind, or have low vision, who have communication barriers and for whom health care information is often not available in accessible formats (IOM, 2004).

Several review articles examined the association between health literacy and health care use and health care outcomes. A review of health literacy and ED outcomes found limited evidence, but the small number of studies identified suggest that inadequate health literacy may be associated with higher ED use and higher costs among Medicare beneficiaries age 65 and older (Herndon et al., 2011). A review of low health literacy and health outcomes found insufficient and inconsistent evidence on the effect of health literacy and numeracy on clinical processes of care (including immunizations, mammography screenings, medication adherence among patients with HIV), health outcomes (including medication adherence, asthma control, diabetes control and complications, and hypertension control), costs, and disparities (Berkman et al., 2011). Similarly, a review of health literacy and diabetes outcomes reported inconsistent and insufficient evidence on the effect of health literacy and numeracy on diabetes risk factors, diabetes complications, and patient experiences (Al Sayah et al., 2013).

Evidence from individual studies echoes the review findings. With respect to utilization, two studies found that higher health literacy was associated with lower utilization. One article found that patients with above basic health literacy had significantly lower risk and lower incidence of all-cause 30-day readmissions after AMI (Bailey et al., 2015). Another study reported a significant, graded, negative association, such that poorer health literacy was associated with significantly higher odds of COPD exacerbations re-
quiring ED visits or hospitalizations (Omachi et al., 2013). Two articles examined effects of health literacy on patient experience. Aboumatar and colleagues (2013) found that among patients with hypertension, there were no differences between patients with high and low health literacy in patient ratings of care, including measures of trust, satisfaction, the likelihood of recommending their doctor, and reporting participatory decision making. Hawley and colleagues (2010) reported that breast cancer patients with moderate or low health literacy were significantly more likely to report poor satisfaction with their care coordination compared to patients with high health literacy. The committee made the following finding:

- The committee identified literature indicating that health literacy may influence health care utilization, clinical processes of care, cost, and patient experience.

CONCLUDING REMARKS

It is important to note that although often correlated (e.g., SEP is correlated with race/ethnicity and both race/ethnicity and income are correlated with community context) the different social risk factors also capture distinct dimensions that may need to be considered in understanding the social determinants of health care processes and outcomes in Medicare beneficiaries.

The conceptual framework implies that social risk factors may influence the health care process as well as the outcomes of care among Medicare beneficiaries in many interrelated ways. Thus, all other things being equal, the performance of a given health care system (in terms of quality, outcomes, and cost) can undoubtedly be affected by the social composition of the population it serves. At the same time, there are mechanisms through which the health care system can itself ameliorate the impact of social risk factors on quality, outcomes, and cost. As a simple example, through its action to control clinical risk factors the health care system can reduce the impact of social factors on health. As an example of more complex mechanisms, the health care system can partner with social services to improve health literacy or enhance the effectiveness of clinical interventions by, for example, ensuring local access to healthy foods. These strategies will of course require extra effort (and cost) on the part of the system, and there is still relatively limited evidence on the effectiveness of various strategies to achieve this goal.

What is clear at this point in time, however, is that health literacy and social risk factors (SEP; race, ethnicity, and cultural context; gender; social relationships; and residential and community context) have been shown to influence health care use, costs, and health care outcomes in Medicare
beneficiaries. However, some specific factors were found not to influence one or more outcomes. The committee has not yet evaluated the literature for the purpose of identifying those factors that could be incorporated into measures used in Medicare payment programs; that is the focus of the third report from the committee.

REFERENCES


Overview of Medicare Value-Based Payment Programs

MEDICARE VALUE-BASED PAYMENT PROGRAMS FOR HOSPITAL INPATIENT CARE

Hospital Readmissions Reduction Program (HRRP)

The Centers for Medicare & Medicaid Services (CMS) implemented the program beginning in fiscal year (FY) 2013 (October 1, 2012). To calculate the payment reduction, CMS first calculates a hospital’s excess readmissions. The algorithm used to calculate excess readmissions captures an individual hospital’s performance compared to that of hospitals nationally over a 3-year performance period. The excess readmission measure is then risk adjusted using a methodology endorsed by the National Quality Forum (NQF) to account for differences in patient characteristics; factors currently included in the adjustment include demographic characteristics, clinical comorbidities, and patient frailty (NQF, 2014). CMS then uses the adjusted excess readmissions measure to calculate the payment adjustment. According to a Kaiser Family Foundation analysis of CMS data, in FY 2016, based on performance for the period of June 2010 through July 2013, an estimated 78 percent of hospitals will be penalized under the HRRP, and 1.2 percent of hospitals will be penalized the maximum rate of 3 percent (Boccuti and Casillas, 2015). The average hospital penalty among penalized hospitals is estimated to be –0.63 percent, totaling approximately $428 million (Boccuti and Casillas, 2015).
Hospital-Acquired Condition (HAC) Payment Reduction

The Agency for Healthcare Research and Quality (AHRQ) Patient Safety Indicator (PSI) 90 Composite includes eight potentially preventable conditions:

1. pressure ulcer,
2. iatrogenic pneumothorax,
3. central venous catheter-related bloodstream infections,
4. postoperative hip fracture,
5. perioperative pulmonary embolism or deep vein thrombosis,
6. postoperative sepsis,
7. postoperative wound dehiscence, and
8. accidental puncture or laceration (CMS, 2015d).

The Centers for Disease Control and Prevention’s (CDC’s) National Healthcare Safety Network (NHSN) measures include Central Line-associated Bloodstream Infection (CLABSI), Catheter-Associated Urinary Tract Infection (CAUTI), and surgical site infection (SSI) measures (CMS, 2015d). The infection measures are currently risk adjusted for certain patient demographics (age and sex) and clinical factors (comorbidities and complications) (HHS, 2014). Measures are then grouped into two domains. Domain 1 covers the PSI 90 Composite and is weighted at 25 percent toward the total HAC score for FY 2016. Domain 2 covers the three CDC NHSN CLABSI, CAUTI, and SSI measures and is weighted at 75 percent toward the total HAC score. In other words, the hospitals receive 99 percent of what they otherwise would have been paid for all discharges (CMS, 2014a). In FY 2015, more than 700 hospitals received payment reductions under the HAC reduction program (CMS, 2014a).

Hospital Value-Based Purchasing

Clinical process measures include measures related to getting appropriate treatments in a timely manner (e.g., receiving angioplasty within 90 minutes of hospital arrival for acute myocardial infarction [AMI] patients). Patient experience measures are taken from the Hospital Consumer Assessment of Healthcare Providers and Suppliers (HCAHPS) survey and cover eight dimensions of care:

1. nurse communication,
2. physician communication,
3. cleanliness and quietness,
4. responsiveness,
5. pain management,
6. pharmacy communication,
7. discharge information, and
8. an overall rating, plus a consistency score (the median score across all dimensions).

Clinical outcomes include 30-day mortality for AMI, heart failure, and pneumonia, and certain patient safety measures—AHRQ PSI 90 composite and CDC NHSN CLABSI (MLN, 2013). For each domain of performance, CMS calculates both an achievement score (compared to a threshold of performance) and an improvement score (compared to a baseline benchmark for all other hospitals, not just other similar hospitals), and uses the better of the two scores when calculating the total performance score (CMS, 2012). The four domains are weighted for the total performance score as follows: 20 percent for clinical process, 30 percent for patient experience, 30 percent for clinical outcomes, and 20 percent for efficiency. CMS uses this performance score in a mathematical formula to calculate an incentive payment for each hospital (MLN, 2013).

According to a Government Accountability Office (GAO) analysis, for FY 2015, 74 percent of hospitals had payment adjustments (bonuses or penalties) of less than 0.5 percent; only 8 percent of hospitals received bonuses of 0.5 percent or greater, and 18 percent of hospitals received penalties of 0.5 percent or greater (GAO, 2015). The GAO analysis also found that payment adjustments varied significantly by hospital characteristics, with safety-net hospitals receiving smaller bonuses and larger penalties compared to hospitals overall, while small urban hospitals received larger bonuses and smaller penalties compared to hospitals overall (GAO, 2015).

MEDICARE VALUE-BASED PAYMENT PROGRAMS FOR AMBULATORY CARE

Medicare Shared Savings Program (MSSP)

The MSSP has two tracks: a one-sided model and a two-sided model. In the one-sided model, health care organizations are eligible to share a portion of cost savings achieved only for the first year of the organization’s agreement with Medicare. They are not accountable for losses during the performance period. Accountable care organizations (ACOs) that enter into a one-sided model must enter a two-sided agreement in subsequent agreements. In the two-sided model, health care organizations share a portion of both savings and losses achieved, and must remain in this model for subsequent agreements. ACOs that enter into a two-sided agreement are eligible for a higher sharing rate with a higher performance payment limit.
compared to those that enter into a one-sided agreement (CMS, n.d.-d). The benchmark is weighted toward the third year using the national growth rate such that benchmark year (BY) one is weighted at 10 percent, BY two is weighted at 30 percent, and BY three is weighted at 60 percent (CMS, 2014c).

To qualify for shared savings, organizations must meet a minimum savings threshold, the minimum savings rate (MSR). For organizations in both the one- and two-sided models, the MSR is calculated based on the percent below the benchmark adjusted for beneficiary characteristics and accounting for normal variation. For the two-sided model, the threshold above which organizations must share losses is determined using the minimum loss rate (MLR), which is calculated based on the percent above the benchmark adjusted for beneficiary characteristics and accounting for normal variation (CMS, 2014c). Among these, 99 percent (401 ACOs) entered into a one-sided agreement and 1 percent (3 ACOs) entered into a two-sided agreement. For performance year 2014, 92 MSSP ACOs held spending to $806 million below their benchmarks, resulting in $341 million in payments to the ACOs and a net savings of $465 for the Medicare Trust Funds (CMS, 2015e). No ACOs under the two-sided model owed losses (CMS, 2015e).

**Physician Value-Based Modifier**

Beginning in 2015, the value modifier was applied to physicians in groups of 100 or more eligible professionals (defined as physicians and select other practitioners and therapists) (CMS, n.d.-c). In 2016, it will be applied to physicians in groups of 10 or more eligible professionals, and beginning 2017, it will be applied to all physicians (CMS, n.d.-c). Although the precise value modifier calculation methodology will change slightly between 2015 and 2016, for physicians in category 1, quality is assessed using a composite score covering six domains (effective clinical care, person- and caregiver-centered experience and outcomes, community/population health, patient safety, communication and care coordination, and efficiency and cost reduction) and cost is assessed using a composite score covering two domains (per capita costs for all attributed beneficiaries and per capita costs for beneficiaries with specific conditions) (CMS, 2015b).

For 2015, category 1 physician groups could either receive a neutral value modifier (fixed at 0.0 percent; no adjustment) or elect to have their value modifier calculated using CMS’s quality tiering methodology. Under quality tiering, physicians could receive an upward, neutral, or downward adjustment (CMS, n.d.-c). For 2016, all category 1 physicians have their value modifier calculated using quality tiering; groups with 10 to 99 eligible professionals can receive an upward or neutral (no) adjustment, and groups
with 100 or more eligible professionals can receive an upward, neutral, or downward adjustment (CMS, 2015b). Physicians in category 2 will receive a value modifier set at a fixed negative adjustment (−1.0 percent for 2015 and −2.0 percent for 2016).

In 2015, 691 groups met the minimum Physician Quality Reporting System reporting requirements for category 1, and 319 failed to meet reporting requirements and were designated to category 2 (CMS, n.d.-a). Of category 1 groups, 127 groups elected to have their value modifier calculated using quality tiering. Among these, 14 groups received upward adjustments for performance, 81 received no adjustments, 11 received negative adjustments, and 21 received no adjustment owing to insufficient data to determine quality and cost performance. A total of $11.4 million was distributed from groups receiving negative adjustments to those receiving positive adjustments. The Physician Value-Based Payment Modifier Program is set to expire in 2018, but a new physician incentive program, the Merit-Based Incentive Payment System is set to begin in 2019 (CMS, 2015h).

End-Stage Renal Disease Quality Incentive Program

To calculate facility performance, the Medicare Improvements for Patients and Providers Act requires CMS to use quality measures assessing anemia management, dialysis adequacy, and other measures specified by the Secretary of the Department of Health and Human Services regarding iron management, bone mineral metabolism, vascular access, and patient satisfaction (CMS, 2015c). Achievement scores are calculated based on where facilities rank in relative to other facilities during the performance period (between the 15th percentile threshold and 90th percentile benchmark) (CMS, 2015c). Improvement scores are calculated relative to the facility’s prior performance and the benchmark (CMS, 2015c). Since 2014, payments for adult beneficiaries are adjusted for age, dialysis onset, body surface, body mass, and specific acute and chronic patient comorbidities; adjustments for pediatric patients are adjusted only for age and dialysis method (MedPAC, 2015c). Payments are also adjusted for facility-level factors, including low volume (between the minimum of 11 cases and 25 cases), rural location, and wage index (CMS, 2015c; HHS, 2014; MedPAC, 2015c). For reporting measures, facilities are given points based on whether they meet reporting requirements (CMS, 2015c). CMS calculates a total performance score on the basis of a facility’s clinical measures and reporting measures (CMS, 2015c). Clinical measures are weighted more heavily than reporting measures, although CMS determines the precise weight annually. For 2016 and 2017, clinical measures are weighted at 75 percent and reporting measures at 25 percent, and that increases in
2018 to clinical measures at 90 percent and reporting measures at 10 percent (CMS, n.d.-b). CMS then assigns payment adjustments on the basis of a facility’s score.

**MEDICARE VALUE-BASED PAYMENT PROGRAMS FOR HEALTH PLANS**

**Medicare Advantage (MA)/Part C**

To determine payments to county-level MA plans, plans first submit a bid to offer coverage, which reflects administrative costs and profit. CMS then compares the bid to a benchmark (calculated using statutory formulas, including county-level rates based on traditional Medicare rates, the national fee-for-service rate, and plan quality) to determine the basic payment amount for enrollees in each county. To do so, CMS first calculates a risk measure for each enrollee, using the CMS hierarchical condition category model, which includes demographics (age and sex), clinical comorbidities, Medicaid status, disabled status, and working aged status,¹ and then multiplies it for the base rate for enrollees. For MA plans whose bid is above the benchmark, enrollees pay a premium covering the difference. For plans whose bid is below the benchmark, the plans receive the standard bid and also a rebate that is a fixed percentage of the difference between the non-standardized bid and its case-mix adjusted benchmark (50, 65, or 70 percent depending on a plan’s star rating). This rebate must be shared with enrollees as either additional benefits or lower premiums. Payments to regional plans are calculated similarly, but their benchmark accounts for county-level plans. Plans that offer Part D coverage offer a separate bid for Part D payment, which is calculated the same way as for plans that offer just Part D coverage (MedPAC, 2015b).

MA plans that achieve higher-quality ratings under Medicare’s Five Star Ratings Program are eligible for quality bonus payments (CMS, 2015a). Plan quality is assessed on the basis of performance on preventive services; management of chronic conditions; beneficiary experience (e.g., satisfaction); beneficiary complaints, access, and performance problems; members choosing to leave the plan; and plan management of beneficiary appeals (Medicare.gov, n.d.-b). Since 2011, CMS required plans to achieve four stars or higher to be eligible for bonus payments, but they are eliminating

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¹ “Working aged” refers to individuals age 65 and older who qualify for Medicare benefits based on their age and who are also eligible for employer group health plan coverage through their current employment or their spouse’s current employment. For the working aged, either Medicare or the employer health plan can serve as primary or secondary coverage, depending on the employer size and the beneficiary’s preference (CMS, 2014b).
the threshold beginning in 2016 (CMS, 2015f). In 2016, plans with higher ratings will receive a bonus equaling 5 percent of the county-level rate (CMS, 2015a).

**Medicare Part D**

CMS calculates this payment by adjusting each plan’s bid (which is estimated based on the expected costs of a Medicare beneficiary of average health) with their enrollees’ actual health status. For this risk adjustment, CMS uses the prescription drug hierarchical condition category risk-adjustment model, which takes into account patient case-mix, demographics (age and sex), disability status, low-income status, and long-term institutionalized status (MedPAC, 2015d).

Through individual reinsurance, Medicare subsidizes 80 percent of drug spending above the out-of-pocket threshold (enrollee costs, including the deductible and cost sharing, also known as the catastrophic cap; $4,850 in 2016), while the plan pays 15 percent, and the enrollee pays 5 percent (Medicare.gov, n.d.-a; MedPAC, 2014). In 2013, Medicare expenditures for reinsurance totaled nearly $20 billion (MedPAC, 2015a). Risk corridor adjustments limit plans’ potential losses or gains by financing costs that are higher than expected or recouping profits deemed excessive (MedPAC, 2015a). At the end of each benefit year, CMS compares a plan’s actual costs to its bid. Up to 5 percent of the bid, plans can keep all profits and must pay all losses. Between 5 and 10 percent above or below the bid, Medicare shares half of savings and losses with the plan. For 10 percent or more above or below the bid, Medicare covers 80 percent of the risk, while plans are at risk of 20 percent (MedPAC, 2014). Nearly 75 percent of plans pay a portion of their profits to Medicare each year under risk corridors; between 2010 and 2012, total annual payments ranged between $900 million and $1 billion (MedPAC, 2014).

**MEDICARE VALUE-BASED PAYMENT PROGRAMS FOR POST-ACUTE CARE**

**Skilled Nursing Facility (SNF) Value-Based Purchasing**

The quality domains include skin integrity and changes in skin integrity, incidence of major falls, and functional status, cognitive function, and changes in function and cognitive function. For FY 2018 forward, CMS proposed three measures, with one measure addressing each of the three domains. CMS will implement the SNF Value-Based Purchasing Program (the incentive program) beginning FY 2019. CMS proposed adopting the NQF-endorsed 30-day all-cause readmission measure as the performance
measure on which FY 2019 incentive payments will be based, and CMS is soliciting comment on implementing the measure for SNF incentive payment application (CMS, 2015g).

REFERENCES


HHS (U.S. Department of Health and Human Services). 2014. Medicare program; hospital Inpatient Prospective Payment Systems for acute care hospitals and the long-term care hospital Prospective Payment System and fiscal year 2015 rates; quality reporting requirements for specific providers; reasonable compensation equivalents for physician services in excluded hospitals and certain teaching hospitals; provider administrative appeals and judicial review; enforcement provisions for organ transplant centers; and electronic health record (EHR) incentive program. Federal Register 79(163):50094.


Appendix B reproduces in its entirety the second report from the Committee on Accounting for Socioeconomic Status in Medicare Payment Programs. The committee made no substantive content changes. This report was originally released on April 7, 2016, as:

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BA  EXAMPLE IMPLEMENTATION STRATEGIES AND CASE STUDIES  303
The Centers for Medicare & Medicaid Services (CMS) have been moving from volume-based, fee-for-service payment to value-based payment (VBP), which aims to improve health care quality, health outcomes, and patient care experiences, while also controlling costs. Since the passage of the Patient Protection and Affordable Care Act in 2010, CMS has implemented a variety of VBP strategies, including incentive programs and risk-based alternative payment models such as bundled (episode-based) payments and accountable care organizations (Burwell, 2015). Emerging evidence suggests that providers disproportionately serving patients with social risk factors for poor health outcomes may be more likely to fare poorly on quality rankings and to receive financial penalties, and less likely to receive financial rewards (Berenson and Shih, 2012; Chien et al., 2007; Friedberg et al., 2010; Gilman et al., 2014, 2015; Joynt and Jha, 2013; Joynt and Rosenthal, 2012; Joynt et al., 2011; Karve et al., 2008; Ly et al., 2010; MedPAC, 2013; Mehta et al., 2008; Rajaram et al., 2015; Ryan, 2013; Shih et al., 2015; Sjoding and Cooke, 2014; Williams et al., 2014). However, an analysis of actual penalties incurred under the Hospital Readmissions Reduction Program for fiscal year 2013 reported that safety-net hospitals incurred only slightly higher penalties than non–safety-net hospitals (Sheingold et al., 2016). The drivers of these disparities in both health care quality and health outcomes are poorly understood, and differences in interpretation have led to divergent concerns about the potential effect of VBP on health equity.1

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1 Health equity means that every person has the opportunity to attain his or her full health potential and no one is disadvantaged from achieving this potential because of social position
STATEMENT OF TASK

In an effort to better distinguish the drivers of variations in performance among providers disproportionately serving socially at-risk populations and to identify methods to account for social risk factors in Medicare payment programs, the Department of Health and Human Services acting through the Office of the Assistant Secretary of Planning and Evaluation (ASPE), contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare programs (see Appendix F for biographical sketches). This report is the second in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the Improving Medicare Post-Acute Care Transformation (IMPACT) Act. In its first report (NASEM, 2016), the committee presented a conceptual framework and described the results of a literature search linking five social risk factors (socioeconomic position; race, ethnicity, and cultural context; gender; social relationships; and residential and community context) and health literacy to health-related measures of importance to Medicare payment and quality programs. Details of the statement of task and the sequence of reports can be found in Box B1-1. The committee will release reports every 3 months, addressing each item in the statement of task in turn. The statement of task requests committee recommendations only in the fourth report.

PERFORMANCE OF PROVIDERS DISPROPORTIONATELY SERVING SOCIALLY AT-RISK POPULATIONS

As described in the committee’s first report (See Appendix A) (NASEM, 2016), socially at-risk populations include individuals with social risk factors for poor health outcomes such as low socioeconomic position, social isolation, residing in a disadvantaged neighborhood, identifying as a racial or an ethnic minority, having a non-normative gender or sexual orientation, and having limited health literacy. Although these populations receive care from a wide range of providers, they are disproportionately repre-
sented among the patients treated by a small subset of providers, including safety-net hospitals, minority-serving institutions, critical access hospitals, and community health centers (Bach et al., 2004; Jha et al., 2007, 2008). Evidence suggests the performance of these providers may differ systematically from providers serving the general population. In particular, hospitals disproportionately serving socially at-risk populations may provide lower-quality care and have worse patient outcomes compared to hospitals serving the general population on average (Girotra et al., 2012; Jha et al., 2011; Popescu et al., 2009). However, there is also evidence of substantial variation in performance among these providers, and some achieve performance scores on par with the top performers among all hospitals (Gaskin et al., 2011; Jha et al., 2008). Additionally, literature suggests that the performance of safety-net and minority-serving providers of ambulatory care is more mixed, and in many cases better compared to providers serving the general population (Goldman et al., 2012; Hall et al., 2014; Laiteerapong et al., 2014; Lopez et al., 2015; O’Malley et al., 2007; Rothkopf et al., 2011; Sequist et al., 2008).

The committee also considered using publicly reported performance data from providers relevant to Medicare beneficiaries—Medicare Hospital Compare hospital data and Medicare Advantage and Medicare Part D Star Ratings health plan data—to identify high-performing providers disproportionately serving socially at-risk populations. To do so would have engaged the committee in original empirical research, uncommon in reports from the National Academies, especially given the time frame the committee faces. The committee identified several challenges to identifying universally high performers. As described in the literature (e.g., Gaskin et al., 2011; Girotra et al., 2012; Jha et al., 2005, 2008; McHugh et al., 2014), there exists substantial variability in performance across measures and practice areas within organizations and across time for all providers. Individual providers perform well and poorly on different measures and in different practice areas. Moreover, there is little stability in performance over time, such that a high performer one year may perform poorly the next. Additionally, a provider’s performance on any individual measure or domain may not generalize to its overall performance and vice versa (Medicare.gov, n.d.; Shwartz et al., 2011).

Given these challenges, the committee did not embark on original research and depended on the published literature described above. Therefore, the committee was unable to identify high- or low-performing providers if interpreted as universally high or low performers across all providers, let alone those disproportionately serving socially at-risk populations. As a result, the committee was also unable to identify high- or low-performing providers who disproportionately serve socially at-risk populations. Despite these challenges:
The committee found that some providers disproportionately serving socially at-risk populations achieved performance that was higher than their peer organizations and on par with the highest performers among all providers.

PRACTICES TO IMPROVE CARE FOR SOCIALEY AT-RISK POPULATIONS

The complex, interacting nature of the drivers of variation in the quality of care and health care outcomes makes it difficult to draw clear conclusions about what precisely drives this variation among providers that disproportionately serve socially at-risk populations. Combined with the fact that, as described in the previous section, the committee was unable to identify universally high- or low-performing providers, it follows that it is also problematic to then identify practices associated with the performance of universally high- and low-performing providers, let alone among those disproportionately serving socially at-risk populations, and to make comparisons between them. Thus, the committee turned to case studies to identify specific practices used either to improve performance or achieve high performance for socially at-risk populations or to mitigate the effects of social risk factors on their patient population’s health outcomes within specific facilities.

The committee reviewed both the peer-reviewed and grey literature in order to identify innovations, interventions, and other strategies providers disproportionately serving socially at-risk populations have implemented to improve care and outcomes for their patients. The committee reached out to organizations known to conduct research or represent providers disproportionately serving socially at-risk populations (Alliance of Community Health Plans, America’s Essential Hospitals, America’s Health Insurance Plans, and The Commonwealth Fund) and asked for help identifying relevant case studies, especially those that are not within the peer-reviewed published literature. These organizations submitted 60 case studies.

The committee reviewed the case studies submitted, as well as the published literature. The evidence identified through these searches has substantial limitations—few rigorous (controlled) evaluations, unlikely to be generalizable, and limited outcome data. Additionally, the relative performance of individual providers compared to their peers was not well documented. Given these limitations, the committee was not able to identify “best practices” if interpreted as uniform and universal strategies to provide high-quality care for socially at-risk populations and was not able to make comparisons between high- and low-performing providers, even among case studies. Furthermore, because community context is a central determinant of what is needed, acceptable, and feasible in different configu-
rations of problems and resources, universal and uniform “best practices” to improve care for all patients within a population and in all settings may not be desirable (Curry et al., 2011; Joynt et al., 2014). Nevertheless,

- The committee found examples of specific strategies implemented in specific community contexts by providers serving socially at-risk populations with the goal to improve health care quality and health outcomes.

IDENTIFYING SYSTEMS PRACTICES

Committee members identified commonalities from the review of the case studies, informed also by the literature and, in some cases, members’ empirical research or professional experience delivering care to socially at-risk populations. The common themes describe a set of practices delivered within a system of collaborating partners, not to specific health care interventions, and are consonant with research findings from the quality improvement literature and related clinical interventions designed to decrease disparities. Note that “system” as used here is not limited to a single health care organization, but refers more generally to a set of interconnected actors who work together to accomplish a common purpose—in this case to improve health equity and outcomes for socially at-risk populations. In this approach, the system is mainly composed of medical providers as well as partnering social service agencies, public health agencies, community organizations, and the community in which those medical providers are embedded. The medical providers may be formally (i.e., through legal arrangements) or informally related to the external partners, but all serve the same community or geographic region. These practices pertain to all health systems that serve socially at-risk populations, not only those providers disproportionately serving socially at-risk populations use.

The committee concluded that six community-informed and patient-centered systems practices show promise for improving care for socially at-risk populations:

- Commitment to health equity: Value and promote health equity and hold yourself accountable
- Data and measurement: Understand your population’s health, risk factors, and patterns of care
- Comprehensive needs assessment: Identify, anticipate, and respond to clinical and social needs
- Collaborative partnerships: Collaborate within and across provider teams and service sectors to deliver care
• Care continuity: Plan care and care transitions to prepare for patients’ changing clinical and social needs
• Engaging patients in their care: Design individualized care to promote the health of individuals in the community setting

As shown in Figure BS-1, the committee conceives of this system as grounded in community-informed and patient-centered care and emerging out of a commitment to health equity. This commitment supports and drives the other population-based practices, resulting in individualized care that promotes the health of the patient in his or her community context. Although in reality, a provider simultaneously engages in each systems
practice, each practice captures a thought process and set of decisions that logically influence the next. For example, a system may already conduct a comprehensive needs assessment, but this assessment will be fundamentally different when driven by a commitment to health equity and includes social need in addition to clinical needs. The value and resources that flow from this commitment drive changes in other processes, such as collaborating with social service agencies in the community, which supports enhanced planning for care transitions. Finally, the hard work of providing high-quality care is never done; this systems approach provides a continuous process for improvement.

**RESOURCE AND SUSTAINABILITY CONSIDERATIONS**

Both the availability of resources and the alignment of financial incentives that makes practices to improve the quality of care, health, and other outcomes for socially at-risk populations sustainable are prerequisites for the adoption and sustainability of these practices and programs. Resources can incentivize reducing disparities by not only explicitly directing resources to reduce disparities or targeting interventions at socially at-risk populations (such as greater investment in safety-net systems), but also by incorporating equitable care and outcomes into accountability processes (e.g., Berenson and Shih, 2012; Chin, 2016; Zuckerman et al., 2016).

In terms of sustainability, interventions that improve health and quality of care or reduce utilization and cost are only feasible to maintain if the provider is paid in such a way that profits (revenues minus costs) are higher with the intervention than without (e.g., global payment, shared savings, financial incentives). Because most of the efforts described in this report involve fixed costs and potentially shared benefits across multiple payers, their economic feasibility depends not only on Medicare’s payment system but also that of other payers. As health care systems increasingly partner with external organizations and other sectors, this will include non–health care stakeholders as well (e.g., Corrigan and Fisher, 2014). All things equal, environments in which a greater share of a provider’s revenue is derived from such VBP methods will make it more sustainable for providers to invest in programs that generate value (improved quality and reduced cost).

**PUTTING THIS REPORT IN CONTEXT**

The committee’s task in this report centered on identifying what high-quality health systems serving socially at-risk populations do to achieve good health outcomes for their patients. As the committee described, it is possible to deliver high-quality care to these populations and the committee outlined certain systems practices that could be instrumental in achieving
that goal. In the next and third report, the committee returns to the question of which social risk factors could be accounted for in Medicare value-based purchasing programs and how. Nothing in this second report should be interpreted as foreshadowing what the committee will conclude in the third report. However, this report does show that socially at-risk populations do not need to experience low-quality care and bad health care outcomes. Providers can feasibly respond to incentives to deliver high-quality and good-value care to socially at-risk populations.

REFERENCES


Introduction

The Centers for Medicare & Medicaid Services (CMS) has been moving from volume-based, fee-for-service payment to value-based payment (VBP), which aims to improve health care quality, health outcomes, and patient care experiences, while also controlling costs. Since the passage of the Patient Protection and Affordable Care Act in 2010, CMS has implemented a variety of VBP strategies, including incentive programs and risk-based alternative payment models such as bundled (episode-based) payments and accountable care organizations (Burwell, 2015). Early evidence from these programs raised concerns about potential unintended consequences for health equity. Specifically, emerging evidence suggests that providers disproportionately serving patients with social risk factors for poor health outcomes (e.g., individuals with low socioeconomic position [SEP], racial and ethnic minorities, gender and sexual minorities, socially isolated persons, and individuals residing in disadvantaged neighborhoods) may be more likely to fare poorly on quality rankings and to receive financial penalties, and less likely to receive financial rewards (Berenson and Shih, 2012; Chien et al., 2007; Friedberg et al., 2010; Gilman et al., 2014, 2015; Joynt and Jha, 2013; Joynt and Rosenthal, 2012; Joynt et al., 2011; Karve et al., 2008; Ly et al., 2010; MedPAC, 2013; Mehta et al., 2008; Rajaram et al., 2015; Ryan, 2013; Shih et al., 2015; Sjoding and Cooke, 2014; Williams

Health equity means that every person has the opportunity to attain his or her full health potential and no one is disadvantaged from achieving this potential because of social position or other socially determined circumstances. A health disparity refers to a difference in a health outcome or a health determinant between populations (CDC, 2015).
et al., 2014). However, an analysis of actual penalties incurred under the Hospital Readmissions Reduction Program for fiscal year 2013 reported that safety-net hospitals incurred only slightly higher penalties than non-safety-net hospitals (Sheingold et al., 2016).

The drivers of these disparities are poorly understood, and differences in interpretation have led to divergent concerns about the potential effect of VBP on health equity. Some suggest that underlying differences in patient characteristics (including clinical, behavioral, and social risk factors) that are out of the control of providers lead to differences in health outcomes (Jha and Zaslavsky, 2014; Joynt and Jha, 2013). In this view, because providers are being held financially accountable for differences in patient outcomes due to factors beyond their control and because providers disproportionately serving socially at-risk populations are historically less well funded than providers caring for the general population, VBP programs may be taking away resources from providers who need them most (Chien et al., 2007; Ryan, 2013). Moreover, because socially at-risk populations may require more resources to achieve the same outcomes as the general population, increasing the resource gap may in turn increase health disparities (Bhalla and Kalkut, 2010; Ryan, 2013).

At the same time, others are concerned that differences in outcomes between providers serving socially at-risk populations and providers serving the general population reflect disparities in the provision of health care (Krumholz and Bernheim, 2014), because studies have shown that socially at-risk populations including racial and ethnic minorities, low-income persons, gender and sexual minorities, and other disadvantaged groups receive poorer quality health care, experience poorer health, and are more likely to receive care from lower-quality providers (Bach et al., 2004; Girotra et al., 2012; IOM, 2000, 2003, 2011; Jha et al., 2007, 2008, 2011; Popescu et al., 2009). In this view, VBP is a mechanism to hold those who provide lower-quality care accountable and to incentivize improvement (Bernheim, 2014). The reality of observed lower-quality care for socially at-risk populations is likely neither entirely beyond the control of payers and providers involved in their care nor entirely the result of lower capabilities or effort on the part of providers and payers. Thus, when considering the effect on health equity of VBP, there will always be an inherent tension between fairness to providers and improving health care and health outcomes for socially at-risk populations. This tension has led some to advocate for accounting for social risk factors in payment methods to promote fairness for providers, and spurred others to implement interventions to address social risk factors to improve health outcomes for socially at-risk populations. At the federal level, Congress passed the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, which requires the Secretary of Health and Human Services to submit reports to Congress assessing the
impact of and recommending methods to account for socioeconomic status on quality and resource use in Medicare. Additionally, CMS established the Accountable Health Communities initiative in 2016 to assess whether investing in interventions that address health-related social needs can improve health care utilization and costs among Medicare and Medicaid beneficiaries (Alley et al., 2016).

**STATEMENT OF TASK**

In an effort to better distinguish the drivers of variations in performance among providers disproportionately serving socially at-risk populations and to identify methods to account for social risk factors in Medicare payment programs, the Department of Health and Human Services acting through the Office of the Assistant Secretary of Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to identify the best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare programs (see Appendix F for biographical sketches). This report is the second in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the IMPACT Act. In its first report (NASEM, 2016), the committee presented a conceptual framework and described the results of a literature search linking five social risk factors (SEP; race, ethnicity, and cultural context; gender; social relationships; and residential and community context) and health literacy to health-related measures of importance to Medicare payment and quality programs. Details of the statement of task and the sequence of reports can be found in Box B1-1. The committee will release reports every 3 months, addressing each item in the statement of task in turn. The statement of task requests committee recommendations only in the fourth report.

**COMMITTEE PROCESS AND APPROACH**

The statement of task contains two key elements: identifying high- and low-performing hospitals, health plans, and other providers (hereafter referred to simply as providers) disproportionately serving socially at-risk populations and identifying best practices of the high-performing providers. The committee reviewed publicly reported performance of hospitals and
An ad hoc committee will provide a definition of socioeconomic status (SES) for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Further, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports, which build on the Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine’s previous studies relevant to this study.

The first report will:
- Define socioeconomic status for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.
- Identify SES factors and other social factors (such as race, health literacy, limited English proficiency) that have been shown to impact health outcomes of Medicare beneficiaries.

The second report will:
- Identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations.

The third report will:
- Specify criteria (along with their strengths and weaknesses) that could potentially be used to determine whether an SES factor or other social factor should be accounted for in Medicare quality, resource use, or other measures used in Medicare payment programs.
- Identify SES factors or other social factors that could be incorporated into quality, resource use, or other measures used in Medicare payment programs.
- Identify methods that could be used in the application of SES factors and other social factors to quality, resource use, or other measures used in Medicare payment programs.

The fourth report will:
- For each of the SES factors or other social factors described above, recommend existing or new sources of data on these factors and/or strategies for data collection, while also identifying challenges to obtaining appropriate data and strategies for overcoming these challenges.

In the fifth report:
- The committee will synthesize and interpret the four brief reports issued as described above into one report that will include comprehensive project findings, conclusion, and recommendations based on the four previous reports.
health plans relevant to the Medicare population to attempt to identify high performers disproportionately serving socially at-risk populations—the Medicare Hospital Compare hospital data and the Medicare Advantage and Medicare Part D Star Ratings for health plan data (CMS, 2015; Medicare.gov, n.d.). The committee also reviewed the published literature examining the performance of providers disproportionately serving socially at-risk populations, including studies of variations in performance among these providers and comparisons to providers serving the general population.

To identify best practices of providers disproportionately serving socially at-risk populations, the committee considered both the published and grey literature. The published literature reviewed focused on targeted innovations, interventions, and other improvement strategies implemented by providers known to disproportionately serve socially at-risk populations—minority-serving institutions, safety-net hospitals, critical access hospitals, and community health centers. Because the committee expected that much of the literature on best practices would exist in the grey literature, it reached out to organizations known to conduct research or represent providers disproportionately serving socially at-risk populations (Alliance of Community Health Plans, America’s Essential Hospitals, America’s Health Insurance Plans, and The Commonwealth Fund) and asked for help identifying relevant case studies, especially those that are not within the peer-reviewed published literature. These organizations submitted 60 case studies for the committee’s consideration.

As will be described in detail in Appendix B2, the committee identified key themes and commonalities in practices that were shown to improve health care quality and health outcomes for socially at-risk populations in specific provider settings and in specific community contexts.

REFERENCES


Improving Care for Socially At-Risk Populations

PERFORMANCE OF PROVIDERS DISPROPORTIONATELY SERVING SOCIALLY AT-RISK POPULATIONS

As described in the committee’s first report (NASEM, 2016), socially at-risk populations include individuals with social risk factors for poor health outcomes such as low socioeconomic position, social isolation, residing in a disadvantaged neighborhood, identifying as a racial or an ethnic minority, having a non-normative gender or sexual orientation, and having limited health literacy (NASEM, 2016). Although these populations receive care from a wide range of providers, they are disproportionately represented among the patients treated by a small subset of providers, including safety-net hospitals, minority-serving institutions, critical access hospitals, and community health centers (CHCs) (Bach et al., 2004; Jha et al., 2007, 2008). Evidence suggests the performance of these providers may differ systematically from providers serving the general population.

Inpatient Care

Safety-net providers “organize a significant level of health care and other related services to uninsured, Medicaid, and other vulnerable patients” (IOM, 2000, p. 21). Safety-net hospitals defined as those with a high proportion of Medicaid or low-income patients on average provide lower-quality care (i.e., adherence to recommended care processes) for myocardial infarction, congestive heart failure, community-acquired pneumonia, and colon cancer (Culler et al., 2010; Goldman et al., 2007;
Rhoads et al., 2013; Ross et al., 2007). Patients at safety-net hospitals also report poorer experiences of care compared to patients at non-safety-net hospitals (Chatterjee et al., 2012; Mouch et al., 2014). On the other hand, one study defined safety-net hospitals as members of the National Association of Public Hospitals and Health Systems (now America’s Essential Hospitals), because members self-identify as safety-net providers and have many characteristics of safety-net hospitals, including serving a large proportion of uninsured and Medicaid patients and mostly having public or nonprofit ownership (Marshall et al., 2012). This study found no significant differences in the quality of care for acute myocardial infarction (AMI), pneumonia, and surgical care between safety-net and non-safety-net hospitals (Marshall et al., 2012). Two studies examined trends over time. One study examined disparities in quality of care (Werner et al., 2008), and the other examined disparities in patient experience (Chatterjee et al., 2012); both found that safety-net hospitals improved more slowly compared to non-safety-net hospitals, resulting in a widening disparity in performance between safety-net and non-safety-net hospitals over time. Disparities in patient safety indicators, mortality rates, and readmission rates at safety-net hospitals compared to non-safety-net hospitals are more mixed (Mouch et al., 2014; Ross et al., 2007, 2012; Wakeam et al., 2014). Given the lack of agreement about the operational definition of a safety-net hospital, differences in measures used to define safety-net hospitals may account for some of the inconsistency in findings (Marshall et al., 2012; McHugh et al., 2009).

Minority-serving institutions are frequently defined in the literature as providers with a proportion of racial and ethnic minority patients in the top decile and are often restricted to blacks or Hispanics. Compared to hospitals with fewer black patients, black-serving hospitals (top decile proportion of black patients) as a group provide lower-quality care for pneumonia, AMI, and lower-extremity vascular procedures (Barnato et al., 2005; Jha et al., 2007; Mayr et al., 2010; Regenbogen et al., 2009). Black-serving hospitals also have poorer patient safety outcomes (Ly et al., 2010), higher readmission rates (Joynt and Jha, 2011; Tsai et al., 2015), and poorer health outcomes for patients with AMI (Barnato et al., 2005; Skinner et al., 2005). Patients at black-serving hospitals also reported poorer experiences of care (Brooks-Carthon et al., 2011). Studies of providers serving high proportions of Hispanics, Asians, and other racial and ethnic minority patients show similar patterns of disparity (Hasnain-Wynia et al., 2010; Jha et al., 2008; Rangrass et al., 2014). Notably, hospitals that disproportionately serve racial and ethnic minority patients perform worse on average regardless of an individual patient’s race (Gaskin et al., 2008; Joynt and Jha, 2011; Lopez and Jha, 2013). In other words, both white and non-white patients at minority-serving institutions receive poorer quality
care and have worse outcomes compared to white and black patients at non-minority-serving institutions (Gaskin et al., 2008; Joynt and Jha, 2011; Lopez and Jha, 2013). Evidence on the quality of care at nursing homes with a high proportion of black residents is inconsistent (Chisholm et al., 2013; Miller et al., 2006).

Critical access hospitals refer to rural safety-net providers—specifically, smaller, rural, acute care hospitals eligible for additional federal funding to provide care to patients who reside in rural areas and have difficulty accessing inpatient care (Joynt et al., 2011, 2013). Compared to both non–critical access hospitals generally and to urban acute care hospitals specifically, critical access hospitals provide lower-quality care on average and have higher mortality rates for AMI, heart failure, and pneumonia (Joynt and Jha, 2011; Joynt et al., 2013; Lutfiyya et al., 2007).

Together, the literature described above suggests that hospitals disproportionately serving socially at-risk populations may provide lower-quality care and have worse patient outcomes compared to hospitals serving the general population on average. However, there is also evidence of substantial variation in performance among these providers. For example, Gaskin and colleagues (2011) found that the performance of minority-serving hospitals varied substantially across measures and by race and ethnicity. Additionally, they found both positive and negative associations between the proportion of black discharges and indicators of mortality and patient safety. Other studies have shown that there is substantial overlap in performance between minority-serving hospitals and white-serving hospitals, and substantial numbers of minority-serving hospitals perform well, achieving performance scores on par with the top non–minority-serving hospitals (Jha et al., 2008). At the same time, several studies of low-performing hospitals for care processes for AMI, heart failure, and pneumonia (those performing in the bottom decile or quartile) reported that these hospitals are more likely to serve disproportionate shares of socially at-risk populations—racial and ethnic minorities and low-income patients—and identify as safety-net hospitals (Girotra et al., 2012; Jha et al., 2011; Popescu et al., 2009).

Ambulatory Care

In contrast to inpatient facilities, literature suggests that the performance of safety-net and minority-serving providers of ambulatory care is more mixed. Safety-net primary care providers include community health centers and minority-serving providers. CHCs, also known as federally qualified health centers, and federally funded health centers provide primary care and preventive services to socially at-risk populations such as Medicaid patients, uninsured patients, migrants, and the homeless. These
health centers are eligible for increased reimbursement rates for Medicare and Medicaid (HRSA, n.d.). Several studies reported that patients of CHCs and their look-alikes (providers with similar characteristics but who do not receive federal grant funding) receive equal or higher-quality care and have lower utilization rates (i.e., emergency department [ED] visits, inpatient hospitalizations, preventable hospitalizations, and hospital readmissions) on average compared to patients accessing other providers (Goldman et al., 2012; Laiteerapong et al., 2014; Rothkopf et al., 2011). In contrast, one study reported that patients of physicians who reported high Medicaid case volumes had higher rates of hospitalization for two ambulatory care–sensitive conditions—chronic obstructive pulmonary disease and pneumonia (O’Malley et al., 2007). As for minority-serving primary care providers, Lopez and colleagues (2015) found that Latino patients within a single large academic care network in Massachusetts who received care from primary care practices with a high proportion of Latino patients received higher-quality care for coronary artery disease and congestive heart failure compared to patients receiving care from practices with fewer Latino patients. Sequist and colleagues (2008) reported that the number of black patients treated by a physician was not associated with worse performance among diabetes patients. One study found that the quality of care did not differ between minority-serving and non–minority-serving dialysis facilities, but that patient survival was worse among minority-serving facilities (Hall et al., 2014). Literature from these ambulatory care facilities provides evidence of further variations in the quality of care among providers disproportionately serving socially at-risk populations.

Publicly Reported Performance Data

The committee considered using publicly reported performance data from providers relevant to Medicare beneficiaries—Medicare Hospital Compare hospital data and Medicare Advantage and Medicare Part D Star Ratings health plan data—to identify high-performing providers disproportionately serving socially at-risk populations. To do so would have engaged the committee in original empirical research, uncommon in reports from the National Academies of Sciences, Engineering, and Medicine, especially given the time frame the committee faces. The committee identified several challenges to identifying universally high performers. As described in the literature (e.g., Gaskin et al., 2011; Girotra et al., 2012; Jha et al., 2005, 2008; McHugh et al., 2014), there exists substantial variability in performance across measures and practice areas within organizations and across time for all providers. Individual providers perform well and poorly on different measures and in different practice areas (Medicare.gov, n.d.). For example, Girotra and colleagues (2012) found that among all hospitals
that reported performance on AMI or on heart failure from 2006 to 2008, 49 and 105 hospitals, respectively, that reported performance data in the Centers for Medicare & Medicaid Services (CMS) Hospital Compare were consistently high performing from 2006 to 2008, and 88 and 147, respectively, were consistently low performing; only 18 hospitals were consistently high performing, and only 19 hospitals were consistently low performing for both AMI and heart failure. Similarly, Jha and colleagues (2005) found little correlation across measures of AMI, congestive heart failure, and pneumonia, and McHugh and colleagues (2014) found little consistency in performance as measured by either achievement or improvement across three quality domains—ED clinical process measures, inpatient clinical process measures, and patient experience measures.

Moreover, there is little stability in performance over time, such that a high performer one year may perform poorly the next. It is precisely for this reason that researchers frequently aggregate data across several years to establish average performance. Additionally, as CMS notes in a caveat about using the data for patient decision making, a provider’s performance on any individual measure or domain may not generalize to its overall performance (Medicare.gov, n.d.). Likewise, one study used a composite measure covering multiple domains (quality/process of care measures for AMI, heart failure, and pneumonia; 30-day readmission rates; in-hospital mortality; efficiency; patient satisfaction; and two survey-based assessments of patient care quality by chief quality officers and frontline physicians) to identify high-performing hospitals (Shwartz et al., 2011). However, because hospitals varied in their performance across measures and the measures were poorly correlated, hospitals that ranked highly on the composite measure were unlikely to be top performers (top quintile) on individual measures.

Given these challenges, the committee did not embark on original research and depended on the published literature described above. Therefore, the committee was unable to identify high- or low-performing providers if interpreted as universally high or low performers across all measures. As a result, the committee was also unable to identify high- or low-performing providers who disproportionately serve socially at-risk populations. Despite these challenges and as described above (e.g., Gaskin et al., 2011; Goldman et al., 2012; Greenberg et al., 2014; Jha et al., 2008; Laiteerapong et al., 2014; Lopez et al., 2015; Rothkopf et al., 2011; Sequist et al., 2008):

- The committee found that some providers disproportionately serving socially at-risk populations achieved performance that was higher than their peer organizations and on par with the highest performers among all providers.
PRACTICES TO IMPROVE CARE FOR SOCIALLY AT-RISK POPULATIONS

The mechanisms underlying disparities in health care outcomes are complex and include both specific practices that occur during the provider–patient encounter and systemic differences that occur between treatment settings (Hasnain-Wynia et al., 2007, 2010). Disparities in health care outcomes occurring within the treatment setting may arise from differences in the quality of care received, which in turn may result from miscommunication, cultural misunderstanding, discrimination, and bias (IOM, 2003). Disparities in health care outcomes may also be attributable to between-provider mechanisms, which include characteristics of providers as well as mechanisms that lie outside of the care setting. Characteristics of providers serving socially at-risk populations that may drive differences in quality and outcomes include having fewer financial resources (e.g., lower margins, historically lower reimbursement rates) and having fewer and lower-quality clinical/health care resources (e.g., fewer technological resources and lower information technology capacity, fewer and less qualified clinicians) (Appari et al., 2014; Bach et al., 2004; Blustein et al., 2010; Frimpong et al., 2013; Groeneveld et al., 2005; Jha et al., 2007, 2008; Li et al., 2015). Mechanisms driving disparities in health care outcomes that lie outside of provider settings include barriers to access and financial constraints for disadvantaged persons and differences in case-mix, including patient clinical characteristics and social risk factors (Chien et al., 2007; Jha and Zaslavsky, 2014; Karve et al., 2008; NASEM, 2016). For example, patients who cannot afford co-payments for prescription drugs or office visits may be less likely to keep chronic conditions under control.

Additional systemic factors driving differences between providers that may also be associated with quality of care and in turn health care outcomes include patient preferences for culturally concordant clinicians and the context of a patient’s place of residence such as racial segregation and neighborhood disadvantage (Bach et al., 2004; Dimick et al., 2013; Popescu et al., 2010; Sarrazin et al., 2009). For example, Dimick and colleagues (2013) found that black patients who lived in the most racially segregated areas were more likely than white patients to undergo surgery at low-quality hospitals even though black patients were also more likely on average than white patients to live nearer to higher-quality hospitals. While these different drivers of disparities in health care quality and outcomes can be understood theoretically as static processes, in actuality, they occur in a more dynamic process such that mechanisms at the individual level (e.g., in the patient–provider encounter), health system level (e.g., provider characteristics), and community level (e.g., social risk factors) occur simultaneously and also interact (Gehlert et al., 2008).
The complex, interacting nature of the drivers of variation in the quality of care and health care outcomes makes it difficult to draw clear conclusions about what precisely drives this variation among providers that disproportionately serve socially at-risk populations. Combined with the fact that, as described in the previous section, the committee was unable to identify high- or low-performing providers if interpreted as universally high or low performers across all outcomes, it follows that it is also problematic to then identify practices associated with the performance of universally high- and low-performing providers, let alone among those disproportionately serving socially at-risk populations, and to make comparisons between them. This is consistent with a study of top-performing hospitals in AMI mortality rates, which found that although all hospitals identified precise protocols and practices targeted at reducing mortality among patients with AMI, the authors identified no single shared practice or set of practices that was instrumental or essential to reducing AMI mortality (Curry et al., 2011). Nevertheless, recognizing that some providers have achieved high performance for certain conditions or in certain quality domains, the committee turned to case studies to identify specific practices used either to improve performance or achieve high performance for socially at-risk populations or to mitigate the effects of social risk factors on their patient population’s health outcomes within specific facilities. The committee reviewed both the peer-reviewed and grey literature in order to identify innovations, interventions, and other strategies providers disproportionately serving socially at-risk populations have implemented to improve care and outcomes for their patients. As described in Appendix B1, the committee reached out to organizations known to conduct research or represent providers disproportionately serving socially at-risk populations (Alliance of Community Health Plans, America’s Essential Hospitals, America’s Health Insurance Plans, and The Commonwealth Fund) and asked for help identifying relevant case studies, especially those that are not within the peer-reviewed published literature.

The committee reviewed the 60 case studies submitted, as well as the published literature. The case studies and published literature include strategies implemented to improve care and outcomes for socially at-risk populations from a variety of providers, not only those providers disproportionately serving socially at-risk populations. The evidence identified through these searches has substantial limitations. The literature revealed few rigorous (controlled) evaluations, which precluded inferences about causal effects of specific strategies. Moreover, because the case studies describe interventions tailored to a local community context, they are unlikely to be generalizable to providers with different resources and located in different communities. In addition, although the case studies documented concerted efforts to improve care processes and patient outcomes, outcome
data were limited and the relative performance of individual providers compared to their peers was not well documented. Given these limitations, the committee was not able to identify “best practices” if interpreted as uniform and universal strategies to provide high-quality care for socially at-risk populations and was not able to make comparisons between high- and low-performing providers, even among case studies. Furthermore, because community context is a central determinant of what is needed, acceptable, and feasible in different configurations of problems and resources, universal and uniform implementation of “best practices” to improve care for all patients within a population and in all settings may not be desirable. As described above, this is consistent with the quality improvement literature. For example a study of top-performing hospitals in AMI mortality rates reported that no single practice or set of practices was essential to achieving high performance (Curry et al., 2011), and leadership and frontline personnel from eight minority-serving institutions identified customizing their approach (compared to using commercially available guides or toolkits) as key to reducing readmissions (Joynt et al., 2014). Likewise, a study identifying best practices for implementing disparities reduction initiatives based on findings from a series of systematic reviews reported that successful interventions “must be individualized to specific contexts, patient populations, and organizational settings” (Chin et al., 2012, pp. 994–995). Nevertheless, as will be described in a subsequent section:

- The committee found examples of specific strategies implemented in specific community contexts by providers serving socially at-risk populations with the goal to improve health care quality and health outcomes.

**IDENTIFYING SYSTEMS PRACTICES**

Committee members identified commonalities from the review of the case studies, informed also by the literature and, in some cases, members’ empirical research or professional experience delivering care to socially at-risk populations. The common themes describe a set of practices delivered within a system of collaborating partners, not to specific health care interventions, and are consonant with research findings from the quality improvement literature and related clinical interventions designed to decrease disparities. Note that “system” as used here is not limited to a single health care organization, but refers more generally to a set of interconnected actors who work together to accomplish a common purpose—in this case to improve health equity and outcomes for socially at-risk populations. In this approach, the system is mainly composed of medical providers as well as partnering social service agencies, public health agencies, commu-
nity organizations, and the community in which those medical providers are embedded. The medical providers may be formally (i.e., through legal arrangements) or informally related to the external partners, but all serve the same community or geographic region.

The committee concluded that six community-informed and patient-centered systems practices show promise for improving care for socially at-risk populations:

- **Commitment to health equity**: Value and promote health equity and hold yourself accountable.
- **Data and measurement**: Understand your population’s health, risk factors, and patterns of care.
- **Comprehensive needs assessment**: Identify, anticipate, and respond to clinical and social needs.
- **Collaborative partnerships**: Collaborate within and across provider teams and service sectors to deliver care.
- **Care continuity**: Plan care and care transitions to prepare for patients’ changing clinical and social needs.
- **Engaging patients in their care**: Design individualized care to promote the health of individuals in the community setting.

In the next section, the committee describes the case studies, as well as supporting literature from the quality improvement and disparities-reduction literature, that support the systems practices. It is important to note that these practices together constitute a general approach to identifying and developing best practices for a specific community context and given specific resources. Unlike clinical best practices that are applied to all individuals in a given population and that are derived from systematic reviews of the evidence to identify causal associations, these systems practices are not interventions that can be applied wholesale in every practice setting for every patient and in every community context and be expected to improve quality and outcomes for socially at-risk populations. Rather, a health care system can use these systems practices to conduct routine self-assessments to identify areas to improve care for socially at-risk populations and develop improvement strategies tailored to the system’s specific assets, barriers, needs, and capacities. These practices pertain to all health systems that serve socially at-risk populations.

As shown in Figure B2-1, the committee conceives of this system as grounded in community-informed and patient-centered care and emerging out of a commitment to health equity. This commitment supports and drives the other population-based practices, resulting in individualized care that promotes the health of the patient in his or her community context.
Although in reality, a provider simultaneously engages in each system practice, each practice captures a thought process and set of decisions that logically influence the next. For example, a system may already conduct a comprehensive needs assessment, but this assessment will be fundamentally different when driven by a commitment to health equity and when it includes social needs in addition to clinical needs. The value and resources that flow from this commitment drive changes in other processes, such as collaborating with social service agencies in the community, which support enhanced planning for care transitions. Finally, the hard work of providing
high-quality care is never done; this systems approach provides a continuous process for improvement.

While these systems practices build on existing models of health care quality improvement, care coordination, care transitions, and patient-centered care, this aspirational and innovative model differs from existing models because it focuses on achieving health equity, incorporates how health systems may address social risk factors, and expands on patient-centered care models to include the broader communities in which patients and health systems are embedded. While other models of care include team-based care (e.g., patient-centered medical home, chronic care model, transitional care and care transitions models) (Coleman et al., 2006; Davis et al., 2005; Naylor et al., 2004; Wagner et al., 1996), these are typically limited to clinical teams, whereas this model also incorporates collaborative partnerships with external organizations, including not only other clinical care providers, but also community organizations and social service and public health agencies to address social risk factors. In sum, these practices make up an approach by which health care systems can promote equitable health outcomes by using data to reveal unmet needs, which are then addressed through collaborative partnerships that coordinate care across time, sites of care, and intensity of needed services to support patients living in the community to engage in their health care in the context of patient goals and community resources.

Tables B2-1a through B2-1f provide summary descriptions of the six systems practices, example implementation strategies, and considerations for implementation. The individual systems practices are discussed in more detail along with case studies that illustrate how these systems practices have been implemented in specific community contexts in the following sections. The case studies highlighted were selected for the comprehensiveness of their descriptions. As such, they are not a representative sample of strategies used by providers and are inherently interventions tailored to meet the needs of specific populations in specific community contexts. Additionally, particular strategies and their effect on improving health care quality and health outcomes may not be replicable by different providers and in different settings. Furthermore, the case studies date back several years and the practices described may no longer be present in the organization. The intervention strategies provide examples of the types of strategies organizations have used to apply a given systems practice in their organizational setting for specific patient populations and given their specific community context. Appendix BA provides examples of implementation strategies and examples of case studies in which these strategies were identified.
**TABLE B2-1a** Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations: Commitment to Health Equity

<table>
<thead>
<tr>
<th>Systems Practice</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Commitment to health equity:</strong></td>
<td>Health care leaders and staff at all levels express a core commitment to valuing and promoting health equity. Health care providers accept accountability for reducing inequities. Strategic decision making considers the impact on equity and has the goal of producing equity as an outcome of the organization’s operations.</td>
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</table>
TABLE B2-1a
Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations:
Commitment to Health Equity

<table>
<thead>
<tr>
<th>Systems Practice Description</th>
<th>Implementation Considerations</th>
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<tbody>
<tr>
<td>Commitment to health equity:</td>
<td>Achieving health equity is also interdependent with other goals to achieve a high-performing health system, including redesigning care delivery and aligning financial incentives. Embedding equity as a value in a health system requires leadership and a change in organizational culture. Leadership sets expectations for staff at all levels regarding activities related to equity and provides feedback on achievement. Valuing equity is a practice that permeates each of the other systems practices.</td>
</tr>
<tr>
<td>Value and promote health equity and hold yourself accountable</td>
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<tr>
<td>Health care leaders and staff at all levels express a core commitment to valuing and promoting health equity. Health care providers accept accountability for reducing inequities. Strategic decision making considers the impact on equity and has the goal of producing equity as an outcome of the organization's operations.</td>
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</table>

**Example Implementation Strategies**

- **Culture of equity:**
  - Senior management and clinician leadership commitment to equity:
    - Integration of health equity into and communication of equity as part of common organizational vision, mission, and goals
  - Integration of health equity into strategic planning, including quality improvement processes:
    - Internal leaders designated responsibility for developing and overseeing a strategic plan to monitor and reduce health inequities
    - Diverse workforce to provide culturally concordant and culturally competent care
    - Workforce trainings and education to improve communication with patients, including cultural competence training and hiring language interpreters
    - Interventions to reduce inequities
- **Integration of health equity into strategic planning, including quality improvement processes:**
  - Integration of health equity into strategic planning, including quality improvement processes:
    - Internal leaders designated responsibility for developing and overseeing a strategic plan to monitor and reduce health inequities
    - Diverse workforce to provide culturally concordant and culturally competent care
    - Workforce trainings and education to improve communication with patients, including cultural competence training and hiring language interpreters
    - Interventions to reduce inequities
- **Accountability for equity:**
  - Identification and acknowledgment of health inequities and setting measurable goals to reduce them
  - Expectations set and feedback provided regarding activities and practices to achieve equity
  - Incorporation of health equity into compensation or incentives
- **Financial and non-financial resources aligned and allocated to promote health equity**

**SOURCES:**

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<thead>
<tr>
<th>Reference</th>
<th>Reference</th>
<th>Reference</th>
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<tr>
<td>Chin et al., 2012; Jones et al., 2010; Taylor et al., 2015.</td>
<td>Chin et al., 2012; IOM, 2001; Taylor et al., 2015.</td>
<td>Chin et al., 2012.</td>
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<tr>
<td>Chien et al., 2007; Davis et al., 2015; Peek et al., 2007; Taylor et al., 2015.</td>
<td>Personal communication, Susan Knudson (HealthPartners) to Chuck Baumgart (committee member), December 14, 2015.</td>
<td>Chien et al., 2007; Davis et al., 2015; Peek et al., 2007; Taylor et al., 2015.</td>
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<tr>
<td>Chin, 2016; Chin et al., 2012; Curry et al., 2011; Davis et al., 2015; IOM, 2003; Jones et al., 2010; Taylor et al., 2015.</td>
<td>Chin, 2016; Chin et al., 2012; Curry et al., 2011; Davis et al., 2015; IOM, 2003; Jones et al., 2010; Taylor et al., 2015.</td>
<td>Chin, 2016; Chin et al., 2012; Curry et al., 2011; Davis et al., 2015; IOM, 2003; Jones et al., 2010; Taylor et al., 2015.</td>
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TABLE B2-1b Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations: Data and Measurement

<table>
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<tr>
<th>Systems Practice</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Data and measurement:</strong></td>
<td>Health care providers understand their patterns of performance across different indicators of social risk. Providers know how their performance for socially at-risk populations compares with top-performing peers.</td>
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<tr>
<td>Understand your population’s health, risk factors, and patterns of care</td>
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</table>
**Example Implementation Strategies**

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<tr>
<th>Implementation Considerations</th>
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<tbody>
<tr>
<td>The concentration of socially at-risk patients among a small subset of health care providers means that many providers will be unable to reliably assess disparities with internal data alone. Providers may need to benchmark their performance against peer organizations or population-based measures.</td>
</tr>
</tbody>
</table>

**Sources:**

- Ayanian and Williams, 2007; Chin et al., 2012; HHS, 2011a; IOM, 2003, 2009; Thorlby et al., 2011.
- Ayanian and Williams, 2007; Chin et al., 2012; HHS, 2011a; Sequist et al., 2008; Thorlby et al., 2011.
- For example, Hostetter and Klein, 2015; Johnson et al., 2015.
Example Implementation Strategies

Considerations

- Proactive identification of patient assets and unmet social needs:
  - Proactive health assessment tool completed by patients
  - Analysis of data from a variety of sources (including performance data, utilization data, clinical notes, patient observations, and patient-generated data)

- Data sharing with other providers, public health and social service agencies, and community organizations to identify patients' social needs
  - Information exchange portal for clinical providers, social service agencies, public health agencies, and community organizations to share information (with patient permission) about social needs

- Review the literature and experiences of peers to anticipate patients' potential needs and assets

Different causal mechanisms may predominate in different contexts. It may be difficult to replicate others' program results when important contextual features differ.

## TABLE B2-1c Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations: Comprehensive Needs Assessment

<table>
<thead>
<tr>
<th>Systems Practice</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Comprehensive needs assessment:</strong></td>
<td>Providers analyze performance data, as well as directly engage patients, to identify unmet clinical or social needs. Providers also review the literature and the experiences of peers to identify lessons and anticipate their patient population’s needs. Based on these activities, providers design programs and practices that anticipate and respond to those needs.</td>
</tr>
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**TABLE B2-1c**

Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations: Comprehensive Needs Assessment

<table>
<thead>
<tr>
<th>Example Implementation Strategies</th>
<th>Implementation Considerations</th>
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<tbody>
<tr>
<td>• Proactive identification of patient assets and unmet social needs:</td>
<td>Different causal mechanisms may predominate in different contexts. It may be difficult to replicate others’ program results when important contextual features differ.</td>
</tr>
<tr>
<td>o Proactive health assessment tool completed by patients(^a)</td>
<td></td>
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<tr>
<td>o Analysis of data from a variety of sources (including performance data, utilization data, clinical notes, patient observations, and patient-generated data)</td>
<td></td>
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<tr>
<td>• Data sharing with other providers, public health and social service agencies, and community organizations to identify patients’ social needs(^b)</td>
<td></td>
</tr>
<tr>
<td>o Information exchange portal for clinical providers, social service agencies, public health agencies, and community organizations to share information (with patient permission) about social needs(^c)</td>
<td></td>
</tr>
<tr>
<td>• Review the literature and experiences of peers to anticipate patients’ potential needs and assets</td>
<td></td>
</tr>
</tbody>
</table>

**SOURCES:**

\(^a\) For example, ACHP, n.d.-c.

\(^b\) Personal communication, Doug McCarthy (The Commonwealth Fund) to staff, January 12, 2016.

\(^c\) Hostetter and Klein, 2015.
Example Implementation Strategies

- Integrated, coordinated, team-based care design:
  - Medical neighborhoods/accountable health communities
  - Care teams, including non-medical professionals

- Increased access to care:
  - Open-access/same-day appointments for ambulatory care
  - New technologies (e.g., teleconference, videoconference, and mobile screening units) that bring clinical care to patients

- Regional collaborations with other health care providers

- Involvement and collaboration with social service and public health agencies and community organizations

Key questions to identify care partners include Who has the resources and skills to help? What informal relationships can be used as building blocks to create collaborations? What are community partners already doing successfully that can be built on? Collaborations may evolve over time as needs and obstacles become clearer. In addition, effective models of collaboration will differ based on the specific patient needs and community context.

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**TABLE B2-1d** Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations: Collaborative Partnerships

<table>
<thead>
<tr>
<th>Systems Practice</th>
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<tr>
<td><strong>Collaborative partnerships:</strong></td>
<td>Providers create collaborative teams to deliver services with scope, intensity, and scale matched to population needs. Collaborations will often need to span multiple service sectors, such as housing, transportation, and nutrition. Collaborations must be sufficiently integrated to share information and critical insights about patients.</td>
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### Example Implementation Strategies

<table>
<thead>
<tr>
<th>Implementation Strategies</th>
<th>Considerations</th>
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<tbody>
<tr>
<td><strong>Integrated, coordinated, team-based care design:</strong></td>
<td>Key questions to identify care partners include Who has the resources and skills to help? What informal relationships can be used as building blocks to create collaborations? What are community partners already doing successfully that can be built on? Collaborations may evolve over time as needs and obstacles become clearer. In addition, effective models of collaboration will differ based on the specific patient needs and community context.</td>
</tr>
<tr>
<td>- Medical neighborhoods/accountable health communities$^a$</td>
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<tr>
<td>- Care teams, including non-medical professionals$^b$</td>
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<tr>
<td><strong>Increased access to care:</strong></td>
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<tr>
<td>- Open-access/same-day appointments for ambulatory care$^c$</td>
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<tr>
<td>- New technologies (e.g., teleconference, videoconference, and mobile screening units) that bring clinical care to patients</td>
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<tr>
<td><strong>Regional collaborations with other health care providers$^d$</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Involvement and collaboration with social service and public health agencies and community organizations$^e$</strong></td>
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**SOURCES:**


$^b$ Chin et al., 2007, 2012; Davis et al., 2015; IOM, 2003, 2015d.

$^c$ Felland et al., 2013; IOM, 2003, 2015d.

$^d$ Cebul et al., 2015; McCarthy et al., 2014; Press et al., 2012.

$^e$ Davis et al., 2015; Peek et al., 2007; Sandberg et al., 2014; Schor et al., 2011.
### Care Continuity

Plan care and care transitions to prepare for patients’ changing clinical and social needs.

Health care providers anticipate and carefully plan patient trajectories through illness progression, across sites of clinical care, between clinical care teams, between health care providers and social service agencies and community organizations, and differing intensity of needed services. Providers design transitions and hand-offs to maintain patient engagement and avoid losses to follow up.
### Example Implementation Strategies

<table>
<thead>
<tr>
<th>Description</th>
<th>Implementation Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinated care teams(^a)</td>
<td>Programs must be prepared for cycles of patient progress and relapse. After successful intervention, providers may need to monitor patients to ensure that progress is maintained, as well as to detect relapse and re-intensify services as needed.</td>
</tr>
<tr>
<td>Case management by trained clinical or lay person care coordinators/patient navigators(^b)</td>
<td></td>
</tr>
<tr>
<td>New technologies (e.g., teleconference, videoconference, shared data) to coordinate care between clinical and social service providers(^c)</td>
<td></td>
</tr>
<tr>
<td>Collocating clinical, behavioral health, and social services(^d)</td>
<td></td>
</tr>
<tr>
<td>Patient education about care transitions(^e)</td>
<td></td>
</tr>
</tbody>
</table>

**SOURCES:**

\(^a\) Chin et al., 2012; Davis et al., 2015.

\(^b\) Chin et al., 2007, 2012; Davis et al., 2015; Masi et al., 2007; Naylor et al., 2011; Peek et al., 2007; Van Voorhees et al., 2007.

\(^c\) Hostetter and Klein, 2015; IOM, 2015d; Naylor et al., 2011.

\(^d\) For example, Buchanan et al., 2009; Larimer et al., 2009; Martinez and Burt, 2006; Pirraglia et al., 2011.

\(^e\) Davis et al., 2015; Naylor et al., 2011.
TABLE B2-1f Description of Systems Practices to Improve Care for Socially At-Risk Populations and Implementation Considerations: Engaging Patients in Their Care

<table>
<thead>
<tr>
<th>Systems Practice</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaging patients in their care:</td>
<td>Providers design care to promote functioning in the patient’s home and neighborhood or other chosen environment. For different patients, the same function (e.g., self-management support) could be realized through different forms (e.g., nurse care manager or community health worker) depending on the level of severity and desired site of care (office visits versus phone consultation versus home visits).</td>
</tr>
</tbody>
</table>
### Example Implementation Strategies

<table>
<thead>
<tr>
<th>Systems Practice Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaging patients in their care: Design individualized care to promote the health of individuals in the community setting.</td>
</tr>
<tr>
<td>Providers design care to promote functioning in the patient's home and neighborhood or other chosen environment. For different patients, the same function (e.g., self-management support) could be realized through different forms (e.g., nurse care manager or community health worker) depending on the level of severity and desired site of care (office visits versus phone consultation versus home visits).</td>
</tr>
<tr>
<td>Culturally sensitive, targeted, and tailored patient education</td>
</tr>
<tr>
<td>Tailored care plans easily understood by patients</td>
</tr>
<tr>
<td>Clinician and non-clinician patient/health navigation</td>
</tr>
<tr>
<td>New technologies (telephone consultation, videoconference, mobile screenings, smartphone apps, etc.) to promote healthy behaviors and reduce health risks</td>
</tr>
<tr>
<td>Reach patients through community centers, homeless shelters, religious organizations, schools</td>
</tr>
</tbody>
</table>

### Implementation Considerations

- Different solutions may be required in different contexts, because causal mechanisms differ or interact in varying ways. For instance, readmissions may be due to inadequate instrumental support (e.g., transportation), undiagnosed behavioral illness, or both.

### SOURCES:

- Itzkowitz et al., 2016; Naylor et al., 2012; Press et al., 2012; Sajid et al., 2012.
- Chin et al., 2012; Hemmige et al., 2012; Masi et al., 2007; Peek et al., 2007; Van Voorhees et al., 2007.
- Chin et al., 2012; Naylor et al., 2012.
- Glick et al., 2012.
Providing community-informed and patient-centered care is a core principle underlying each of the six systems practices described in the following sections. Patient-centered care is a component of high-quality care, but it may be particularly salient to patients with social risk factors who may be at increased risk of receiving lower-quality care and having poorer care experiences (Crawford et al., 2002; IOM, 2001; NASEM, 2016). Patient-centered care reflects the patient’s goals and values (IOM, 2001, 2013a). This means that patients are involved in making decisions about their care and practitioners understand what is practical for the patient to do given the individual patient’s degree of agency and opportunity in daily life (Ferrer et al., 2014, 2016; Joynt et al., 2014). Additionally, providers reduce barriers to accessing care and coordinate care across care settings (and with external partners) (IOM, 2001, 2013a). Although patient-centered care shows promise to improve outcomes, especially with respect to patient experiences and self-management, there remains little evidence on effects on clinical outcomes, use, and costs—in part because it may take time for these benefits to accrue (Crawford et al., 2002; IOM, 2013a; Jackson et al., 2013; Jaen et al., 2010; Rathert et al., 2013).

Community-informed care expands on the principle of patient-centered care to also understand and account for the community context in which a care setting and a patient are embedded. As described in the committee’s first report (NASEM, 2016), community context refers to a set of broadly defined characteristics of residential environments, including physical and social environments, policies, infrastructural resources, and opportunity structures that may be relevant to health and health care outcomes. Because communities can be defined along multiple axes (e.g., geographically defined communities, racial or ethnic communities, and other social groups), health systems may serve multiple, potentially overlapping communities. Communities will vary in the ways they frame issues, the language used to discuss them, and cultural meanings attached to interventions (Hawe et al., 2009). Practicing community-informed care means that health care providers design care with an understanding of the local community’s orientation to different needs and proposed interventions. Providers also design care with a deep understanding of the community environment, including assets, obstacles, key partners, and cultural considerations. The committee chose the term community-informed to connote care that takes account of assets, conditions, and needs in the community where the patient resides, and is agnostic about whether care is “based” in the community.

Practicing community-informed care will require not only recognition of what community needs exist, but also that communities will have different types of needs, which can be met in different ways. In applying each
of the systems practices, health care organizations may provide clinical interventions tailored to populations based on social context. Additionally, health care organizations may partner or establish coalitions with social service and public health agencies and community organizations. This may be particularly relevant for organizations with more limited resources. Health care organizations may also intervene directly on social issues—for example, providing supportive housing or opportunities for socialization. Finally, health care organizations may identify social risk factors that the medical or clinical health system cannot address or should not address. For certain social risk factors, presuming that primary solutions lie within the health care sector risks “medicalizing” the factors in undesirable ways if the health care sector acts on them, because they may be better addressed through social policies or interventions rather than through individual medical interventions (Lantz et al., 2007; Woolf and Braveman, 2011). For example, although patients may have health or social issues related to low educational attainment, these problems may be better addressed through interventions in the education sector than through health care interventions. Identifying how and why a community can or should be engaged will likely be essential to effective community engagement (HHS, 2011b).

Community involvement occurs along a continuum that ranges from simple outreach to a strong, bidirectional relationship with shared leadership (HHS, 2011b). Specific ways in which health care providers can better understand the community they serve and address a community’s needs include soliciting information, guidance, and feedback on program designs, identifying and partnering with community resources, having a significant organizational presence, and investing in the community (e.g., HHS, 2011b; Meyers, 2008). Community-informed health care providers may simply seek input or feedback from community stakeholders about program design. Community-informed health care providers may also seek to know of and align their programs with existing community efforts, such as maintaining a repository of available community-based resources with which the health care provider can partner or to which a provider can refer patients for services (e.g., Joynt et al., 2014; Klein and McCarthy, 2010). Health care providers can also work with existing community assets to collaboratively reach out to socially at-risk populations. Hospitals can provide community-level population health data to facilitate collaborations with the community. Having a significant presence in the community can include having visible, community-based office locations and having staff who reside in and are hired from the community. Investing in the community could include expressing an organizational commitment to support unmet community needs, such as engaging in community service activities in the community or providing charitable care, as well as directly investing in the community, such as hiring staff from the community, providing
health-promoting resources such as establishing farmers’ markets in the community, and identifying funding strategies to address population health across health care and social services (Halfon et al., 2014; Meyers, 2008). These varying levels and ways of involving communities are discussed in more detail throughout the next sections on the six systems practices.

Kaiser Permanente is a large, nonprofit integrated managed care organization that provides a case study of a community-informed health system. Kaiser’s comprehensive, multifaceted approach to improving community-level health uses ethnography and interviewing to understand drivers of health disparities; reduces barriers to receiving coordinated, culturally, and linguistically appropriate clinical care; promotes healthy behaviors in the community through targeted dissemination and interventions (e.g., farmers’ markets, partnering with community activists to promote healthy eating and physical activity); and invests in environments supportive of health (Kaiser Permanente, n.d.; Meyers, 2008; Tyson, 2015). Health Share of Oregon’s Community Advisory Council provides an example of a more structured approach to providing community-informed care, and is described in Box B2-1.

**BOX B2-1**

Community-Informed Patient-Centered Care Case Study: Health Share of Oregon’s Community Advisory Council

Health Share of Oregon, established in 2012, is a nonprofit, state-designated coordinated care organization (CCO) that provides coordinated medical, dental, and behavioral care for Medicaid beneficiaries in a tri-county area surrounding Portland, Oregon. Oregon policy makers require state-designated CCOs to establish a Community Advisory Council (CAC) comprising community and government representatives, a majority of whom must be consumers. At Health Share, the CAC members are strategically recruited to reflect the diversity of the community across multiple axes of diversity, including race and ethnicity, age, gender, sexual orientation, and geographic location. Among other duties, the CACs are tasked with conducting a community health assessment to identify community needs and developing a community health improvement plan to address health disparities. At Health Share, the CAC also provides feedback and advice about ways to link Health Share’s medical services to social and behavioral services available in the community, as well as identifies strategies to engage community members in CCO strategic planning to achieve Health Share’s vision, mission, and goals. The Health Share of Oregon CAC is also specifically tasked with advising organizational governance regarding Health Share’s strategic plan, quality improvement plan, innovative interventions and care redesign, and opportunities to improve population health at the community level (DeMars, 2014; Health Share of Oregon, n.d.; Klein et al., 2014).
Commitment to Health Equity

As described in Appendix B1, health equity means that every person has the opportunity to attain his or her full health potential and no one is disadvantaged from achieving this potential because of social position or other socially determined circumstances. Conversely, health inequities refer to unfair differences or inequalities in health, and focus on systematic, often social processes that drive these inequalities, such as the distribution of resources (CDC, 2015). The Institute of Medicine (IOM) previously identified equity as fundamental to high-quality health care (IOM, 2001). The IOM also identified health care organizations together with individual clinicians, patients, and their legal and regulatory contexts as being responsible for eliminating health care disparities (IOM, 2003). However, achieving health equity requires more than providing equitable health care, or the same type of care to all patients regardless of social risk, because this may not be sufficient to reduce health inequities. Indeed, some subpopulations may need more intensive care to achieve the same health outcomes.

Providing high-quality health care for socially at-risk populations may require organizations to embed health equity as a value through organizational commitment and leadership. Embedding health equity as a value of an organization’s culture will likely require commitment from staff in all areas and at all levels of an organization, especially senior leadership. For example, studies of interventions to reduce racial and ethnic disparities identified top-down commitment from leadership to reducing disparities in health care as essential to effective interventions (Chin et al., 2012; Jones et al., 2010). Similarly, studies of top-performing hospitals, including a systematic review, identified leadership commitment to and involvement in quality improvement as key to achieving high performance (Curry et al., 2011; Taylor et al., 2015). Another study of organizational changes to improve the quality of care in safety-net systems identified organization-wide commitment and support for practice redesigns, including support from leadership, as important to effective practice transformation (VanDeusen-Lukas et al., 2015).

To demonstrate their commitment to equity, organizational leaders, including executives and governance, may need to identify reducing health inequities as an organizational priority, such as by incorporating equity as a value into the organization’s vision, mission, and goals. For example, one study identified incorporating practice redesigns into an organization’s vision, mission, and values as an organizational change important for improving the quality of care in safety-net settings (VanDeusen-Lukas et al., 2015). Organizational leaders can also show their commitment to equity by allocating financial and non-financial resources (including workforce and technology investments discussed below) to achieve equity goals. Studies of high-performing hospitals, including a systematic review,
found that providing financial and non-financial resources were critical to improving quality (Curry et al., 2011; Taylor et al., 2015). Literature also suggests that achieving health equity is a goal interdependent with other goals to provide high-performing health care, such as redesigning care delivery to provide high-quality care, improving health outcomes and patient experience, and reducing health care costs (American Medical Group Association, 2011; Berwick et al., 2008; Chin et al., 2012; IOM, 2001, 2010). Organizational leaders can further support equity goals by supporting practices targeted at reducing health disparities, incorporating the goal of promoting equity into organizational policies and processes (including quality improvement processes), and by holding staff accountable (Curry et al., 2011; Taylor et al., 2015). Specific activities into which leaders can incorporate the aim of achieving health equity to support organizational transformation to achieve a culture of equity may include

- investing in a diverse workforce to provide culturally concordant and culturally competent care and improved communication;
- designing interventions to reduce health disparities;
- redesigning care to incorporate equity goals; and
- setting measurable goals to reduce health disparities and holding staff accountable.

**Workforce Investments to Promote Health Equity**

Initiatives targeted at enhancing workforce capacity to reduce health inequities include investments in additional staff such as hiring language interpreters or clinical and non-clinical staff from diverse backgrounds as well as staff development activities such as providing education, trainings, and other resources for staff (IOM, 2003). Evidence from the quality improvement literature shows that building and maintaining highly qualified staff, recruiting staff who are committed to the organizational vision, and developing talent through mandatory and specialized trainings (such as on evidence-based practice) is important to achieving high performance in hospitals (Taylor et al., 2015). Trainings regarding health equity may address cultural competence to improve communication between patients and providers, social determinants of health to increase awareness of social risk factors and capacity to identify potential unmet social needs, best practices for engaging with language interpreters, and social justice issues such as unconscious bias (American Medical Group Association, 2011). Although evidence is limited (Anderson et al., 2003; Meghani et al., 2009), some evidence suggests that racial concordance between physicians and patients may be associated with better quality of care and increased patient trust, satisfaction, and intent to adhere (Cooper and Powe, 2004; Street et al., 2008). Similarly, a systematic review found that
studies of cultural competency training for health professionals reported no effect to moderately beneficial effects on patient outcomes and no negative effects (Lie et al., 2011). Another more recent study found that hospitals with greater cultural competency (covering commitment from leadership, integration of cultural competency into management and operations, workforce diversity and training, community engagement, patient–provider communication, and care delivery supportive of culturally competent practice) were associated with better patient experiences of care overall and better scores for nurse communication, staff responsiveness, quiet room, and pain control among racial and ethnic minorities (Weech-Maldonado et al., 2012).

**Designing Interventions to Reduce Health Inequity**

To achieve health equity, health care organizations may need to proactively design interventions to reduce disparities, such as by improving care for certain targeted subpopulations. As described above, providing the same type of care to all patients may not reduce disparities. For example, socially at-risk populations may require more intensive care. A study identifying themes from systematic reviews of interventions to reduce racial and ethnic disparities found that successful interventions involved the active design of interventions to reduce disparities that were targeted to specific contexts, patient populations, and organizational settings (Chin et al., 2012). This may include designating internal leaders across the organization who are responsible for developing and overseeing a strategic plan to monitor and reduce health disparities. For example, a study of characteristics common to successful practice transformation to improve quality in safety-net systems noted that physician leaders and operational leaders must be engaged to spearhead practice transformations (VanDeusen-Lukas et al., 2015). Similarly, identifying a quality improvement “champion” and creating a quality improvement team comprising staff from all levels was common to successful interventions to reduce racial and ethnic health disparities (Chin et al., 2012). Based on these systematic reviews, the study also identified appointing staff to disparities-reduction initiatives as a best practice for implementing interventions to reduce disparities (Chin et al., 2012).

**Redesigning Care to Promote Health Equity**

An organization that is committed to achieving equity may need to not only design interventions to reduce health inequities, but also incorporate equity goals into its general organizational practices and procedures. As described above and in the experience of HealthPartners of Minnesota (American Medical Group Association, 2011; see also Box B2-2), incorporating the aim of equitable care in resource allocation, overall strate-
HealthPartners is the largest consumer-governed, nonprofit health care organization in the country, providing medical and dental services and health care coverage to more than 1.5 million individuals in Michigan, Minnesota, North Dakota, and South Dakota. Since 2001, HealthPartners has engaged in a comprehensive initiative to integrate achieving equitable care into its strategic vision. HealthPartners has a history as a safety-net provider. Furthermore, in addition to demographic changes similar to those seen across the United States nationally, beginning in the 1980s, the organization began to see increasing numbers of immigrants, especially South Asian and East African refugee populations. In response, the organization’s executive leadership and governance recognized changes to its patient population, acknowledged and accepted accountability for existing health disparities, and acknowledged that providing equitable care was a strategic issue and part of its organizational vision. In addition, the organization believed that there were business, legal, and quality improvement rationales to provide equitable care. Together, grounded in the principle that changing inequalities is intertwined with achieving other aims of a high-performance health system, including providing safe, timely, effective, efficient, and patient-centered care (IOM, 2001), the organization committed to integrating the aim of equitable care into its larger practice transformation to improve the health of the population it serves.

To achieve this organizational goal, in 2001, HealthPartners executive management established a Health Disparities and Cultural Competence Task Force to lead and oversee the strategy to integrate the aim of achieving equitable care. In 2003, the Task Force commissioned an organizational assessment to establish the organization’s baseline performance with respect to health disparities and culturally competent care, identify priorities, and set goals. Goals identified include measuring disparities in patient experience, preventive services, and diabetes care by race and “financial class” (American Medical Group Association, 2011) by 2006; measuring disparities in vascular disease care, pregnancy, and asthma by race and “financial class” by 2008; and reducing identified disparities by 75 percent by 2010. To achieve measurement goals, beginning in 2004, HealthPartners implemented standard processes for collecting race, ethnicity, and country of origin data at the point of care and language preference and need for interpreter services during appointment scheduling. As HealthPartners collected this data, the organization also incorporated results by race, ethnicity, and payer in its reporting processes to increase awareness of disparities across the organization.

To reduce disparities, HealthPartners established an Equitable Care Sponsor Group that comprises senior management representing all areas of the organization and is responsible for community and patient engagement and overseeing specific project teams. Community outreach activities to targeted cultural groups and the broader community include leadership symposiums and community forums to build trust, identify unmet needs, and receive input on ways to improve
communication and health care delivery. Project teams include an Interpreter Services Workgroup, which established and promotes best practices for working with an interpreter and educates staff about ways to improve communication with patients through an interpreter, and the Disparities Oversight Team, which identifies opportunities, develops and oversees annual strategies to reduce disparities, and partners with organizational leaders to develop and implement interventions.

HealthPartners implemented several specific strategies to reduce disparities, including changes to clinical practice and broadening and supporting the workforce to create a diverse and inclusive environment. Changes to clinical practice include ensuring clinical best practices are applied to all patients, as well as practice redesigns such as outreach phone calls and same-day mammography to reduce barriers to mammography screening among non-white and low-income patients and enrollees. Workforce development activities include both hiring more diverse staff (including those with more language skills), as well as providing trainings, educational opportunities, resources, and other tools to increase awareness of health disparities and solutions. These tools include language trainings accompanying the expansion of interpreter staff, educational forums about social risk factors for poor health, and cultural competence training. In addition, HealthPartners developed the HealthPartners Equitable Care and Service intranet site, which provides access to resources and information to provide language-concordant health information (including translated materials) and arrange for interpreters, as well as information about training programs and population health data.

HealthPartners accepts accountability for health disparities in several ways. To evaluate the impact of these comprehensive efforts, HealthPartners compiles a Disparities Scorecard, which details clinical quality and patient experience data by subpopulation, as well as disparities trends. Similar population data are also available at a more local level for clinic managers and directors in their quality and services reports. In 2010, HealthPartners implemented 90-Day Plans to further increase awareness and accountability among frontline staff. Clinic leaders are required to maintain a written document that details clinic-specific goals, baseline and follow-up performance for specific measures, and specific activities to achieve goals. HealthPartners also includes disparities-reduction goals in payment incentives and other compensation for management and physicians. Since beginning this initiative to integrate the aim of achieving equitable care into its overall mission, HealthPartners identified numerous health disparities. Although it did not reach its goal of reducing identified disparities by 75 percent by 2010, from 2007 to 2010, HealthPartners reduced disparities in mammography screening rates by race and ethnicity by nearly half and payer (publicly compared to privately insured women) by nearly one-fifth. HealthPartners has seen similar reductions in racial disparities in the quality of care for heart failure, colorectal cancer screening rates, and diabetes outcomes through the end of 2014\(^a\) (American Medical Group Association, 2011; McCarthy et al., 2009).

\(^a\) Personal communication, Susan Knudson (HealthPartners) to Charles Baumgart (committee member), December 14, 2015.
gic planning and individual practices, and accountability processes such as performance reporting are essential to transforming an organizational culture to one that promotes health equity and reduces health disparities (Berwick et al., 2008; Chin et al., 2012; IOM, 2001, 2010). An organization’s strategic plan provides a way to translate the aim of achieving equity in all organizational practices into an actionable strategy in which each practice incorporates the aim of achieving equity (American Medical Group Association, 2011; VanDeusen-Lukas et al., 2015). A study synthesizing lessons from successful interventions to reduce racial and ethnic disparities based on a series of systematic reviews noted that effective interventions must be integrated with overall quality improvement efforts, rather than be a separate, discrete initiative (Chin et al., 2012). Thus, valuing equity is a practice that will permeate each of the other systems practices to improve care for socially at-risk populations.

Specific practices to support equity goals include investments in health information technology (HIT) and redesigning care to promote equity. Technology should facilitate identifying socially at-risk patients and populations, as well as their clinical and social needs and assets. HIT investments should also facilitate the provision of data in ways that are easily understood by all levels of staff, including community-level population health data for senior managers and clinic-level data for frontline staff. Here, the population in “population health” refers to all people residing in the provider’s catchment area, or the geographic community it serves, and is not restricted to an enrollee or patient population. These activities are discussed in more detail in subsequent sections on data and measurement and comprehensive needs assessment. Care should be redesigned to provide integrated, accessible, coordinated, team-based care that links clinical and social interventions to reduce barriers to care and to support the health of patients in the community setting. Although these are acknowledged as good practice for the general population (IOM, 2001, 2013a), they may be especially relevant for socially at-risk populations that have more unhealthy behaviors, more numerous and more complex health needs, more difficulty managing their health and social needs, and more limited health literacy; experience greater barriers to accessing care; may be at increased risk of receiving lower-quality care and having poorer care experiences; and who potentially receive care from multiple providers across a broad range of services (Bachrach et al., 2014; Crawford et al., 2002; Davis et al., 2015; IOM, 2001, 2013a; NASEM, 2016; Schor et al., 2011). Organizations that value equity should pay particular attention to ensure that the design of their care facilitates providing equitable care and promotes equitable health care outcomes.

Because a commitment to health equity acknowledges that social processes drive inequalities in health, to reduce health inequities and improve
care for socially at-risk populations, organizations may be motivated to acknowledge the social context of their patient populations and even address social risk factors for poor health outcomes (Bachrach et al., 2014). This may be particularly true in the context of value-based purchasing models that provide economic incentives to do so (Bachrach et al., 2014). To consider and address social risk factors for poor health care outcomes, organizations may need to go beyond providing equitable care within the walls of their health systems to understand, partner with, and in some cases invest in the community in which they are embedded to support health outcomes of the communities they serve (Bachrach et al., 2014; Chin et al., 2012; Schor et al., 2011). Specific practices to redesign care for socially at-risk populations are discussed in more detail in subsequent sections on collaborative partnerships, care continuity, and engaging patients in their care.

**Accountability for Health Equity**

Effectively reducing health inequities will likely require an organization to accept accountability for its population health outcomes. Because population health is defined at the community level and is not restricted to an enrolled or patient population, organizations are accountable for community-level population health outcomes, not just the outcomes of their patient population. Accountability consists of both internal accountability within the health system and external accountability, such as accountability to third-party payers like Medicare. Accountability within the health system means that everyone within an organization from executive leadership down to frontline staff is accountable for population health outcomes. This requires organizations to acknowledge health disparities between subpopulations, set measurable goals to reduce disparities identified, and ensure these goals are achieved equitably (Ayanian and Williams, 2007).

Organizational leaders can set equity goals by communicating equity as part of their organizational vision, mission, and goals to staff at all levels through orientations and trainings and setting expectations regarding activities and practices staff should perform to reduce disparities. For example, a study identifying best practices for implementing interventions to reduce racial and ethnic disparities based on common themes identified through systematic reviews of such interventions suggests that organizations can make staff understand their role in reducing disparities by incorporating disparities-reduction training into staff orientations and including responsibilities with respect to disparities reduction into job descriptions (Chin et al., 2012). Organizational leaders can then ensure that equity goals are met through performance monitoring and reporting and hold staff accountable by evaluating and providing feedback to staff on their achieve-
ment on activities related to equity. Studies of interventions to reduce racial and ethnic health disparities found that simply having and providing data on disparities increased awareness about disparities but was not associated with improved outcomes (Sequist et al., 2010; Thorlby et al., 2011). However, a systematic review of interventions to reduce racial and ethnic disparities in diabetes found that providing in-person feedback to providers about their performance improved diabetes outcomes for African-American patients (Peek et al., 2007). Similarly, one study found that providing feedback to providers improved care for high-cost Medicare beneficiaries (Davis et al., 2015) and a systematic review of high-performing hospitals identified feedback to address low performance as well as rewarding and recognizing high performance as important to achieving high performance overall (Taylor et al., 2015). In some cases, it may also be appropriate to incorporate disparities-reduction goals into payment incentives and other compensation for management and physicians.\(^1\) External accountability can further support the alignment of interdependent goals to also incentivize health equity improvements (Jones et al., 2010).

HealthPartners of Minnesota and Kaiser Permanente provide two case studies of embedding equity as a value in a health system. HealthPartners is a Minnesota-based integrated health care organization that integrated the aim of equitable care into a larger practice transformation and successfully reduced disparities in cancer screenings, heart failure care, and diabetes outcomes\(^2\) (American Medical Group Association, 2011). This initiative is described in Box B2-2. Kaiser Permanente (also described in the previous section) made an organizational commitment to reducing health disparities beyond providing equitable health care (Meyers, 2008; Tyson, 2015). Specific initiatives Kaiser Permanente implemented include investing in local communities, Kaiser’s Community Health Initiatives program, and reducing the environmental impact of its facilities (Meyers, 2008). One way in which Kaiser invests in the communities it serves is by partnering with local health departments and public hospitals to invest in HIT and provide technical assistance for implementing quality improvement initiatives in safety-net settings. The Community Health Initiatives program supports increasing food access, such as establishing weekly farmers’ markets at its hospitals and medical office buildings to improve access to healthy foods, and promoting healthy environments, such as supporting health promotion programs in the workplace (Kaiser Permanente, 2015). Efforts to build healthier facilities include infrastructure investments to use more environmentally friendly construction and design elements and minimize the environmental impact.

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\(^1\) Personal communication, Susan Knudson (HealthPartners) to Charles Baumgart (committee member), December 14, 2015.

\(^2\) Ibid.
of its processes on the local communities. For example, Kaiser replaced the use of regular diesel fuel with more environmentally friendly biodiesel fuel for its supply transportation and courier trucks to reduce harmful emissions and air pollution in its local communities (Meyers, 2008).

Data and Measurement

Measurement is fundamental to quality improvement in health care (Berwick et al., 2008). Health care providers that aim to improve care for their socially at-risk patients maintain not only performance data but also data on the distribution of performance by various indicators of social risk. Studies have found that regularly collecting consistent race, ethnicity, and language data among a provider’s patient population and analyzing performance data disaggregated by race, ethnicity, and language to identify existing health disparities within their organizations are critical to effective interventions to reduce disparities (Ayanian and Williams, 2007; Chin et al., 2012; CMS, 2015; HHS, 2011a; Jones et al., 2010; Thorlby et al., 2011). Similarly, a systematic review of high-performing hospitals found that performance monitoring and reporting is essential to improving overall quality of care (Taylor et al., 2015). Together, this literature suggests that collecting consistent data by social risk factors and disaggregating data by indicators of social risk may also be critical for improving care for socially at-risk populations. Although there is little evidence to date that simply collecting and reporting data effectively improves care and reduces disparities, some studies have shown that providing performance data stratified by race and ethnicity increased awareness about disparities; these studies suggest that those who identify disparities may be motivated to seek to understand the drivers of and to reduce disparities (Chin et al., 2012; RWJF, 2011; Sequist et al., 2010).

Because socially at-risk populations are disproportionately represented in a small subset of providers, internal performance data may not be sufficient to reveal health disparities. Health care providers may also need to routinely compare their performance to those of peer organizations and top performers and consider examining community-level health data, such as those identified in coordination with local public health agencies, in addition to population health data on their patients. Early adopters of race and ethnicity data collection and stratified reporting identified a lack of standardized data as a primary challenge to comparing performance to peer organizations (RWJF, 2011; Thorlby et al., 2011). In previous reports, the IOM recommended core metrics for health and health care (IOM, 2015d), population health measures (IOM, 2013b), standardized data on race, ethnicity, and language (IOM, 2009), and social and behavioral domains and measures that may capture additional social risk factors for poor health (IOM, 2015a).
Furthermore, as described in the earlier section on publicly reported performance data, because there is little consistency in top performers across measures, domains, and time (e.g., Gaskin et al., 2011; Girotra et al., 2012; Jha et al., 2005, 2008; McHugh et al., 2014; Shwartz et al., 2011), it will be important to identify appropriate peers for comparison. Maintaining accurate and complete data may also facilitate the identification of clinical, behavioral, and social needs within a provider’s patient population. Comprehensive needs assessment is discussed in the next section.

Montefiore Health System and Denver Health provide case studies of two safety-net systems that developed analytic tools to better identify socially at-risk patients. Montefiore Health System, a safety-net provider located in the Bronx in New York City, internally developed the Clinical Looking Glass, a data analytics tool to identify and reach out to patients whose conditions are not under control and who have missed follow-up appointments (Hostetter and Klein, 2015). Denver Health, the largest public safety-net provider in Colorado, developed an analytic tool that enhances standard clinical predictive models using a set of rules to segment its patient population into risk tiers matched to clinical and social services and staffing models (Hostetter and Klein, 2015; Johnson et al., 2015). This tool is described in more detail in Box B2-3.

Comprehensive Needs Assessment

Health care providers that seek to improve care for socially at-risk populations periodically may need to conduct comprehensive needs assessments to proactively identify patients at risk. Anticipating patient needs is fundamental to improving care for all patients (IOM, 2001). However, socially at-risk populations are likely to have unmet social needs that affect health care outcomes (NASEM, 2016) that may not be identified through clinical data alone. Thus, comprehensive needs assessments may need to include not only consideration of clinical and behavioral risk factors as is done for the general population, but also social risks that may be related to health care outcomes. As such, comprehensive needs assessments may use clinical risk prediction models, but may also require further analysis of performance and other data (for example, patient-generated data, clinical notes, or physician observations) to identify unmet needs. In addition to needs or deficits, providers should also identify strengths and capacities of patients and communities that can be built on or enhanced (Green and Haines, 2016). Identifying and building on community assets and capacities may be important for sustaining community engagement (HHS, 2011b). Kaiser Permanente’s Colorado region developed a proactive health assessment tool described in Box B2-4 that provides a case study in proactively identifying health risks among Medicare beneficiaries (Kaiser Permanente
with stakeholders from the community, such as local health and public
health care providers can also conduct needs assessments collaboratively
for other settings and their results may not be generalizable. Additionally,
are specific to a particular community context and programs designed
needs and assets in their patient population. However, needs and assets
review the literature and the experiences of peers to anticipate potential
Colorado, 2014).

Among other results, an evaluation of the program found
that beneficiaries and their physicians reported that the tool helped raise
potential health risks that otherwise would not have been raised during
office visits and that diagnosis and treatment of depression among older
beneficiaries increased (ACHP, n.d.-c; Groshek, 2015; Kaiser Permanente
Colorado, 2014).

In addition to analyzing internal data, health care providers may also
review the literature and the experiences of peers to anticipate potential
needs and assets in their patient population. However, needs and assets
are specific to a particular community context and programs designed
for other settings and their results may not be generalizable. Additionally,
health care providers can also conduct needs assessments collaboratively
with stakeholders from the community, such as local health and public

BOX B2-3
Data and Measurement Case Study: Denver Health Risk Tiering

Denver Health is a public, integrated health system and the largest provider
of services to Medicaid and uninsured patients in Colorado. In 2012, Denver
Health received a $19.8 million grant from the Center for Medicare & Medicaid
Innovation to implement its 21st Century Care program to provide primary care
to publicly insured and uninsured patients using collaborative care teams and
enhanced health information technology (HIT). As part of this campaign, Denver
Health developed and implemented an analytic tool to segment its patient popula-
tion into four risk tiers ranging from healthy individuals in the general population
(Tier 1) to superusers, or patients with multiple, complex physical, mental health,
and social needs who have multiple emergency department visits and hospital
admissions (Tier 4). Risk tiers are matched to enhanced staffing models and
enhanced clinical and HIT services designed to meet patients’ needs, with more
intensive staffing and services for patients with higher risk. The initial model used
only claims data to identify costly patients, but clinicians reported that this model
could not help them distinguish between costly patients insensitive to change and
high opportunity patients, or patients with potentially avoidable utilization who are
also amenable to help from primary care team intervention. In response, Denver
Health assembled a team including executive leadership, clinicians, pharmacists,
quality improvement experts, health services researchers, actuaries, and HIT de-
developers to develop a set of tier promotion rules to supplement predictive model-
ing. These rules promote patients to a higher tier based on clinical data, provider
observations, and social risk factors (e.g., lack of social support). For example,
a healthy mother may be promoted from Tier 1 to Tier 2 if she has a history of
adverse birth outcomes, such as delivering an infant with low birth weight. Denver
Health is continuing to refine the tool, including developing rules to better account
for patients’ social risk factors (Hostetter and Klein, 2015; Johnson et al., 2015).
health departments and community organizations. For example, under the Patient Protection and Affordable Care Act of 2010, nonprofit (tax-exempt) hospitals must conduct a community health needs assessment every 3 years. Recommendations for conducting these assessments suggest that important components include defining the community; building shared ownership of community health and shared commitment to improving community health; data collection using shared measurement; data analysis, including stratified

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**BOX B2-4**  
**Comprehensive Needs Assessment Case Study: Kaiser Permanente Colorado’s PATHWAAY Program**

Kaiser Permanente Colorado is the largest nonprofit health care provider in Colorado. Its service area includes disproportionate shares of Hispanic individuals, persons with limited English proficiency, and individuals who reside in a designated health professional shortage area. Kaiser Permanente’s Colorado region established the Proactive Assessment of Total Health and Wellness to Add Active Years (PATHWAAY) Program to collect patient-generated health data through a comprehensive Total Health Assessment (THA) to develop a Personal Prevention Plan (PPP) to address potential health risks and improve health for Medicare beneficiaries. Prior to an annual wellness visit, Medicare beneficiaries complete a THA via the Kaiser Permanente patient portal. The THA screens members for health risks such as falls, urinary incontinence, malnutrition, pain, frailty, and mood disorders. The THA responses are processed, scored, and entered into the patient’s electronic health record (EHR). Identified risks are sent to the patient’s care team. A registered nurse reviews the THA and calls beneficiaries to follow up on the THA, to gather more information as needed, and to discuss the risks and health concerns identified through the THA in more detail. Together with the beneficiary’s primary care physician, the nurse then creates a PPP that specifies activities to address any risks. For example, nurses may recommend that beneficiaries at risk for incontinence attend incontinence class. At the beneficiary’s appointment, the primary care physician reviews the THA and PPP with the patient to confirm and update risks and plans to address them. At the end of the visit, patients receive a printed copy of their PPP and information from the THA, PPP, and the visit are entered into the patient’s EHR. The organization reported that following implementation, beneficiaries reported that they raised issues through the THA they normally might not have raised during an office visit and physicians reported that the THA instigated conversations with beneficiaries about issues that otherwise may not have been raised. Beneficiaries also reported taking increased actions to improve their health. Of beneficiaries who reported taking action, a majority reported that their health improved “a great deal.” Following implementation, Kaiser Permanente’s Colorado region also saw increased and sustained attendance at balance and incontinence classes and increased diagnosis and treatment of depression among older beneficiaries (ACHP, n.d.-c; Groshek, 2015; Kaiser Permanente Colorado, 2014).
reporting by indicators of social risk, identification of assets, capacities, and unmet needs; defining priorities and a plan to address unmet needs; and engaging the community through continuous communication throughout all stages of the needs assessment and dissemination of results (Barnett, 2011; CDC, 2013; CHA, 2013; Myers and Stoto, 2006; Rosenbaum, 2013).

As implied by these components, results from the needs assessment can help providers to identify the scope, intensity, and scale of needed services. Health care providers may also use the results of these needs assessment activities to prioritize which needs the provider can best meet by balancing factors such as patient priorities based on intensity of need, whether the need is amenable to help from clinical or social interventions, and the health care provider’s own capacity to address a need. Finally, once unmet and potential needs have been identified (and prioritized), health care providers may need to design or identify programs and an implementation strategy to respond to these needs. Examples of practice transformation and other programs are described in the following section on collaborative partnerships.

**Collaborative Partnerships**

Improving health and health care outcomes for socially at-risk populations will require collaboration within and between care teams within health systems, across clinical settings, and between health systems and external partners, such as community organizations and public health and social service agencies (Bachrach et al., 2014; Schor et al., 2011). While this is also true of improving care for the general population, collaborative partnerships both within and beyond the clinical care setting may be particularly relevant for socially at-risk populations that are likely to have both medically complex conditions and unmet social needs (Bachrach et al., 2014; Schor et al., 2011). Collaboration within health systems internally include practice redesigns to provide integrated, accessible, coordinated care, such as through implementation of a patient-centered medical home (Sandberg et al., 2014; VanDeusen-Lukas et al., 2015; Wagner et al., 2014). Studies, including two systematic reviews, found that implementing a patient-centered medical home shows promise to improve quality of care and patient experiences, while less is known about the effect of implementing a medical home on clinical outcomes, utilization, and costs (Jackson et al., 2013; Jaen et al., 2010; Rathert et al., 2013). However, evidence from implementing the Chronic Care Model and other integrated care delivery models show the potential of such integrated models to improve both quality of care and clinical outcomes (Coleman et al., 2009; Davis et al., 2015). Although much of the evidence on medical homes comes from the general population or patients with chronic illnesses, some safety-net organizations have successfully transformed their practice into medical homes (Wagner et al., 2014).
With respect to specific elements of clinical practice designs that may improve care for socially at-risk populations, strategies to increase access to care that show promise for improving quality of care and patient outcomes include providing same-day appointments; extending practice hours in ambulatory care; using clinical staff such as paramedics and medical assistants and trained, unlicensed lay persons like community health workers and informal caregivers to support care management; and delivering care through new technologies such as mobile screening units and video and telephone consultations that bring clinical care to patients (Felland et al., 2013; IOM, 2015c; McCarthy and Mueller, 2008; Sandberg et al., 2014). Studies have also reported that multidisciplinary teams have been important to improving care for high-cost Medicare beneficiaries (Davis et al., 2015) and reducing disparities (Chin et al., 2007, 2012; Peek et al., 2007). Furthermore, involving non-physician clinicians in care teams may improve care and reduce disparities. For example, a systematic review of interventions to reduce racial and ethnic disparities in diabetes found that nurse- and pharmacist-led interventions showed promise to improve quality of care and health outcomes and potential to reduce disparities (Peek et al., 2007). Studies of high-performing hospitals also identified coordinated, patient-centered care teams and multidisciplinary and multi-level collaboration and communication as important factors for achieving high performance (Curry et al., 2011; Taylor et al., 2015).

Whereas the medical home concept pertains principally to primary care settings, health systems may also redesign care across broader medical neighborhoods to coordinate and collaborate with other health care providers regionally (including specialists and hospitals) and in which performance measurement and payment systems are aligned to promote shared accountability for outcomes across the continuum of care (Fisher, 2008; Greenberg et al., 2014; Huang and Rosenthal, 2014; Silow-Carroll and Rodin, 2013; Van Citters et al., 2013). For example, a systematic review of high-performing hospitals identified collaboration and communication with other health services providers (including ambulatory care providers, administrators, and social services) throughout a patient's care trajectory as a crucial improvement strategy (Taylor et al., 2015). Similarly, a systematic review of interventions to improve asthma outcomes among racial and ethnic minority adults found that Health Resources and Services Administration Health Disparities Collaboratives, established to bring together CHCs to share knowledge and disseminate quality improvement techniques, showed potential to improve quality of care (Press et al., 2012). An evaluation of MetroHealth Care Plus, a CMS waiver program comprising a regional health improvement collaborative of three safety-net organizations in Ohio that enrolled uninsured poor patients and accepted a CMS-approved budget-neutral cap, provides further evidence of
the potential for collaborative partnerships to improve not only health care quality and outcomes, but also value. Program results reported improved diabetes outcomes among enrollees with diabetes and reduced hospitalizations among all enrollees (Cebul et al., 2015). Additionally, expenditures for enrollees averaged more than one quarter lower than the budget-neutral cap—$415.05 total per member-month costs for MetroHealth Care Plus compared to $582.41 for the budget-neutral cap or $104 million in actual services provided compared to the $145 million CMS-allowed expenditure cap for all eligible enrollees (Cebul et al., 2015).

Health care providers may also need to partner with community organizations and public health agencies to link clinical interventions to social programs necessary to support healthy individuals, such as mental health services, substance abuse treatment, housing assistance, vocational counseling, legal assistance, and assistance with government benefits (Bachrach et al., 2014; Foubister, 2013; McCarthy and Cohen, 2013; Sandberg et al., 2014; Schor et al., 2011). For example, one study found that including and coordinating care among patients, family members, providers, and social service agencies showed “modest success” at improving care for high-cost, high-risk Medicare beneficiaries (Davis et al., 2015, p.e350). Case studies of three U.S. regions with relatively high performance despite greater poverty compared to other top-performing areas also identified collaboration across a wide variety of stakeholders (e.g., providers, patients, payers, nonprofit community organizations, academic researchers, faith-based groups, educators, etc.) as pivotal to achieving high performance (McCarthy et al., 2014). The case studies also identified shared commitment to increasing access to care for underserved populations and regional cooperation to invest in and use health information technology as well as engage the community as important to increasing access to care for underserved populations and to achieve high performance overall (McCarthy et al., 2014).

As alluded to in these examples of regional collaboration, government can be an important facilitator of collaborative partnerships by providing leadership, aligning financial incentives (payment reform), promoting shared accountability (through both performance measurement/public reporting and financial accountability), and by facilitating enhanced funding for social risk factors related to health (e.g., through value-based purchasing methods, identifying and coordinating nonprofit community benefit funds, and by aligning non–health sector funding to promote population health) (Chin et al., 2012; Corrigan and Fisher, 2014; IOM, 2014, 2015b; Jones et al., 2010). For example, the New York City Department of Health and Mental Hygiene established the Citywide Colon Cancer Control Coalition that convened a wide range of stakeholders in 2003 to implement a multifaceted program, including an annual summit of stakeholders, a
public education campaign, outreach and education to health care providers, patient navigator programs, and a quality improvement initiative to successfully increase colon cancer screening among all New York City residents age 50 and older and also to reduce racial and ethnic disparities (Itzkowitz et al., 2016).

Hennepin Health is a county-based, safety-net accountable care organization (ACO) that provides another example of a health department serving a critical role as a convener that shares insights into how various stakeholders can better coordinate care and align resources (Sandberg et al., 2014). Hennepin Health, originally created in 2011 as a Medicaid demonstration project comprising a partnership of the Hennepin County Human Services and Public Health Department and three health providers—a safety-net hospital and medical center, a community health center, and a nonprofit health maintenance organization serving Medicare and Medicaid beneficiaries—used primary care coordination teams to coordinate care across clinical, behavioral, and social service settings (including collaborations with homeless shelters, housing agencies, and law enforcement agencies); invested in HIT infrastructure to integrate information from and facilitate coordination across clinical, behavioral and social services; and expanded its workforce to include specialized nurse care coordinators, pharmacists, dentists, behavioral health staff, social workers, community health workers, housing and social services navigators, vocational counselors, emergency medical services staff, and HIT professionals (Sandberg et al., 2014). Early results from Hennepin Health suggest that this type of collaborative model may be effective at reducing ED visits and increasing the quality of care for chronic illnesses (diabetes, vascular diseases, asthma care), while also achieving cost savings (Sandberg et al., 2014). Hennepin Health’s shared savings model has allowed the ACO to reinvest savings ($1.6 million in 2012, $1.1 million in 2013, and $1.3 million in 2014) in practice redesigns, quality improvement initiatives, and in the workforce (including increased staffing as well as education and trainings).

The Colorado Coalition for the Homeless’ Stout Street Health Center and Renaissance Stout Street Lofts and UPMC for You’s Cultivating Health for Success program provide examples of more targeted collaboration between federally qualified health centers and supportive housing. Specifically, both programs integrate supportive housing, a community health center medical home, and case management services to provide health care services and social interventions for homeless individuals with the goal of reducing ED visits and inpatient care and increasing planned primary and behavioral health care visits and self-management behaviors (Klein, 2014; Lovelace, 2016). The Colorado Coalition for the Homeless program is described in more detail in Box B2-5. Early results concordant with other evaluations of supportive housing (Buchanan et al., 2009; Larimer et al., 2009; Martinez
BOX B2-5

Collaborative Partnerships Case Study: Colorado Coalition for the Homeless’ Stout Street Health Center and Renaissance Stout Street Lofts

The Colorado Coalition for the Homeless integrates health care and social services for the homeless under a “housing first” model. Housing first is grounded in the idea that homeless persons must have safe housing before medical and social needs (including multiple chronic medical conditions, substance abuse, and serious mental illness) can be addressed. In September 2014, the coalition opened its Stout Street Health Center and Renaissance Stout Street Lofts, a federally qualified health center and 78 supportive housing units for formerly homeless individuals and families collocated in a building in downtown Denver. The new facility cost $35 million to construct, which the coalition financed using funding from two federal programs designed to encourage investments that benefit underserved populations (the Low Income Housing Tax Credit Program and the New Market Tax Credit Program), as well as grant funding from Denver city and county, foundations and individual donors, and the Health Resources and Services Administration. Expected funding from Colorado’s Medicaid expansion under the Patient Protection and Affordable Care Act of 2010 was key to the coalition’s long-term funding. Stout Street Health Center provides health care services, including primary care, mental health care, substance abuse treatment, dental and vision care, and social services to about 18,000 current homeless persons, formerly homeless persons residing in coalition residences, and formerly homeless persons who no longer live in coalition residences. The health center assigns patients to a care team that includes a primary care physician, a physician’s assistant, a social worker, and part-time psychiatrists and pharmacists who coordinate to provide physical and behavioral health services. A case manager and patient navigator plan and provide social supports such as housing support, career and educational counseling, life skills and financial literacy training, and assistance applying for government benefits. The patient navigator also facilitates access to health care services, including accompanying patients to appointments. The Renaissance Stout Street Lofts comprise 59 one-bedroom and 19 two-bedroom apartments that share a common kitchen, outdoor courtyard, computer room, and on-site laundry. Social workers and an on-site property manager are also available to residents as needed. Based on results from a pilot program and an early evaluation of a subset of program participants, the coalition expects integrating housing and clinical and behavioral services will reduce health care utilization and costs, and improve health status (including clinical and mental health outcomes) and housing stability. Specifically, the Colorado Coalition evaluation found an average cost savings of $4,745 per person largely achieved through lower utilization in health and emergency services (Colorado Coalition for the Homeless, 2014, 2015; Klein, 2014).
and Burt, 2006) suggest that integrating housing and clinical and behavioral services can potentially reduce health care utilization and costs, and improve health status (including clinical and mental health outcomes) and housing stability. Specifically, the Colorado Coalition evaluation found an average cost savings of $4,745 per person largely achieved through lower utilization of health and emergency services (Klein, 2014).

**Care Continuity**

Health care providers ensure care continuity by actively managing patient and enrollee care trajectories across the continuum of care (Bodenheimer, 2008; Haggerty et al., 2003). Although continuity of care is a goal of high-quality care for all populations, it is particularly salient for socially at-risk populations that potentially receive care and services from multiple providers and across a broad range of health care providers, social service agencies, and community organizations (Davis et al., 2015; IOM, 2013a). For socially at-risk populations, ensuring care continuity may include anticipating and managing transitions as a patient progresses through an illness, across sites of clinical care, between clinical care teams, between health care providers and social service agencies and organizations, and through differing intensities of needed services.

Studies of top-performing hospitals, including a systematic review, identified effective communication and coordination across departments and diverse staff types and levels to ensure seamless transitions as a key strategy to achieving high performance (Curry et al., 2011; Taylor et al., 2015). Actively managing transitions may require designing care to prevent losing patients or enrollees during transitions and to promote patient engagement in their care (discussed in the next section), such as through the use of coordinated care teams, trained care coordinators, and patient navigators, or through collocating services. A review of randomized controlled trials of interventions to improve care transitions among chronically ill adults found that all but one trial showed positive effects on at least one outcome—clinical outcomes, patient experience, quality of life, health care use, and costs—regardless of the specific type of intervention (e.g., discharge planning and follow up, case management, coaching, patient education, peer support, telehealth) (Naylor et al., 2011).

For socially at-risk populations, health care providers may need to build on existing models of managing care transitions designed to manage transitions between health care settings (e.g., Coleman et al., 2006; Naylor et al., 2004) to ensure that transitions involving partnering community organizations and public health and social service agencies are also managed (IOM, 2013a). Importantly, care trajectories are not linear. Patients may cycle through periods of progress and relapse, and providers must be
prepared to monitor patients who have seen improvements to ensure that progress is maintained, as well as to detect any setbacks or deteriorations, and to intensify services as needed (Davis et al., 2015).

The Visiting Nurse Service of New York (VNS) CHOICE Health Plans, Fallon Health’s NaviCare and Summit ElderCare, and Geisinger Health Plan’s Medically Complex Medical Home provide examples of health care providers actively managing care transitions across care settings, across a patient’s illness trajectory, and across a patient’s needed intensity of services. VNS Choice Health Plans is a managed care organization serving New York City residents who are eligible for Medicare, Medicaid, or both that assigns a care manager to coordinate services across members of the patient’s care team using a variety of tailored interventions. The care team may include physicians, nurses, social workers, pharmacists, home health aides, and informal family caregivers, and interventions include teaching enrollees and family caregivers about self-management, care team meetings to review care needs and care plans, and using HIT to facilitate monitoring care for clinicians and decision making for enrollees (Johnson and McCarthy, 2013). Similarly, in 2010, Fallon Health developed the NaviCare program, which uses a navigator to coordinate services between patients living at home or in an assisted living or long-term care facility and members of the enrollee’s primary care team (ACHP, n.d.-a). Fallon Health also oversees the Summit ElderCare program, established in 1995, which centers around the provision of services such as medical care, rehabilitation services, meals, recreation, and occasions for social interaction at one of its adult day health centers, and also provides in-home support, such as assistance with bathing and dressing, preparing meals, and managing medications (ACHP, n.d.-a). Geisinger Health Plan’s Medically Complex Medical Home uses a two-person team to manage a patient’s transition from an inpatient facility back home, and is discussed in more detail in Box B2-6. Geisinger estimates that the program achieved cost reductions of approximately 20 percent or $1,000 per member per month largely through reductions in ED visits and hospital admissions (ACHP, n.d.-b).

**Engaging Patients in Their Care**

Engaging patients in their care describes designing care tailored to meet an individual patient’s needs and designing care that promotes the health of patients in the community setting by supporting individuals in managing their health conditions, participating in their health care decisions, taking up healthy behaviors, and reducing health risks. Engaging patients in their care may be particularly relevant for patients with social risk factors who have greater barriers to accessing care, more unhealthy behaviors, more numerous and more complex health needs, more difficulty managing their
Geisinger Health Plan is a nonprofit health maintenance organization that serves beneficiaries in Delaware, Maine, New Jersey, Pennsylvania, and West Virginia. Geisinger’s Medically Complex Medical Home program provides a two-person care team to help medically complex elderly patients transition from an inpatient facility (e.g., a hospital or skilled nursing facility) back home. High-risk patients are identified through utilization data (i.e., frequent hospitalizations or emergency department [ED] visits) and referral. Once identified, a patient is assigned a care team consisting of a nurse care manager and a trained community health worker. The team visits patients before discharge to introduce themselves and to schedule a home visit within 2 days of discharge. At the home visit, the care team identifies clinical and social barriers to managing the patient’s health condition. Clinical barriers include problems with medication adherence, while social barriers may include inability to prepare food or poor access to transportation. The care team may also identify safety issues in the patient’s home, such as stairs or wires that could lead to falls. The care team also facilitates ways to address these barriers like arranging for support services such as meal delivery to the home or transportation services. During the home visit, the care team also reviews the patient’s Self-Management Action Plan, a tailored care plan that is easily understood by the patient. Once patients are no longer deemed as high risk, the care team returns the patient to his or her primary care medical home team, typically after 3 to 6 months. However, some patients may continue to be high risk and remain in the program indefinitely. Other patients may also be referred to hospice if appropriate, in which case the care team continues to manage the patient’s care until his or her death. A study of a 9-month pilot of the program covering 75 medically complex patients reported increased numbers of identified and managed gaps in care related to standards of care, safety, end-of-life planning, and medication management and potentially avoided ED visits and hospitalizations. Geisinger estimates that the effect of addressing these gaps in care resulted in cost savings of $1,000 per member per month, a cost reduction of approximately 20 percent achieved largely through avoided ED visits and hospitalizations (ACHP, n.d.-b).

Tailoring care to meet a patient’s specific needs includes identifying the appropriate form and intensity of delivering integrated, accessible clinical care for individual patients and identifying and linking clinical care to interventions that address that patient’s specific clinical and social needs. This may include providing individualized care as well as culturally tailoring and targeting care for socially at-risk subpopulations. Individualized care planning has shown promise to improve care for high-cost Medicare beneficiaries (Davis et al., 2015), and several systematic reviews found that
culturally tailoring interventions to meet patients’ needs has been effective at reducing racial and ethnic disparities with respect to HIV prevention, the quality of diabetes care and diabetes outcomes, depression prevention and treatment, and breast cancer screening (Chin et al., 2012; Hemmige et al., 2012; Masi et al., 2007; Peek et al., 2007; Van Voorhees et al., 2007). Additionally, because health literacy is a mediator of social risk factors and health outcomes (NASEM, 2016), tailoring care for low literate patients or providing health literacy training to providers to improve communication with low literate patients may be one strategy to reduce disparities (Logan et al., 2015). Because patients’ needs will change over time, providers will need to reevaluate the type and intensity of services required periodically (Davis et al., 2015).

Promoting functioning in the community includes supporting patients to promote healthy behaviors (such as healthy eating, physical activity, tobacco cessation), prevent health problems (such as managing physical safety in the home, identifying symptoms of poor health, and barriers to medication adherence), and manage health and social needs (such as providing transportation assistance and facilitating access to healthy meals) in the home, neighborhood, and other chosen environments (Schor et al., 2011). To support individuals in the community, health care providers may need to first collect and maintain current databases about a patient’s contact information (telephone number, email address, or place of residence) to ensure the provider can find the patient. Specific types of activities providers may practice to engage patients in their care and to support individuals in the community include educating patients about self-management, healthy behaviors, and care coordination; providing culturally sensitive, targeted, and tailored patient education; providing tailored care plans easily understood by patients; employing patient navigators or health navigators to facilitate access to and to coordinate care between clinical and social services; using new technologies (e.g., telephone consultation, videoconference, mobile screenings, smartphone apps) to promote healthy behaviors and reduce health risks; and engaging patients through community organizations (such as community centers, homeless shelters, religious organizations, and schools) to promote healthy behaviors and participation in their health care. For example, the Health Plan of San Mateo, a local public health plan that serves historically underserved residents of San Mateo County, California, (e.g., older adults, persons with disabilities) meets with enrollees at sites convenient to them in the community setting (e.g., adult day health centers, dialysis facilities, mental health support group meetings) to conduct health risk assessments and provide care planning3 (CHCS PRIDE, 2014).

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3 Personal communication, Doug McCarthy (The Commonwealth Fund) to staff, January 12, 2016.
Patient education about self-management, healthy behaviors, and care coordination, especially interactive approaches, has shown promise to reduce racial and ethnic disparities (Chin et al., 2012; Naylor et al., 2012; Press et al., 2012; Sajid et al., 2012). Specifically, systematic reviews reported that culturally tailored patient education can improve asthma outcomes (Press et al., 2012), educational programs can increase knowledge and informed decision making about prostate cancer screenings (Sajid et al., 2012), and tailored patient education combined with patient navigation can increase adherence to colorectal cancer screenings (Naylor et al., 2012). With respect to patient navigators alone, studies have shown that employing patient navigators or care managers to facilitate access to clinical and social services, coordinate care, and support self-management has shown promise to improve care for high-cost Medicare beneficiaries and to reduce racial and ethnic disparities (Chin et al., 2012; Davis et al., 2015; Itzkowitz et al., 2016; Naylor et al., 2012). Furthermore, studies suggest that both clinical patient navigators (e.g., nurses and physicians) and non-clinical patient navigators (such as community health workers and informal caregivers who receive training as peer patient navigators) can be effective at improving care, including improving screening rates and reducing hospital admissions and readmissions for socially at-risk populations (e.g., Davis et al., 2015; Itzkowitz et al., 2016; Lasser et al., 2011). One systematic review found moderate evidence that telephone support combined with patient navigation increased cervical cancer screening for racial and ethnic minority women (Glick et al., 2012). Studies also reported that when identifying activities to support patients that best meet their needs, clinicians may also need to address patients’ practical opportunities and the patient’s degree of agency for desired behaviors (Ferrer et al., 2014, 2016). For example, although patients might find increasing physical activity to be a desirable goal and have access to outdoor opportunities for physical activity (such as a public park), barriers such as feeling unsafe in their neighborhood after dark and lack of peer or partner support may inhibit them from actually taking up more physical activity (Ferrer et al., 2014).

West County Health Centers, the Citywide Colon Cancer Control Coalition (C5), and Genesys HealthWorks provide case studies of interventions to support self-management and promote healthy behavior change to individuals residing in the community (Hostetter and Klein, 2014; Klein and McCarthy, 2010). West County Health Centers is a federally qualified health center located in rural Sonoma County, California, that uses video conferencing to enable clinicians to monitor patients’ care at home, include non-local family members to participate in their relative’s care and decision making (such as during end-of-life discussions), encourage healthy behavior changes, and coordinate care between patients and other health care providers and social services agencies, such as behavioral health staff and social
workers (Hostetter and Klein, 2014). This video conferencing technology also enables nurses on home visits to confer with other clinicians. The New York City Department of Health and Mental Hygiene together with other stakeholders established the C5 initiative in 2003 to reduce racial and ethnic health disparities in colon cancer screening (Itzkowitz et al., 2016). Among other activities, including public education campaigns, provider education, a direct referral initiative to streamline referrals, and a colonoscopy quality improvement initiative, C5 used foundation grant funding to demonstrate that employing patient navigators could increase colonoscopy adherence and reduce the no-show rate. The program also showed that lay adults older than age 50 who have undergone a colonoscopy can be trained to effectively serve as peer patient navigators, and modeling of the program demonstrated that employing patient navigators to improve colonoscopy adherence among low socioeconomic status African-American and Latino populations is cost-effective. Patient navigation has expanded substantially beyond the initial demonstration and is considered a focus of C5. Overall, the initiative was effective at increasing the screening rate from 42 percent in 2003 to 70 percent in 2014, and also eliminated racial and ethnic disparities. Genesys HealthWorks is an integrated practice model in Genessee County, Michigan, that includes the use of health navigators to provide self-management support and encourage behavior change (described in more detail in Box B2-7). An evaluation found that the program significantly increased healthy behaviors and self-management behaviors and decreased unhealthy behaviors (Genesys, 2013; Holtrop et al., 2008; Klein and McCarthy, 2010).

**APPLYING SYSTEMS PRACTICES**

To illustrate how each systems practice might be applied to a specific practice setting in a specific community context, the committee developed a pair of working examples for the inpatient and outpatient settings. Importantly, these case examples are hypothetical and illustrative of how an organization might implement a systems approach to achieving health equity, but are not intended as a one-size-fits-all approach. As described in detail in the preceding sections, the specific interventions appropriate to a given care setting will depend on the specific needs of a provider’s patient population, each individual health care provider’s available resources, and the local community context. Table B2-2 provides working examples of systems practices applied to reducing readmissions in the hospital setting and to improving diabetes care in the outpatient setting.
**BOX B2-7**

Engaging Patients in Their Care Case
Study: Genesys HealthWorks

Genesys HealthWorks is an integrated practice model designed to improve quality and reduce costs. Genesys Health System, a nonprofit, integrated health care system, developed the model to improve the health of residents of Genesee County, Michigan, which covers the greater metropolitan area of Flint. As part of the model, Genesys HealthWorks implemented an integrated self-management support program using health navigators to support patients to adopt healthy behaviors such as physical activity and healthy eating and to reduce health risks like tobacco use. The health navigator program began as a variety of pilot programs and research projects in 1997 and evolved to target patients receiving care at a Genesys Health System patient-centered medical home practice and low-income, uninsured enrollees of the Genesee Health Plan. Unlike other case management programs that target high-risk patients, HealthWorks supports a wide range of patients from healthy patients to those with chronic illnesses to those recovering from acute care episodes; the intensity of services provided depends on the patient’s clinical and social needs.

Health navigators come from a variety of backgrounds and include nurses, health educators, social workers, and dieticians. Navigators receive additional trainings in which they develop community resource guides, practice health behavior change counseling techniques, and develop referral plans with participating practices. Patients may be referred to the program by a provider or a community agency that identifies an acute or chronic need or a health goal, if a health care need is identified upon enrollment in the health plan, or following an emergency department visit. When a patient is referred to the program, health navigators make an initial, 45 minute- to 1-hour call or in-person visit to assess the patient’s needs, and then make brief, 10 to 15 minute follow-up calls. The number of follow-up calls is determined by each individual patient’s needs. During the calls, the health navigator helps patients identify a health behavior area for improvement, set goals, identify barriers and facilitators to achieving behavior changes, and identify specific actions patients can take to achieve their goals. The navigator subsequently uses motivational interviewing techniques to encourage, support, and guide patients to achieve their health goals. The health navigator also reinforces the patient’s referring clinician’s recommendations related to healthy behaviors (e.g., medication adherence, preventive screenings, self-management behaviors) and refers patients to community resources, such as counseling services for depressed patients. Patients are reassessed at 3 and 6 months from baseline. At both the initial assessment and follow up, navigators send a letter to the patient’s referring clinician detailing the patient’s progress. An evaluation of the program found that participants significantly increased healthy behaviors, decreased unhealthy behaviors, and increased self-management behaviors. Specific improvements include reduction in current smokers, increased physical activity, and increased medication adherence, among others (Genesys, 2013; Holtro et al., 2008; Klein and McCarthy, 2010).
RESOURCE AND SUSTAINABILITY CONSIDERATIONS

The successful examples of health care organizations improving the quality of care, health, and other outcomes for socially at-risk populations arise in specific contexts and may not generalize to other health systems. Although the majority of examples reviewed did not explicitly address financial considerations, among other factors, both the availability of resources and the alignment of financial incentives that makes such efforts sustainable are prerequisites for the adoption and sustainability of these practices and programs. For example, a hospital with a larger endowment may have been able to invest in HIT to such an extent that implementing referral tracking for at-risk patients is a modest and feasible step, whereas a hospital with fewer resources would require a more substantial infrastructure investment to do so. Resources can incentivize reducing disparities by not only explicitly directing resources to reduce disparities or targeting interventions at socially at-risk populations (such as greater investment in safety-net systems), but also by incorporating equitable care and outcomes into accountability processes (e.g., Berenson and Shih, 2012; Chin, 2016; Zuckerman et al., 2016).

In terms of sustainability, interventions that improve health and quality of care or reduce utilization and cost are only feasible to maintain if the provider is paid in such a way that profits (revenues minus costs) are higher with the intervention than without. This alignment could be the result of risk-sharing models that incentivize better population health management such as global payments and shared savings models or bonuses and penalties related to quality and cost. Note that even where there is financial alignment, organizations with fewer resources may not be able to respond to them without upfront resources. Because most of the efforts described in this report involve fixed costs and potentially shared benefits across multiple payers, their economic feasibility depends not only on Medicare’s payment system but that of other payers. As health care systems increasingly partner with external organizations (e.g., community organizations) and other sectors (e.g., social services and public health), this will include non–health care stakeholders as well (e.g., Corrigan and Fisher, 2014), All things equal, environments in which a greater share of a provider’s revenue is derived from such value-based payment (VBP) methods will make it more sustainable for providers to invest in programs that generate value (improved quality and reduced cost).

OPPORTUNITIES TO ADDRESS THE GAPS IN KNOWLEDGE

The committee concluded that six systems practices as well as the foundational element of providing community-informed and patient-centered
TABLE B2-2 Working Examples of the Systems Practices Applied to Reducing Readmissions and Improving Diabetes Care

<table>
<thead>
<tr>
<th>Reducing Readmissions</th>
<th>Congruence with the patient’s values is a key determinant of progress. For example, adherence to a modified diet is more likely if the diet is tailored to the patient’s customary eating patterns. A “try it and see” approach is often necessary. Relationships and trust, the foundations of patient-centered care, take time to build.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient-centered care:</td>
<td>Involve patients and their family members in decision making and tailor care to reflect their goals, values, and capacities.</td>
</tr>
<tr>
<td>Community-informed care:</td>
<td>Personnel managing care transitions do so with practical knowledge of available resources in their catchment areas.</td>
</tr>
<tr>
<td>Commitment to health equity:</td>
<td>Hospital leaders seek to close gaps in readmissions rates for socially at-risk patients.</td>
</tr>
<tr>
<td>Data and measurement:</td>
<td>Hospital leaders compare performance in readmission rates across the spectrum of social risks. Hospital leaders benchmark hospital performance against high-performing organizations’ outcomes. The hospital collects qualitative data from families and caregivers to understand the drivers of higher readmission rates among some socially at-risk subpopulations.</td>
</tr>
<tr>
<td>Comprehensive needs assessment:</td>
<td>Through local data gathering and insights from published literature, organizations identify factors influencing short-interval readmissions. Drivers often include clinical and social factors, such as poor access to primary care follow up, financial barriers to outpatient care or filling prescriptions, difficulty arranging transportation to appointments, limited understanding of self-care, poor communication and coordination across providers (e.g., lost referrals), undiagnosed behavioral illness, an unstable home environment, or homelessness.</td>
</tr>
</tbody>
</table>
Reducing Readmissions

Patient-centered care:

- Involve patients and their family members in decision making and tailor care to reflect their goals, values, and capacities.
- Congruence with the patient’s values is a key determinant of progress. For example, adherence to a modified diet is more likely if the diet is tailored to the patient’s customary eating patterns. A “try it and see” approach is often necessary.
- Relationships and trust, the foundations of patient-centered care, take time to build.

Community-informed care:

- Tailor care to reflect the social context of the community.
- Personnel managing care transitions do so with practical knowledge of available resources in their catchment areas.

Commitment to health equity:

- Value and promote health equity and hold yourself accountable. Hospital leaders seek to close gaps in readmissions rates for socially at-risk patients.

Data and measurement:

- Understand your population’s health, risk factors, and patterns of care.
- Hospital leaders compare performance in readmission rates across the spectrum of social risks. Hospital leaders benchmark hospital performance against high-performing organizations’ outcomes. The hospital collects qualitative data from families and caregivers to understand the drivers of higher readmission rates among some socially at-risk subpopulations.

Comprehensive needs assessment:

- Identify, anticipate, and respond to clinical and social needs.
- Through local data gathering and insights from published literature, organizations identify factors influencing short-interval readmissions. Drivers often include clinical and social factors, such as poor access to primary care follow up, financial barriers to outpatient care or filling prescriptions, difficulty arranging transportation to appointments, limited understanding of self-care, poor communication and coordination across providers (e.g., lost referrals), undiagnosed behavioral illness, an unstable home environment, or homelessness.

Improving Diabetes Care

Patient-centered plans to achieve clinical goals for glucose and blood pressure control account for individualized benefits and risks of treatment, including avoidance of hypoglycemia or hypotension in older patients with diabetes at increased risk of falling due to underlying frailty. Affordability of specific medications and glucose testing supplies under the patient’s health plan is carefully considered.

Bilingual and bicultural staff members are included in primary care teams and community health workers when appropriate. Dietary recommendations are tailored to reflect patient preferences. Clinical teams assess patients’ feasible opportunities for a healthy diet and activity patterns within their neighborhood contexts. Clinical teams partner with and refer patients to community resources to support healthy diet and promote physical activity.

Leaders of a physician group within a Medicare accountable care organization (ACO) or Medicare Advantage health plan seek to reduce disparities in control of glucose and blood pressure for socially at-risk patients with diabetes.

ACO or health plan leaders compare medical group performance in diabetes care across the spectrum of social risks. The ACO or MA health plan benchmarks performance to identify high-performing medical groups with improved outcomes. The ACO or health plan collects qualitative data obtained to understand reasons why socially at-risk patients may have greater difficulty adhering to medications or recommendations for diet and exercise.

Through local data gathering and insights from published studies, organizations identify factors influencing control of glucose and blood pressure among patients with diabetes. Key factors often include overly complex medication regimens, out-of-pocket costs for medications, and neighborhoods that have limited access to healthy foods and to safe areas for regular exercise.

continued
Improving Diabetes Care

The Medicare ACO or health plan develops a diabetes registry to monitor diabetes quality indicators and provide real-time feedback and reminders to patients and their primary care teams. The ACO or health plan partners with local pharmacies to enhance medication teaching and monitoring of glucose and blood pressure to supplement primary care clinic visits. The ACO or health plan employs community health workers linked to the primary care team to provide home-based health coaching related to nutrition and exercise. The ACO or health plan also partners with public health and social service agencies or community organizations to improve access to healthy foods and safe areas to exercise, as well as to identify and address competing priorities such as instability in housing or home utility services.

Diabetes is recognized as a chronic condition requiring an integrated approach to medication, diet, exercise, and weight management to bridge clinic and home settings. Primary care teams engage and coordinate care with specialists for patients with glucose or blood pressure levels that are particularly difficult to control.

Patients receive self-management support and peer coaching to improve chronic disease management of their diabetes. Enhanced use of mobile applications and sensors enable patients to record and communicate their home glucose and blood pressure readings to their primary care teams and receive real-time guidance on medication changes and lifestyle modifications to improve their diabetes control.

### TABLE B2-2 Continued

| Collaborative partnerships: | The hospital creates internal teams and external partners to address the major drivers of readmissions. These teams often employ nurse care managers to review discharge arrangements and ensure that the hospital and home-based components have been addressed with sound plans in place. The hospital employs community health workers linked to the care team to provide home-based health coaching. The hospital collaborates with external partners such as community organizations and public health and social service agencies to address issues beyond the reach of the health system such as housing and food insecurity, income support, and transportation needs. |
| Care continuity: Plan care and care transitions to prepare for patients’ changing clinical and social needs. | The hospital recognizes discharge not as a singular event but as a transitional period that the patient’s hospital care team must actively manage. Specific strategies to manage a patient’s discharge into the community may include ensuring that discharge summaries reach the outpatient clinicians, follow-up appointments are set prior to discharge, patients receive the self-management support to improve chronic disease management, and palliative care options are explored when appropriate. |
| Engaging patients in their care: Design individualized care to promote the health of individuals in the community setting. | Hospitals identify formal and informal caregivers and financial and non-financial resources available to patients living in the community that can support patients’ self-management and help reduce their risk of readmission. The patient’s care team carefully reviews the patient’s functioning in daily life (e.g., giving attention to memory loss, help with activities of daily living, or limited English language proficiency). |

care described in this chapter show promise to improve care and achieve high-performing care for socially at-risk populations. Although the evidence on the effects of these practices to improve care is limited, these systems practices and the overall systems approach the committee proposes can be used to generate testable hypotheses. In other words, these practices and the systems approach can also be seen of as aspirational and innovative service delivery models that can be rigorously evaluated with respect to their potential to improve or achieve high-performing care for socially at-risk populations and to reduce health inequities, as well as the resource requirements to do so. Additionally, although these practices primarily pertain to care delivery, they are best supported when financial incentives are aligned, and thus may further warrant testing in the context of VBP methods that support the sustainability of these interventions. Organizations that apply these systems practices going forward offer an opportunity...
Improving Diabetes Care

The Medicare ACO or health plan develops a diabetes registry to monitor diabetes quality indicators and provide real-time feedback and reminders to patients and their primary care teams. The ACO or health plan partners with local pharmacies to enhance medication teaching and monitoring of glucose and blood pressure to supplement primary care clinic visits. The ACO or health plan employs community health workers linked to the primary care team to provide home-based health coaching related to nutrition and exercise. The ACO or health plan also partners with public health and social service agencies or community organizations to improve access to healthy foods and safe areas to exercise, as well as to identify and address competing priorities such as instability in housing or home utility services.

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Patients receive self-management support and peer coaching to improve chronic disease management of their diabetes. Enhanced use of mobile applications and sensors enable patients to record and communicate their home glucose and blood pressure readings to their primary care teams and receive real-time guidance on medication changes and lifestyle modifications to improve their diabetes control.

to test the effect of these systems practices on both health equity goals and goals to improve value.

PUTTING THIS REPORT IN CONTEXT

The committee’s task in this report centered on identifying what high-quality health systems serving socially at-risk populations do to achieve good health outcomes for their patients. As the committee described, it is possible to deliver high-quality care to these populations and the committee outlined certain systems practices that could be instrumental in achieving that goal. In the next and third report, the committee returns to the question of which social risk factors could be accounted for in Medicare value-based purchasing programs and how. Nothing in this second report should be interpreted as foreshadowing what the committee will conclude in the
third report. However, this report does show that socially at-risk populations do not need to experience low-quality care and bad health care outcomes. Providers can feasibly respond to incentives to deliver high-quality and good value care to socially at-risk populations.

REFERENCES


APPENDIX B


Example Implementation Strategies and Case Studies

As described in Appendixes B1 and B2, the committee reviewed both the peer-reviewed and grey literature in order to identify strategies providers disproportionately serving socially at-risk populations have implemented to improve care and outcomes for their patients. As part of this effort, the committee reached out to organizations known to conduct research or represent providers disproportionately serving socially at-risk populations (Alliance of Community Health Plans, America’s Essential Hospitals, America’s Health Insurance Plans, and The Commonwealth Fund) who submitted 60 case studies. The committee also searched the published literature to identify additional examples. Based on a review of the case studies submitted, informed also by the literature and, in some cases, committee members’ empirical research or professional experience delivering care to socially at-risk populations, the committee identified commonalities from which it concluded that six community-informed and patient-centered systems practices show promise for improving care for socially at-risk populations.

This appendix includes a series of tables that provide a selection of implementation strategies and case studies in which these strategies were identified for each of the six systems practices. Table BA-1 includes examples regarding a commitment to health equity, Table BA-2 includes examples of data and measurement strategies, Table BA-3 has examples of components of comprehensive needs assessments, Table BA-4 provides examples of collaborative partnerships, Table BA-5 offers strategies for providing care continuity, and Table BA-6 lists examples of engaging patients in their care. These tables aim to illustrate the range and types of activities
### TABLE BA-1 Commitment to Health Equity: Example Implementation Strategies and Case Studies

<table>
<thead>
<tr>
<th>Example Implementation Strategy</th>
<th>Example Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior management and clinician leadership commitment to equity</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente(^b)</td>
</tr>
<tr>
<td>Integration of health equity into and communication of equity as part of common organization vision, mission, and goals</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente(^b)</td>
</tr>
<tr>
<td>Internal leaders designated responsibility for developing and overseeing a strategic plan to monitor and reduce health inequities</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td>Diverse workforce to provide culturally concordant and culturally competent care</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td></td>
<td>Hennepin Health(^c)</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente(^b)</td>
</tr>
<tr>
<td></td>
<td>Tucson and Southern Arizona(^d)</td>
</tr>
<tr>
<td>Workforce trainings and education to improve communication with patients, including cultural competence training and hiring language interpreters</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td>Interventions to reduce inequities</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente(^b)</td>
</tr>
<tr>
<td>Identification and acknowledgment of health inequities and setting measurable goals to reduce them</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td>Expectations set and feedback provided regarding activities and practices to achieve equity</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td>Incorporation of health equity into compensation or incentives</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td>Financial and non-financial resources aligned and allocated to promote health equity</td>
<td>HealthPartners Minnesota(^a)</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente(^b)</td>
</tr>
</tbody>
</table>

**SOURCES:**

\(^a\) Personal communication, Susan Knudson (HealthPartners) to Charles Baumgart (committee member), December 14, 2015.

\(^b\) Meyers, 2008.

\(^c\) Sandberg et al., 2014.

\(^d\) Klein et al., 2014b.
### TABLE BA-2 Data and Measurement: Example Implementation Strategies and Case Studies

<table>
<thead>
<tr>
<th>Example Implementation Strategy</th>
<th>Example Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular, standardized collection of social risk factor data</td>
<td>Denver Health(^a)</td>
</tr>
<tr>
<td>Analysis and monitoring of performance data disaggregated by indicators of social risk to identify existing health disparities within organizations</td>
<td>HealthPartners Minnesota(^b)</td>
</tr>
<tr>
<td>Enhanced risk prediction models</td>
<td>Denver Health(^a)</td>
</tr>
<tr>
<td></td>
<td>Montefiore Medical Center(^c)</td>
</tr>
</tbody>
</table>

**SOURCES:**
\(^a\) Hostetter and Klein, 2015.
\(^b\) Personal communication, Susan Knudson (HealthPartners) to Charles Baumgart (committee member), December 14, 2015.
\(^c\) McCarthy and Chase, 2010.

### TABLE BA-3 Comprehensive Needs Assessment: Example Implementation Strategies and Case Studies

<table>
<thead>
<tr>
<th>Example Implementation Strategy</th>
<th>Example Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proactive health assessment tool completed by patients</td>
<td>Kaiser Permanente Colorado PATHWAAY(^a)</td>
</tr>
<tr>
<td></td>
<td>Community Care of North Carolina(^b)</td>
</tr>
<tr>
<td>Analysis of data from a variety of sources (including performance data, utilization data, clinical notes, patient observations, and patient-generated data)</td>
<td>Denver Health(^c)</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente Colorado PATHWAAY(^a)</td>
</tr>
<tr>
<td>Information-exchange portal for clinical providers, social service agencies, public health agencies, and community organizations to share information (with patient permission) about social needs</td>
<td>Colorado Coalition for the Homeless(^d)</td>
</tr>
<tr>
<td></td>
<td>Parkland Hospital(^c)</td>
</tr>
</tbody>
</table>

**NOTE:** PATHWAAY = Proactive Assessment of Total Health and Wellness to Add Active Years.

**SOURCES:**
\(^a\) ACHP, n.d.-c.
\(^b\) Klein and McCarthy, 2009.
\(^c\) Hostetter and Klein, 2015.
\(^d\) Klein, 2014.
\(^e\) Personal communication, Doug McCarthy (The Commonwealth Fund) to staff, January 12, 2016.
<table>
<thead>
<tr>
<th>Example Implementation Strategy</th>
<th>Example Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical neighborhoods/accountable health communities</td>
<td>Colorado Regional Care Collaborative Organizations&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Hennepin Health&lt;sup&gt;b&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Minnesota Accountable Communities for Health&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Oregon Coordinated Care Organizations&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Care teams including non-medical professionals</td>
<td>Citywide Colon Cancer Control Coalition&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Hennepin Health&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Truman Medical Center&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>Open-access/same-day appointments for ambulatory care</td>
<td>The New York City Health and Hospitals Corporation&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Alaska Native Medical Center&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Denver Health&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>New technologies (e.g., teleconference, videoconference, and mobile screening units) that</td>
<td>Montefiore Medical Center&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>bring clinical care to patients</td>
<td>West County Health Centers&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Community Health Centers, Inc.&lt;sup&gt;j&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Project ECHO&lt;sup&gt;j&lt;/sup&gt;</td>
</tr>
<tr>
<td>Regional collaborations with other health care providers</td>
<td>Western New York, West Central Michigan,</td>
</tr>
<tr>
<td></td>
<td>Southern Arizona&lt;sup&gt;k&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Health Share of Oregon&lt;sup&gt;l&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Hennepin Health&lt;sup&gt;m&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>MetroHealth Care Plus&lt;sup&gt;n&lt;/sup&gt;</td>
</tr>
<tr>
<td>Involvement and collaboration with social service and public health agencies and</td>
<td>Colorado Coalition for the Homeless&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td>community organizations</td>
<td>Hennepin Health&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Montefiore Medical Center&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Neighborhood Health Plan&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>UPMC for You Cultivating Health for Success&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Denver Health&lt;sup&gt;e&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

SOURCES:
<sup>a</sup> Corrigan and Fisher, 2014.
<sup>b</sup> Sandberg et al., 2014.
<sup>c</sup> Itzkowitz et al., 2016.
<sup>d</sup> America’s Essential Hospitals, 2015.
<sup>e</sup> McCarthy and Mueller, 2008.
<sup>f</sup> Murray et al., 2003.
<sup>g</sup> McCarthy et al., 2007.
<sup>h</sup> McCarthy and Chase, 2010.
<sup>i</sup> Hostetter and Klein, 2014.
<sup>j</sup> Felland et al., 2013.
<sup>k</sup> McCarthy et al., 2014.
<sup>l</sup> Klein et al., 2014a.
<sup>m</sup> Hostetter and Klein, 2015.
<sup>n</sup> Cebul et al, 2015.
<sup>o</sup> Silow-Carroll and Rodin, 2013.
<sup>p</sup> Lovelace, 2016.
TABLE BA-5  Care Continuity: Example Implementation Strategies and Case Studies

<table>
<thead>
<tr>
<th>Example Implementation Strategy</th>
<th>Example Case Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinated care teams</td>
<td>Priority Health Tandem 365&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Kaiser Permanente Colorado PATHWAAY&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Fallon Health NaviCare and Summit ElderCare Programs&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Hennepin Health&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Denver Health&lt;sup&gt;e&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Truman Medical Center&lt;sup&gt;f&lt;/sup&gt;</td>
</tr>
<tr>
<td>Case management by trained clinical or lay person care</td>
<td>Geisinger Health Plan Medically Complex Medical Home&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
<tr>
<td>coordinators/patient navigators</td>
<td>The New York City Health and Hospitals Corporation&lt;sup&gt;h&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Health Care Homes in Minnesota&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td>New technologies (teleconference, videoconference, shared</td>
<td>West County Health Centers&lt;sup&gt;j&lt;/sup&gt;</td>
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<tr>
<td>data) to coordinate care between clinical and social</td>
<td></td>
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<tr>
<td>service providers</td>
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<tr>
<td>Collocating clinical, behavioral health, and social</td>
<td>Priority Health Tandem 365&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>services</td>
<td>Colorado Coalition for the Homeless&lt;sup&gt;k&lt;/sup&gt;</td>
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<td></td>
<td>Hennepin Health&lt;sup&gt;d&lt;/sup&gt;</td>
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<tr>
<td></td>
<td>Cherokee Health Systems&lt;sup&gt;i&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Truman Medical Center&lt;sup&gt;f&lt;/sup&gt;</td>
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<td></td>
<td>Eskenazi Hospital&lt;sup&gt;m&lt;/sup&gt;</td>
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<tr>
<td>Patient education about care transitions</td>
<td>Geisinger Health Plan Medically Complex Medical Home&lt;sup&gt;g&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

NOTE: PATHWAAY = Proactive Assessment of Total Health and Wellness to Add Active Years.

SOURCES:
<sup>a</sup> ACHP, n.d.-d.
<sup>b</sup> ACHP, n.d.-c.
<sup>c</sup> ACHP, n.d.-a.
<sup>d</sup> Sandberg et al., 2014.
<sup>e</sup> McCarthy et al., 2007.
<sup>f</sup> America's Essential Hospitals, 2015.
<sup>g</sup> ACHP, n.d.-b.
<sup>h</sup> McCarthy and Mueller, 2008.
<sup>i</sup> Felland et al., 2013.
<sup>j</sup> Hostetter and Klein, 2014.
<sup>k</sup> Klein, 2014.
<sup>l</sup> Personal communication, Doug McCarthy (The Commonwealth Fund) to staff, January 12, 2016.
<sup>m</sup> America’s Essential Hospitals, 2014.
### Table BA-6: Engaging Patients in Their Care: Example Implementation Strategies and Case Studies

<table>
<thead>
<tr>
<th>Example Implementation Strategy</th>
<th>Example Case Studies</th>
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| Patient education about self-management, healthy behaviors, and care coordination | Genesys HealthWorks<sup>a</sup>  
Cook County Health & Hospitals System<sup>b</sup> |
| Culturally sensitive, targeted, and tailored patient education | New York City Citywide Colon Cancer Control Coalition<sup>c</sup>  
UCare (UCare Response to CMS)<sup>d</sup>  
Denver Health<sup>e</sup> |
| Tailored care plans easily understood by patients | Geisinger Health Plan Medically Complex Medical Home<sup>f</sup>  
Kaiser Permanente Colorado PATHWAAY<sup>g</sup> |
| Clinician and non-clinician patient/health navigation | Best Babies Zone<sup>h</sup>  
Genesys HealthWorks<sup>a</sup>  
New York City Citywide Colon Cancer Control Coalition<sup>c</sup> |
| New technologies (telephone consultation, videoconference, mobile screenings, smartphone apps, etc.) to promote healthy behaviors and reduce health risks | Columbus Regional<sup>i</sup>  
Genesys HealthWorks<sup>a</sup>  
West County Health Centers<sup>i</sup> |
| Reach patients through community centers, homeless shelters, religious organizations, schools | Best Babies Zone<sup>b</sup>  
Health Plan of San Mateo<sup>j</sup>  
Hennepin Health<sup>i</sup>  
Denver Health<sup>e</sup> |

NOTE: CMS = Centers for Medicare & Medicaid Services; PATHWAAY = Proactive Assessment of Total Health and Wellness to Add Active Years.

**SOURCES:**

<sup>a</sup> Klein and McCarthy, 2010.
<sup>b</sup> America’s Essential Hospitals, 2014.
<sup>c</sup> Itzkowitz et al., 2016.
<sup>d</sup> Personal communication, Mark Hamelburg (America’s Health Insurance Plans) to Charles Baumgart (committee member), December 18, 2015.
<sup>e</sup> McCarthy et al., 2007.
<sup>f</sup> ACHP, n.d.-b.
<sup>g</sup> ACHP, n.d.-c.
<sup>h</sup> Foubister, 2013.
<sup>i</sup> Hostetter and Klein, 2015.
<sup>j</sup> Personal communication, Doug McCarthy (The Commonwealth Fund) to staff, January 12, 2016.
that individual health care providers have implemented to apply each of the six systems practices. This appendix should therefore be considered a series of illustrative examples rather than a comprehensive and exhaustive list of organizations and practical strategies identified in the published and grey literature.

REFERENCES


Appendix C reproduces in its entirety the third report from the Committee on Accounting for Socioeconomic Status in Medicare Payment Programs. The committee made no substantive content changes. This report was originally released on July 13, 2016, as:

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The Centers for Medicare & Medicaid Services (CMS) are steadily moving from paying for volume (fee-for-service payments) to paying for quality, outcomes, and costs (value-based payment [VBP]) in the traditional Medicare program. Since Congress enacted the Patient Protection and Affordable Care Act of 2010, CMS has implemented a variety of VBP models, including quality incentives and risk-based, alternative payment models (APMs) (Burwell, 2015). In this report both types of strategies are referred to broadly as VBP. Financial incentives such as pay-for-performance programs link financial bonuses and/or penalties to quality or value (NASEM, 2016a). APMs include episode-based payments and population-based (global) payments, shifting greater financial risk to providers to hold them accountable for the quality and efficiency of care they provide, as well as health outcomes achieved (NASEM, 2016a). Although not considered entirely VBP models, Medicare Part C (i.e., Medicare Advantage) and Part D also have design features that tie quality and cost performance to payment (e.g., risk sharing and bonus payments).

Stakeholders have raised concerns that current Medicare quality measurement and payment programs, and VBP programs in particular, that do not account for social risk factors may underestimate the quality of care provided by providers disproportionately serving socially at-risk populations.\(^1\) Patients with social risk factors may require more resources and more intensive care to achieve certain health outcomes compared to the

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\(^1\)Note, the term *provider* in this report refers to the reporting unit (or, provider setting) being evaluated—e.g., hospitals, health plans, provider groups, etc.
resources and care needed to achieve those same outcomes in more advantaged patients (NASEM, 2016b). At the same time, because these providers are also more likely to care for patients who are uninsured or covered by Medicaid, they have historically been less well funded than providers caring for larger proportions of patients with commercial insurance that pay more generously for care. If providers disproportionately serving vulnerable populations are likely to have fewer resources to begin with and care for patients who require more resources to achieve the same health care outcomes, these providers may be more likely to fare poorly on quality rankings (Chien et al., 2007; Joynt and Rosenthal, 2012; Ryan, 2013). The poorer average performance among providers disproportionately serving socially at-risk populations combined with the fact that they have fewer resources has raised concerns that Medicare’s VBP programs may potentially increase disparities. Similar concerns apply to capitated payments made to Medicare Part C health plans.

STATEMENT OF TASK

In response to concerns about health equity and accuracy in reporting and to the Improving Medicare Post-Acute Care Transformation (IMPACT) Act approved by Congress in 2014, the Department of Health and Human Services (HHS) acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to identify criteria for selecting social risk factors, specific social risk factors Medicare could use, and methods of accounting for those factors in Medicare quality measurement and payment applications. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare programs (see Appendix B for biographical sketches).

This report is the third in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the IMPACT Act. In the first report, the committee presented a conceptual framework and described the results of a literature search linking five social risk factors and health literacy to health-related measures of importance to Medicare quality measurement and payment programs—referred to in this report as performance indicators used in VBP. In the second report, the committee reviewed the performance of providers disproportionately serving socially at-risk populations, discussed drivers of variations in performance, and identified six community-informed and patient-centered systems practices that show promise to improve care for socially at-risk populations. Details of the statement of task and the sequence of reports can be found in Box C1-1. The committee will release reports every
3 months, addressing each item in the statement of task in turn. The statement of task requests committee recommendations only in the fourth report.

This report builds on the conceptual relationships and empirical associations between social risk factors and performance indicators identified in the first report to provide guidance on which factors could be considered for Medicare accounting purposes, criteria to identify these factors, and methods to do so in ways that can improve care and promote greater health equity for socially at-risk patients. To that end, the committee also aims to address issues that must be carefully considered to maintain or enhance provider incentives to improve care for socially at-risk patients throughout the report while also promoting accuracy in reporting and compensating providers fairly. The committee’s goals in accounting for social risk factors in Medicare payment programs are

1. Reducing disparities in access, quality, and outcomes;
2. Quality improvement and efficient care delivery for all patients;
3. Fair and accurate public reporting; and
4. Compensating providers fairly.

To achieve these goals, accounting for social risk factors should neither mask low-quality care or health disparities nor reward poor performance. Additionally, inclusion of social risk factors in quality measurement and payment should not disincentivize providers from finding strategies to overcome the influence of social risk factors on health care outcomes.

**CRITERIA FOR SELECTING SOCIAL RISK FACTORS**

The primary goal of the criteria is to guide selection of social risk factors that could be accounted for in VBP so that providers or health plans are rewarded for delivering quality and value independent of whether they serve patients with relatively low or high levels of social risk factors. Under VBP, providers who care for patients who would score lower on the measures of performance as a result of factors outside of the providers’ control (such as certain social risk factors), rather than as a result of the quality of care delivered, should not be penalized because of the influence of these non-modifiable factors. The effect of these other factors should be minimized. In sum, the criteria should guide identification of social risk factors that could be accounted for in performance indicators used in VBP to promote accuracy in reporting.

The criteria put forth by this committee adhere closely to the guidelines for selecting risk factors developed by the National Quality Forum (NQF) in their 2014 report *Risk Adjustment for Socioeconomic Status or Other Sociodemographic Factors*. Like NQF, the committee’s criteria explicitly
focuses on selecting risk factors that will be applied to adjustment of performance indicators used for VBP. However, the committee’s criteria reflect the need to apply to a broader range of methods to account for social risk factors. Criteria developed to select risk factors for prior risk adjustment models that the committee reviewed and drew upon in developing their criteria are listed in Appendix CA.

**Conclusion 1:** Three overarching considerations encompassing five criteria could be used to determine whether a social risk factor should be accounted for in performance indicators used in Medicare value-based payment programs. They are as follows:

A. **The social risk factor is related to the outcome.**
   1. The social risk factor has a conceptual relationship with the outcome of interest.
   2. The social risk factor has an empirical association with the outcome of interest.

B. **The social risk factor precedes care delivery and is not a consequence of the quality of care.**
   3. The social risk factor is present at the start of care.
   4. The social risk factor is not modifiable through provider actions.

C. **The social risk factor is not something the provider can manipulate.**
   5. The social risk factor is resistant to manipulation or gaming.

These criteria are described and summarized in Table CS-1, along with the rationale and limitations of each criterion, as well as practical considerations.

**APPLYING CRITERIA TO SOCIAL RISK FACTORS AND HEALTH LITERACY**

The conceptual framework presented in the committee’s first report (see Appendix A) illustrates the primary hypothesized conceptual pathways by which five social risk factors (socioeconomic position [SEP]; race, ethnicity, and cultural context; gender; social relationships; and residential and community context) as well as health literacy may directly or indirectly affect performance indicators used in Medicare VBP programs (NASEM, 2016a). As described in the committee’s first report, the conceptual framework applies to all Medicare beneficiaries, including beneficiaries with disabilities and those with end-stage renal disease. The committee also identified specific indicators that correspond to the social risk factors. These indicators represent ways to measure the latent constructs of the social risk factors and are distinct from specific measures.
Figure CS-1 illustrates the primary hypothesized relationships between social risk factors and health literacy and performance indicators used in VBP. The committee applied the selection criteria they developed to the five social risk factors (and their respective indicators) and health literacy, and also describes the rationale and limitations of each factor and indicator relative to those criteria.

**Socioeconomic Position**

SEP is commonly measured using indicators including income and wealth, education, and occupation and employment. In the medical field, insurance status is also used as a proxy for SEP. Income and education are promising indicators of SEP, because they are related to health care outcomes of interest, precede care delivery and are not a consequence of the quality of care, and meet practical considerations; measures are likely to be resistant to gaming and manipulation. Wealth is likely to be strongly associated with health and health care outcomes, but accurate data is difficult to collect. Dual eligibility as a proxy for SEP is also an available measure that meets practical criteria. Because dual eligibility captures elements of income, wealth, and health status, dual eligibility can be considered a broader measure of health-related resource availability that captures medical need. Occupation is likely to be strongly associated with performance indicators used in VBP, but practical considerations limit its potential use.

**Race, Ethnicity, and Cultural Context**

Indicators in this category include race, ethnicity, language, nativity, immigration history, and acculturation. Race, ethnicity, language (especially limited English proficiency), and nativity (i.e., foreign-born versus U.S. born; country of origin) are promising indicators, particularly in combination. Literature supports a conceptual relationship between acculturation and health care outcomes of interest, but existing measures have limitations, and empirical evidence is lacking. Documentation status as a measure of immigration history is likely to be sensitive to collect.

**Gender**

Normative gender categories (men and women) are strong candidates for inclusion in accounting methods, despite the fact that effects of gender are difficult to separate from biological effects of sex empirically. However, the committee notes that gender is already included in clinical risk adjustment. The relationship between gender identity (describing individuals who identify as transgender, intersex, or otherwise nonconforming gender)
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rationale</th>
<th>Challenges/Limitations</th>
<th>Practical Considerations</th>
</tr>
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<tbody>
<tr>
<td>A. The social risk factor is related to the outcome. &lt;br&gt;&lt;em&gt;This category is the most basic pair of criteria for a social risk factor—that there be both a plausible and valid reason why the risk factor would be associated with the outcome and empirical evidence that such a relationship holds in practice. Together these criteria lay the foundation for the validity and practical importance of the risk factor.&lt;/em&gt;</td>
<td></td>
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<tr>
<td>1. Conceptual relationship with the outcome of interest</td>
<td>A conceptual relationship informed by research and experience ensures that there is a reasonable conceptual basis for expecting a systematic relationship.</td>
<td>A conceptual relationship may not be consistent over time or across settings. It is not always possible to distinguish unique causal roles of factors so usefulness in an adjustment model does not necessarily imply that outcomes would improve through interventions on risk factor.</td>
<td>Acceptability and face validity: Some factors may be indicated empirically, but would need to be excluded because it has poor face validity or because data would be unacceptable to collect and include.</td>
</tr>
<tr>
<td>2. Empirical association with the outcome of interest</td>
<td>An empirical association confirms the conceptual relationship. Without this criterion, an adjustor (social risk factor) may have no effect.</td>
<td>Empirical evidence may not be generalizable to the particular setting. Relationship may not hold in multivariate model.</td>
<td>Data limitations often represent a practical constraint to what factors are included in risk models. The aim is to reliably and feasibly capture accurate data. The challenge is to push for greater reliability and feasibility of factors that may be important to include, even if factors are excluded today, because it is currently infeasible. Privacy laws and concerns about patient confidentiality may also be an issue.</td>
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<td></td>
<td>Contribution of unique variation in the outcome (i.e., not redundant or highly correlated with another risk factor): Prevent overfitting and unstable estimates, or coefficients that appear to be in the wrong direction; reduce data collection burden.</td>
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</table>
B. Social risk factor precedes care delivery and is not a consequence of the quality of care.
Factors that reflect a model of care delivery, a treatment decision, or the direct consequences of care or treatment decision are not appropriate adjustors, as they reflect true differences in quality of care or other outcomes.

3. The risk factor is present at the start of care.
   If a risk factor is present at start of care, then it is less likely that it would be the result of care provided. Does not eliminate a risk factor being a consequence of care delivery in dynamic settings or under population health settings. Prioritize slowly changing factors over rapidly changing variables: Measurement would have to be more frequent, but rapidly changing variables would not fully disqualify a measure.

4. The risk factor is not modifiable through the provider actions.
   The goal is to adjust for factors independent of the care provided. Adjusting for the care provided contravenes this goal. It may be difficult to identify in practice the extent to which care provision might affect a particular social risk factor.

C. The social risk factor is not something that the provider can manipulate.

5. The risk factor is resistant to manipulation or gaming.
   This criterion ensures validity of performance score as representing quality of care (versus, for example, upcoding). It is often difficult to anticipate how a measure might be manipulated. Prioritize specific coding over vague coding: vague codes are more vulnerable to manipulation; however, there are vaguely coded variables that may be important nevertheless, so this would not fully disqualify an indicator.

Prioritize continuous over dichotomous measures of the same constrict where applicable to reduce “edge” gaming.

Carefully monitor high-leverage factors (i.e., risk factors that are not prevalent but highly predictive of outcomes), as they may be important but especially attractive for gaming.
FIGURE CS-1 Conceptual framework of social risk factors and performance indicators for value-based payment (VBP).

NOTES: This conceptual framework illustrates primary hypothesized conceptual relationships. For the indicators listed in bullets under each social risk factor, bold lettering denotes measurable indicators that could be accounted for in Medicare VBP programs in the short-term, italicized lettering denotes measurable indicators that capture the basic underlying constructs and currently present practical challenges, but are worth attention for potential inclusion in accounting methods in Medicare VBP programs in the longer term; and plain lettering denotes indicators that have considerable limitations.

* As described in the conceptual framework outlining primary hypothesized conceptual relationships between social risk factors and outcomes used in VBP presented in the committee’s first report (NASEM, 2016a), health care use captures measures of utilization and clinical processes of care; health care outcomes capture measures of patient safety, patient experience, and health outcomes; and resource use captures cost measures.
and sexual orientation (describing individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming) and health care outcomes is not well established. HHS is currently testing and collecting data on promising measures of gender identity and sexual orientation that could be revisited for potential inclusion when there is more evidence of an effect. In the short term, there is likely to be very low prevalence of individuals who have nonnormative gender identities. Thus, accounting for variations in gender identity is unlikely to have a significant effect in accounting methods.

**Social Relationships**

Social relationships are typically assessed using three indicators in health research: marital/partnership status, living alone, and emotional and instrumental social support. Marital/partnership status and living alone are likely to influence health and health care outcomes, are easy to measure, and may at least partly capture elements of emotional and instrumental social support. Some evidence suggests that the relationship between marital/partnership status and health is changing along with demographic shifts, which point to a need to reassess the empirical associations and revisit assumptions about the conceptual relationship over time. Emotional social support and instrumental social support are likely to influence health care outcomes. However, because social support is multidimensional, identifying the measure that represents the most relevant dimension for a given health care outcome may pose both conceptual and practical challenges for data collection and measurement.

**Residential and Community Context**

Residential and community context includes compositional characteristics that represent aggregate characteristics of neighborhood residents and characteristics of physical and social environments (i.e., environmental measures) (NASEM, 2016a). Compositional characteristics and environmental measures of residential and community context are related to health care outcomes, precede care delivery and are not a consequence of the quality of care, are not modifiable through provider action, and generally meet practical considerations, with some limitations. A measure of census tract-level neighborhood deprivation (i.e., a composite measure of neighborhood compositional characteristics) is likely a good proxy for a range of individual and true area-level constructs (compositional and environmental) relevant to performance indicators used in VBP. Measures of urbanicity and housing are also available. These measures are also feasible to obtain. Environmental measures are an emerging area of research and other mea-
sures could be revisited for potential inclusion when there is more empirical evidence and better measures.\(^2\)

**Health Literacy**

The committee does not conceive of health literacy as a social risk factor, but rather as the product of an individual’s skills and abilities (e.g., reading and other critical skills), social and cultural factors, education, health system demands, and the health care context. However, the committee included health literacy in its conceptual framework and retained it for consideration in this report because health literacy is included in the committee’s charge and because it is specifically mentioned in the IMPACT Act and therefore of interest to Congress. Additionally, social risk factors like education and language influence health literacy. Health literacy (capturing the related construct of numeracy) is related to health care outcomes of interest and generally meets practical considerations. However, provider actions can potentially mitigate the effects of low health literacy. Thus, to preserve incentives to provide effective care to patients with low health literacy, it may be not be desirable to adjust performance measures to account for differences in health literacy. Nevertheless, it may be desirable to otherwise compensate providers for the greater effort or costs required to provide health literate care and thereby produce good health care outcomes.

After applying the selection criteria to indicators of the five social risk factors and health literacy, the committee made the following conclusions:

\(^2\) The committee sees no conflict between this report and the 2013 IOM report *Variation in Health Care Spending: Target Decision Making, Not Geography*, which recommended against using area-level payment adjustments to account for regional practice patterns. That committee’s charge was to evaluate whether area-level differences in per-beneficiary spending were real and if so, to develop explanations for the variation. That report examined whether health care markets (characterized using relatively large geographies such as hospital service areas, hospital referral regions, or metropolitan statistical areas) were characterized by persistent patterns of spending driven by commonalities in medical decision making or other provider behavior and concluded that area spending variability was mainly due to price markups in the commercial insurance market and variation in the use of post-acute care in Medicare. In contrast, this report focuses on differences in performance indicators used in VBP (including variations in health care utilization and resource use, but also quality) driven by differences in social characteristics of a provider or other risk-bearing entity’s patient population. The use of area-level measures is therefore at much smaller geographic units (e.g., census tracts of patient place of residence) and serves to more accurately characterize providers’ patient populations in Medicare quality measurement and payment programs.
Conclusion 2: There are measurable social risk factors that could be accounted for in Medicare value-based payment programs in the short term. Indicators include

- Income, education, and dual eligibility;
- Race, ethnicity, language, and nativity;
- Marital/partnership status and living alone; and
- Neighborhood deprivation, urbanicity, and housing.

Conclusion 3: There are some indicators of social risk factors that capture the basic underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in accounting methods in Medicare value-based payment programs in the longer term. These include

- Wealth,
- Acculturation,
- Gender identity and sexual orientation,
- Emotional and instrumental social support, and
- Environmental measures of residential and community context.

METHODS TO ACCOUNT FOR SOCIAL RISK FACTORS IN VALUE-BASED PAYMENT PROGRAMS

When developing and selecting methods to account for social risk factors in VBP programs, understanding the type of incentive design is important for evaluating the potential benefits and challenges of various accounting methods. The incentive design will interact with the method used to account for social risk factor(s) and produce certain potential benefits and risks. Selecting the appropriate method (or, methods) to account for social risk factors will depend on the balance of these potential positive and negative consequences.

CMS payment models cover a spectrum of approaches from traditional fee-for-service to population-based payment models. Current Medicare financial incentive programs include

- Hospital-Acquired Condition Payment Reduction,
- Hospital Readmissions Reduction Program,
- Hospital Value-Based Purchasing, and
- Physician Value-Based Modifier.

Current Medicare APMs include

- End-Stage Renal Disease Quality Incentive Program, and
- Medicare Shared Savings Program.
Other VBP mechanisms in Medicare payment programs include

- Medicare Advantage/Part C Star Ratings Bonus Payment and risk-adjusted capitation and
- Medicare Part D risk-adjusted capitation, individual reinsurance, and risk corridor adjustments.

VBP programs in development include

- Home Health Value-Based Purchasing,
- Skilled Nurse Facility Value-Based Purchasing, and

The Center for Medicare & Medicaid Innovation also tests innovative payment models. In early 2016, CMS identified 10 APMs, including several innovative models for inclusion under MACRA (CMS, 2016), such as (among others)

- Bundled Payment Care Improvement initiative,
- Next Generation Accountable Care Organizations, and
- Comprehensive Primary Care Plus.

Given that the Medicare VBP landscape is evolving and CMS is moving toward more comprehensive population-based APMs, the committee identified methods that could apply to any VBP program, not just the existing ones.

**Potential Harms of the Status Quo Compared to Accounting for Social Risk Factors**

Although adjustment for social risk factors could have important benefits, any proposal to account for social risk factors in Medicare payment programs will entail its own advantages and disadvantages that need to be carefully considered. The status quo (which does not account for social risk factors) has disadvantages that include incentives for providers and insurers to avoid serving patients with social risk factors, underpayment to providers who disproportionately serve socially at-risk populations, and underinvestment in quality of care. While proposals that do account for social risk factors would likely diminish these harms, there are also some potential ways in which accounting for social risk factors could incrementally introduce new harms. These include reducing incentives to improve care for patients with social risk factors and limiting the ability of socially at-risk patients to identify providers who will deliver the best care for
them. Neither an unadjusted or adjusted summary score provides information about which provider is better for a patient based on his or her level of social risk factors unless all providers are equally good or bad with all patients. Only stratification by social risk factors will reveal such insights. Additionally, any method that obscures differences due to poor quality could be unfair in terms of compensating providers who provide high-quality care. Finally, any method for accounting for social risk factors that holds providers to different standards for socially at-risk populations may create the perception that patients with social risk factors are entitled to a lower quality of care. Even if these concerns are unfounded, perceptions of inequitable treatment can further erode trust in the health care system among patients with social risk factors.

**Conclusion 4:** It is possible to improve on the status quo with regard to the effect of value-based payment on patients with social risk factors. However, it is also important to minimize potential harms to these patients and to monitor the effect of any specific approach to accounting for social risk factors to ensure the absence of any unanticipated adverse effects on health disparities.

**Methods to Account for Social Risk Factors**

The committee’s review of methods to account for social risk factors in Medicare VBP programs takes as the point of departure that the goals of Medicare payment and reporting systems are reducing disparities in health care access, affordability, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly for the services they provide. Differences in quality by populations with social risk factors may reflect a combination of drivers, including mechanisms that occur during the patient–provider encounter (e.g., discrimination, bias), provider characteristics (e.g., fewer financial resources, fewer and lower-quality clinical/health care resources), and barriers to access and financial constraints for socially at-risk persons (NASEM, 2016b). In practice these mechanisms may occur simultaneously and also interact; it is difficult if not impossible to decompose observed differences into these components quantitatively. The committee therefore proposes approaches that do not require disentangling the mechanisms of these multiple pathways for social risk factors. The fact that some providers do well with socially at-risk populations does not imply that it is equally easy to do so on average, and such population differences may also affect the relationship between provider quality and observed provider scores. The standard for taking such factors into account should not be that it is impossible to provide optimal care, but that it is more difficult on average.
Taking such factors into account need not “adjust away” disparities. Lower levels of performance for any group should not be reported as sufficient or receive maximum rewards. However, a provider that does not achieve performance on par with top performers (i.e., optimal care) could still be eligible for some reward because, for example, it improved substantially relative to its own benchmark.

Conclusion 5: Characteristics of a public reporting and payment system that could accomplish the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly include

1. Transparency and accountability for overall performance and performance with respect to socially at-risk members of the population;
2. Accurate performance measurement—with high reliability and without bias (systematic error) related to differences in populations served;
3. Incentives for improvement overall and for socially at-risk groups, both within reporting units (i.e., the provider setting that is being evaluated—hospitals, health plans, etc.) and between reporting units.

The committee reviewed literature on a range of methods to account for risk factors in public reporting and payment systems for which inclusion of social risk factors may be appropriate, with the aim to be inclusive.

- Finding: The committee identified four categories—(A) public reporting; (B) adjustment of performance measure scores; (C) direct adjustment of payments; and (D) restructuring payment incentive design—encompassing 10 methods to account for social risk factors that could be used to address policy goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly.

Public reporting seeks to make overall quality visible—to consumers, providers, payers, and regulators (IOM, 2006). It may lead to quality improvement via reputation incentives, and particularly when linked to behavioral nudges, by increasing market share (i.e., influencing choice of provider) for higher-quality reporting units (IOM, 2006). Public reporting methods that could account for social risk factors include (1) stratification by patient characteristics within reporting units, and (2) stratification by reporting unit characteristics (e.g., comparing safety-net hospitals to peers).
Adjusting performance measure scores seeks to “level the playing field,” to estimate true reporting unit quality—that which would occur if all units had the population average patient. Social risk factors can be considered confounders of true performance if they are beyond provider control and unevenly distributed across units and thereby distort (bias) comparisons. Adjustment is a means to account for social risk factors statistically in an effort to more accurately measure true performance. Methods to adjust performance measure scores include (1) risk adjustment for mean within-provider differences, (2) risk adjustment for within- and between-provider differences, and (3) adding quality measures for performance for at-risk groups in addition to the overall measure.

VBPs incorporate explicit or implicit (as in the case of bundled or global payment including shared savings) rewards or penalties based on performance on quality and/or cost of care. This can be achieved through three underlying conceptual approaches. First, payers could pay more to those that are doing a better job in the measurement period (i.e., pay for achievement). Second, payers could pay for the mix of patients the reporting unit treats, that is, pay more to those that treat greater numbers of socially at-risk patients under the assumption that they simply need more resources. This approach lacks incentives to improve unless some other system for accountability is superimposed. Third, payers could pay for improvement, that is, pay more to those who improve to a greater degree.

The committee also expands on how VBP could incorporate measures of social risk factors. Payments could be directly adjusted using social risk factors, or incentive design could be restructured. Direct adjustments of payment explicitly use measures of social risk factors, but by themselves do not affect performance measure scores. Methods include (1) risk adjustment in payment formula without adjusting measured performance, and (2) stratification of benchmarks used for payment. Restructuring payment incentive designs do not explicitly use measures of social risk factors, but implicitly account for social risk factors. Methods include (1) paying for improvement relative to a reporting unit’s own benchmark (to a greater extent or exclusively), including “growth models”; (2) downweighting social risk factor-sensitive measures in payment; and (3) adding a bonus for low disparities.

Applying Methods to Account for Social Risk Factors

In many cases, methods from multiple categories can be used together. In some cases, multiple methods from a single category can be used in combination. In this respect, each approach has some advantages and disadvantages and a combination of approaches may yield a better result than any one method alone. The committee underscores that the benefits
and harms of any single or composite method of accounting for social risk factors should be assessed in reference to the status quo or some other feasible alternative rather than a perfect world in which social risk factors do not confound efforts to improve the quality and efficiency of health care delivery (referred to by some as a “full information” scenario).

**Conclusion 6:** To achieve goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly, a combination of reporting and accounting in both measures and payment are needed.

Considerations around the trade-offs of various methods of accounting for social risk factors are different for cost-related performance compared to quality performance. Costs in the context of VBP can refer to the costs of improving quality or achieving good outcomes for socially at-risk patient or to the cost of care billed to a payer. As noted earlier, because achieving high performance on performance indicators used in VBP may require greater investments on the part of health care providers and health plans to overcome barriers socially at-risk populations face, costs to achieve good outcomes and improve care quality for socially at-risk populations are likely to be higher than costs to achieve the same outcomes and improve care quality for more advantaged patients. Because at least some of these costs will be outside of the services that can be billed to payers like CMS, as described in an earlier section, a potential harm of not accounting for social risk factors in a VBP environment is that this increased cost may be a disincentive to care for socially at-risk populations. On the other hand, lower resource use observed in billed costs of care may reflect unmet need or barriers to access rather than the absence of waste. Thus, lower cost is not always better; whereas, higher quality is always better.

**Conclusion 7:** Strategies to account for social risk factors for measures of cost and efficiency may differ from strategies for quality measurement, because observed lower resource use may reflect unmet need rather than the absence of waste, and thus lower cost is not always better, while higher quality is always better.

**Monitoring**

Both the status quo and any new approach to accounting for social risk factors will have uncertain tradeoffs in terms of the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and com-
Accounting for Social Risk Factors in Medicare Payment

Many unknowable factors including provider and patient beliefs and behavioral responses will affect the results that any new system yields. Monitoring data on a variety of indicators will facilitate assessment of the effects of existing and new programs on potential unintended adverse effects—such as enrollment (for health plans), patient complaints, access to and quality of care for socially at-risk populations, and the financial sustainability of providers disproportionately caring for socially at-risk populations.

**Conclusion 8:** Any specific approach to accounting for social risk factors in Medicare quality and payment programs requires continuous monitoring with respect to the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly.

Finally, because behavioral and other responses to new systems may change the balance of risks and benefits over time, to take into account these behavioral and other responses, the specific approach to accounting for social risk factors may need to be reassessed.

**CONCLUDING REMARKS**

The committee notes that it is not within its statement of task to recommend whether social risk factors should be accounted for in VPB or how; that decision sits elsewhere. The committee hopes that the conclusions in this report help CMS and the Secretary of HHS make that important decision. In the next report, the committee tackles the question of how to gather the data that could be used to account for social risk factors in Medicare VBP.

**REFERENCES**


The Centers for Medicare & Medicaid Services (CMS) are steadily moving from paying for volume (fee-for-service payments) to paying for quality, outcomes, and costs (value-based payment [VBP]) in the traditional Medicare program. Since Congress enacted the Patient Protection and Affordable Care Act of 2010, CMS has implemented a variety of VBP models including quality incentives and risk-based, alternative payment models (APMs) (Burwell, 2015). Quality incentives such as pay-for-performance schemes link financial rewards and penalties to the quality and efficiency of care provided. APMs such as episode-based (bundled) payments and accountable care organizations hold health care providers accountable for both the quality and cost of the care they deliver. In this report both types of strategies are referred to broadly as value-based payment.

A growing body of research has demonstrated that social risk factors (defined in the committee’s first report as socioeconomic position; race/ethnicity and cultural context; gender; social relationships; and residential and community context) as well as health literacy may influence health outcomes as much as—or more than—medical care does (Deaton, 2016; McGinnis, 2016; NASEM, 2016a; Woolf and Purnell, 2016). These findings are a concern for policymakers and health care providers because Medicare beneficiaries with social risk factors for poor health care outcomes are disproportionately concentrated among a subset of health care providers (Bach et al., 2004; Jha et al., 2007, 2008). Clustering of socially at-risk patients is often found in a small subset of providers (e.g., safety-net hospitals, critical access hospitals, minority-serving institutions, community health centers).
(NASEM, 2016b). Note, the term provider in this report refers to the reporting unit (or, provider setting) being evaluated (e.g., hospitals, health plans, provider groups, etc.).

A wide range of stakeholders has raised concerns that current Medicare quality measures and payment programs that financially reward or penalize providers based on the health care outcomes of their patients and do not account for social risk factors may underestimate the quality of care for such providers. Patients with social risk factors may require more resources and more intensive care to achieve certain health outcomes compared to the resources and care needed to achieve those same outcomes in more advantaged patients (NASEM, 2016b). At the same time, because these providers are also more likely to care for patients who are uninsured or covered by Medicaid, they have historically been less well funded than providers caring for larger proportions of patients with commercial insurance that pay more generously for care. If providers disproportionately serving vulnerable populations are likely to have fewer resources to begin with and care for patients who require more resources to achieve the same health care outcomes, these providers may be more likely to fare poorly on quality rankings (Chien et al., 2007; Joynt and Rosenthal, 2012; Ryan, 2013). Indeed, evidence suggests hospitals disproportionately serving socially at-risk populations (safety-net, minority-serving, and critical access hospitals) perform worse on average on performance indicators used in VBP compared to hospitals serving the general population (NASEM, 2016b). However, there is also evidence of substantial variation among these providers such that some achieve performance on par with top performers among all hospitals (NASEM, 2016b). Additionally, evidence among ambulatory care providers disproportionately serving socially at-risk population is more mixed, with many performing as well as or better than their providers serving the general population (NASEM, 2016b).

The poorer average performance among providers disproportionately serving socially at-risk populations combined with the fact that they have fewer resources has raised concerns that Medicare’s VBP programs may potentially increase disparities. For one, the disproportionate penalties among providers disproportionately serving socially at-risk populations can be perceived as penalizing providers for caring for socially at-risk populations and may reduce incentives to keep doing so. Additionally, if these providers are more likely to have lower average performance, they may also be less likely to receive rewards and more likely to be penalized under VBP schemes compared to providers serving the general population. In this way, VBP programs may be taking resources from the very organizations who need them most (Chien et al., 2007; Ryan, 2013). In so doing, quality in these providers may worsen (Grealy, 2014; Ryan, 2013) and the orga-
nizations could also fail, further reducing access to care for socially at-risk patients (Lipstein and Dunagan, 2014).

Proposals to improve VBP programs to address these unintended consequences on health disparities recommend accounting for differences in patient social risk factors when measuring quality and calculating payment, also referred as risk adjustment or payment adjustment. As defined in the committee’s first report (see Appendix A) and discussed in more detail in Appendix C4, although the committee conceives of risk adjustment and payment adjustment as two separate methods, risk adjustment can become a method of payment adjustment when risk adjusted measures are used as the basis of payment. This proposal extends the rationale for adjusting for differences in clinical risk factors across providers to ensure accurate measurement and fair comparisons by taking into account differences that are beyond the control of individual providers (currently performed for all Medicare quality measures and payment programs) to also include social risk factors that may be beyond the control of providers (Girotti et al., 2014; Jha and Zaslavsky, 2014; Joynt and Jha, 2013; Pollack, 2013; Renacci, 2014).

Critics of such accounting are concerned that some forms of adjusting payments or quality measures for social risk factors may reduce incentives for providers who care for disadvantaged patients to improve the quality of care they provide to these patients (Bernheim, 2014; Kertesz, 2014). Critics of accounting for social risk factors also argue that adjusting measures would obscure health disparities, making it more difficult to hold providers accountable for lower-quality care and would also accept and potentially institutionalize a lower standard of care for socially at-risk populations (Bernheim, 2014; Jha and Zaslavsky, 2014; Kertesz, 2014; Krumholz and Bernheim, 2014; O’Kane, 2015). If the goal of VBP models is to improve quality and control costs while simultaneously enhancing health care equity and improving outcomes for disadvantaged patients, careful attention must be paid to the delicate balance between adjusting payments and quality measures and preserving incentives to improve the care these patients receive.

These concerns draw attention to possible harms that may be introduced after accounting for social risk factors that would not otherwise exist. However, new harms that may arise from accounting for social risk factors are best considered in relation to the possible advantages and disadvantages that already exist under the status quo. Evaluating the benefits and disadvantages of accounting for social risk factors thus requires evaluating the likely effect of new methodologies on existing disparities in quality and access to care, to understand whether accounting methods are likely to exacerbate or diminish these disparities.
STATEMENT OF TASK

In response to concerns about health equity and accuracy in reporting and to support the Improving Medicare Post-Acute Care Transformation (IMPACT) Act approved by Congress in 2014, the Department of Health and Human Services acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to identify criteria for selecting social risk factors, specific social risk factors Medicare could use, and methods of accounting for those factors in Medicare quality measurement and payment applications. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare programs (see Appendix F for biographical sketches). This report is the third in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the IMPACT Act. In the first report, the committee presented a conceptual framework and described the results of a literature search linking five social risk factors and health literacy to health-related measures of importance to Medicare quality measurement and payment programs. In the second report, the committee reviewed the performance of providers disproportionately serving socially at-risk populations, discussed drivers of variations in performance, and identified six community-informed and patient-centered systems practices that show promise to improve care for socially at-risk populations. Details of the statement of task and the sequence of reports can be found in Box C1-1. The committee will release reports every three months, addressing each item in the statement of task in turn. The statement of task requests committee recommendations only in the fourth report.

COMMITTEE PROCESS

In their first report (see Appendix A), the committee laid out a conceptual framework that captures the relationships among social risk factors and health literacy and health care-related outcomes and other performance measures. This report builds on the conceptual relationships and empirical associations between social risk factors and health literacy and quality measures and health care outcomes identified in the first report to provide guidance on which factors could be considered for Medicare accounting purposes, criteria to identify these factors, and methods to do so in ways that can improve care and promote greater health equity for socially at-risk patients. To that end, the committee also aims to address issues that must be carefully considered to maintain or enhance incentives for providers to
BOX C1-1
Statement of Task

An ad hoc committee will provide a definition of socioeconomic status (SES) for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Further, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports, which build on the Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine’s previous studies relevant to this study.

The first report will:
- Define socioeconomic status for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.
- Identify SES factors and other social factors (such as race, health literacy, limited English proficiency) that have been shown to impact health outcomes of Medicare beneficiaries.

The second report will:
- Identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations.

The third report will:
- Specify criteria (along with their strengths and weaknesses) that could potentially be used to determine whether an SES factor or other social factor should be accounted for in Medicare quality, resource use, or other measures used in Medicare payment programs.
- Identify SES factors or other social factors that could be incorporated into quality, resource use, or other measures used in Medicare payment programs.
- Identify methods that could be used in the application of SES factors and other social factors to quality, resource use, or other measures used in Medicare payment programs.

The fourth report will:
- For each of the SES factors or other social factors described above, recommend existing or new sources of data on these factors and/or strategies for data collection, while also identifying challenges to obtaining appropriate data and strategies for overcoming these challenges.

In the fifth report:
- The committee will synthesize and interpret the four brief reports issued as described above into one report that will include comprehensive project findings, conclusion, and recommendations based on the four previous reports.
improve care for socially at-risk patients throughout the report while also promoting accuracy in reporting and compensating providers fairly. The committee’s goals in accounting for social risk factors in Medicare payment programs are

1. Reducing disparities in access, quality, and outcomes;
2. Quality improvement and efficient care delivery for all patients;
3. Fair and accurate public reporting; and
4. Compensating providers fairly.

To achieve these goals, accounting for social risk factors should neither mask low-quality care or health disparities nor reward poor performance. Additionally, inclusion of social risk factors in quality measurement and payment should not disincentivize providers from finding strategies to overcome the influence of social risk factors on health care outcomes.

In Appendix C2, the committee identifies criteria for selecting social risk factors that could be incorporated into Medicare quality measurement and payment programs along with the rationale for and potential challenges of each criterion. In Appendix C3, the committee applies the criteria identified in Appendix C2 to the social risk factors and their respective indicators identified in the committee’s first report. The committee also identifies the rationale for including these factors and indicators based on the criteria, as well as their limitations relative to those criteria. Appendix C4 presents an overview of current and planned Medicare VBP programs and how they currently account for social risk factors (if at all) and describes alternative methods of accounting for social risk factors in these programs.

REFERENCES


Criteria for Selecting Social Risk Factors for Application in Medicare Quality Measurement and Payment

RATIONALE FOR ACCOUNTING FOR SOCIAL RISK FACTORS IN QUALITY MEASUREMENT AND PAYMENT

Performance measurement and public reporting are critical building blocks for quality improvement and attainment of a high-performing health system. Public reporting provides information to payers, administrators, and regulators to help identify which providers offer high-quality care and which require improvement—or worse, merit sanctions (IOM, 2006). By enabling comparisons of provider performance, public reporting can also incentivize quality improvement and inform consumer decision making (IOM, 2006). As Medicare and the U.S. health care system at large shift their focus from providing individual treatments to providing preventive care and improving population health, payment systems have correspondingly reflected a shift from paying for the provision of services (fee-for-service or volume-based payment) to paying for the production of good health care outcomes (value-based payment [VBP]) (McGinnis, 2016). These VBP models tie payment to performance, which shifts greater financial risk to providers, thereby raising the stakes of performance measurement and public reporting.

Underlying the assumption that both public reporting and VBP will motivate improvement is the reasoning that performance measurement and comparisons of provider performance will help identify the drivers of variation, which will in turn inform how subpar performance can be improved. At the same time, meaningful comparisons aim to reflect provider performance with all else equal by minimizing the effect of other factors such
as patient characteristics that may affect health care quality or outcomes independently of provider influence (Ash et al., 2013). In epidemiology, these other factors are considered confounders.

A confounder is a third variable that is associated with both an exposure (independent variable) and the outcome of interest (dependent variable), but does not mediate the effect of the exposure on the outcome (the confounder is not in the causal pathway). In performance measurement, the exposure is the reporting unit’s (e.g., hospital’s or health plan’s) performance and the outcome is the measure of health care use, health care outcomes, or resource use. The committee embraced measures from these domains in its expanded definition of “health outcomes” in its first report (see Appendix A). Health care use captures measures of health care utilization and clinical processes of care; health care outcomes include health outcomes, but also measures of patient safety and patient experiences of care; and resource use captures cost measures. In this report, the committee groups these domains and measures into the overarching category of performance indicators used in VBP.

If confounders are unevenly distributed across comparison groups, this can lead to bias (systematic error) in performance measurement, which in turn leads to a distortion of the true association between the exposure and outcome (Aschengrau and Seage, 2008). In experimental studies (such as a randomized controlled trial), researchers can minimize the effect of confounders by randomizing known (and unknown) confounders across treatment groups to ensure the groups are comparable. However, in the real world (and thus observational data), confounders are typically unevenly distributed across groups. To minimize this bias, those assessing provider performances can identify specific factors as confounders and account for them statistically in an effort to more accurately measure the true association. When comparing health system performance, the principal method to account for differences in patient characteristics in quality and outcomes measurement is risk adjustment (also known as case-mix adjustment), although it is only one of several potential methods. (Methods are discussed in Appendix C4.)

Clinical risk factors are patient characteristics that may influence performance indicators used in VBP and may also be unevenly distributed across providers. For this reason, quality measures and payment models currently account for underlying and systematic differences in clinical risk factors known to independently drive variation in performance (NASEM, 2016a). For example, one health plan may have sicker patients than another health plan. Risk adjustment for clinical risk factors accounts for this selection (Kunkel and Powell, 1981; Pope et al., 2004). Accounting for social risk factors extends the rationale of accounting for clinical risk factors to also include social risk factors as characteristics that may impede accurate comparisons across health care providers. To the extent that social
risk factors influence performance indicators used in VBP independently of provider actions and these social risk factors are unevenly distributed across providers, when providers are held accountable for their performance on these measures, accounting for underlying differences in social risk factors may be appropriate. Importantly, identifying a third variable as a confounder is primarily a conceptual exercise that can be supported by empirical data. However, a third variable can also have other conceptual relationships between an exposure and an outcome (for example, mediation and moderation). When factors have other relationships with an outcome of interest, it may be desirable to account for the factor in a different way or not account for the factor at all.

GUIDING PRINCIPLES

The committee developed selection criteria for social risk factors to support the methods for accounting for social risk factors in Medicare payment, particularly payment tied to performance indicators. Underlying the committee’s approach to accounting for social risk factors is a commitment to achieving health equity. Health equity is an ethical value that broadly refers to the elimination of unfair inequalities in health status by power, wealth, or prestige that may exist across social groupings by virtue of factors such as race, income, or sex (Braveman and Gruskin, 2003). When applied to health care, equity represents the commitment of providers, health systems, or payers to achieving a universally high standard of health care quality for all patients. To the greatest extent possible, a commitment to equity requires the elimination of disparate outcomes that arise across otherwise similar patients because of their social risk factors. However, complete equality of outcomes may not be attainable within a health system because some of the factors contributing to disparities are not modifiable by providers, health systems, or payers. Additionally, achieving health equity requires more than equitable health care, or providing the same type and quality of health care to all patients regardless of social risk, because this may not be sufficient to reduce health disparities. Some subpopulations (such as those with greater levels of social risk factors) may require more intensive care to achieve the same health outcomes that can be achieved in the general population with less intensive care and at lower cost. A system of accounting for social risk factors in VBP achieves the ethical goal of equity when it appropriately recognizes the challenges of caring for populations with social risk factors, while creating incentives that are likely to lead to the improvement of care for socially at-risk patients.

The translation of this ideal into policies to account for social risk factors is complex for both philosophical and practical reasons. Philosophically, the concept of health equity is open to multiple possible interpretations, with
different implications for resource distribution and measurement (Culyer, 2007). For example, achieving a fair distribution of resources across populations with different social risk factors is likely to require balancing resources across subgroups defined by level of disease burden, socioeconomic status, race, and other social risk factors. Establishing an equitable allocation of resources in these cases requires policy makers to define reasonable trade-offs between worthwhile societal goals, such as eliminating health disparities and improving overall health. Relatedly, there are significant trade-offs between health equity, efficiency, and other values.

The committee does not take a position on how to resolve the complex trade-offs inherent in promoting health equity, a task that exceeds the scope of this report. However, it is assumed that some conception of equity is always guiding choices of different methods for accounting for social risk factors, as well as the choices of measures used to represent health care quality and equity. Accordingly, it is important that any selection of methods to account for social risk factors be justified relative to a particular conception of equity, and trade-offs in resource allocation that arise from different alternative conceptions of equity be made transparent by policy makers and subjected to ethical deliberation among affected stakeholders.

Even after adopting a conception of equity to account for social risk factors, there is a tension around the best way to get there, because, as described above, equity is open to multiple possible interpretations. As described in Appendix C1 and in the committee’s first report, critics of accounting for social risk factors in VBP programs are concerned about the potential to institutionalize a poorer standard of care and to reduce incentives to improve care for socially at-risk populations. Proponents are concerned about incentives for providers to avoid socially at-risk populations, further reducing already limited resources among providers disproportionately serving socially at-risk populations, and, consequently, increasing health disparities. Such differences may arise from differential weight these opposing views place on the potential harms of accounting for social risk factors in VBP and the harms of not accounting for social risk factors (i.e. the status quo). (Potential harms of the status quo compared to accounting for social risk factors are discussed in Appendix C4.)

Underlying these arguments is a fundamental disagreement about the interpretation of observed differences as well as the ability of providers to address social risk factors that may influence observed differences in performance. As described in the committee’s second report (see Appendix B), the lower average performance among providers disproportionately serving socially at-risk populations and the poorer health and health care outcomes among socially at-risk populations is likely neither wholly attributable to factors out of the control of providers nor wholly the result of poorer care on the part of providers (NASEM, 2016b). On the one hand, some oppo-
ponents believe that because observed differences in performance indicators used in VBP could reflect actual differences in health care quality as well as the influence of social risk factors, given that it is not possible to determine whether or to what extent the poorer performance is due to real differences, risk adjustment could obscure real disparities and thereby reduce incentives to improve care and reduce health disparities. Proponents might counter that if the difference in outcomes affecting the disadvantaged groups is found consistently across the health care system, then providers treating more patients from those groups should not bear the entire penalty for those disparities. Opponents might argue that these providers should be held responsible for providing services in a manner that compensates for social risk factors, while proponents might view social risk factors as less easily addressed through provider actions compared to opponents. They may also believe the costs of addressing social risk factors to be high and thus must be accounted for in the payment system even if it is appropriate to expect providers to address social risk factors.

The primary goal of the criteria is, therefore, to guide selection of social risk factors that could be accounted for in VBP so providers or health plans are rewarded for delivering quality and value independent of whether they serve patients with relatively low or high levels of social risk factors. As described in the previous section, VBP aims to incentivize quality improvement for all patients by tying payment to performance. Under VBP, providers who care for patients who would score lower on the measures of performance as a result of factors outside of the providers’ control (such as certain social risk factors), rather than as a result of the quality of care delivered, should not be penalized because of the influence of these non-modifiable factors. The measures should reflect quality; the effect of other factors, such as patient characteristics, should be minimized. In sum, the criteria should guide identification of social risk factors that could be accounted for in performance indicators used in VBP to promote accuracy in reporting.

COMMITTEE PROCESS

The criteria put forth by this committee adhere closely to the guidelines for selecting risk factors developed by the National Quality Forum (NQF) in their 2014 report Risk Adjustment for Socioeconomic Status or Other Sociodemographic Factors. However, the committee made several changes to reflect their priorities. Like NQF, the committee’s criteria explicitly focuses on selecting risk factors that will be applied to adjustment of measures used for VBP. However, as will be discussed in detail in Appendix C4, there are multiple methods to account for social risk factors in VBP, including some models that adjust payment directly. The com-
mittee’s criteria reflect the need for selected social risk factors to apply to this broader range of methods.

The NQF guidelines drew on guidelines previously developed for the Centers for Medicare & Medicaid Services (CMS) hierarchical condition categories (HCCs) risk adjustment model (Pope et al., 2004), which the committee also reviewed. Whereas the NQF guidelines and the committee’s criteria reflect the increased need to account for social risk in addition to clinical risk as Medicare moves toward a payment model tied to performance, prevention, and population health (Burwell, 2015), the CMS-HCC model aims to predict medical expenditure risk. In developing the criteria, the committee also reviewed criteria developed to guide whether to include a specific HCC in the Department of Health and Human Services (HHS) HCC risk adjustment model for individual and small group markets (Kautter et al., 2014) as well as criteria to identify case-mix adjustors for the Consumer Assessment of Health Care Providers and Systems (CAHPS) surveys case-mix adjustment model (Elliott et al., 2009; O’Malley et al., 2005). The criteria the committee reviewed and drew upon in developing their criteria are listed in Appendix CA.

**CRITERIA FOR SELECTING SOCIAL RISK FACTORS**

**Conclusion 1:** Three overarching considerations encompassing five criteria could be used to determine whether a social risk factor should be accounted for in performance indicators used in Medicare value-based payment programs. They are as follows:

A. **The social risk factor is related to the outcome.**
   1. The social risk factor has a conceptual relationship with the outcome of interest.
   2. The social risk factor has an empirical association with the outcome of interest.

B. **The social risk factor precedes care delivery and is not a consequence of the quality of care.**
   3. The social risk factor is present at the start of care.
   4. The social risk factor is not modifiable through provider actions.

C. **The social risk factor is not something the provider can manipulate.**
   5. The social risk factor is resistant to manipulation or gaming.

These criteria along with their rationale, potential limitations, and practical considerations for applying the criteria are described in detail in the subsequent sections.
Criteria Category A: The Social Risk Factor Is Related to the Outcome

This category is the most basic pair of criteria for a social risk factor—that there be both a plausible and valid reason why the risk factor would be associated with the outcome and empirical evidence that such a relationship holds in practice. Together these criteria lay the foundation for the validity and practical importance of the risk factor.

Criterion 1: Conceptual Relationship with the Outcome of Interest

A conceptual relationship between the social risk factor and the outcome of interest (i.e., performance indicators used in VBP) ensures there is a reasonable link that might explain an association between the factor and the outcome. Conceptual relationships can be direct or indirect; a risk factor may also be a marker or proxy for otherwise unmeasured factors. To meet this criterion, the conceptual relationship may follow any of these pathways—the factor may be in a direct causal pathway, mediate the causal pathway, or be associated with an otherwise unmeasured confounder. In other words, while this criterion requires some conceptual relationship, it does not require a well-established, direct, causal relationship.

Establishing a unique causal effect can be difficult. In particular, identifying causal mechanisms can be challenging when risk factors operate through multiple pathways, as many social risk factors do (NASEM, 2016a). The main rationale for including social risk factors for which the precise causal mechanism is not well established is the fundamental cause theory (Link and Phelan, 1995). From this perspective, the causal mechanisms are expected to change over time, but the effect of fundamental causes like social risk factors on health outcomes are expected to persist. For example, it is well established that race and ethnicity may influence health. (See the committee’s first report [NASEM, 2016a] or Appendix C3 for a more thorough discussion.) However, the precise mechanism by which race and ethnicity affect a given health care outcome in a particular setting may be less well established and may change over time. When the aim is prediction and accounting for differences in underlying risk between providers, rather than explanation, how a social risk factor such as race/ethnicity affects health is less important than that factor’s predictive power (i.e., the strength of the relationship between race/ethnicity and the outcome of interest) (Elliott et al., 2009; O’Malley et al., 2005). Thus, an association between a social risk factor and outcome that persisted despite changes in the underlying causal mechanism would meet this criterion. Note that, because the goal is not to identify causes of poor quality, but rather to allow providers to see their performance with and without the influence of social risk factors, the existence of a conceptual relationship does not necessarily imply that outcomes...
would improve through interventions targeted at social risk factors or at ameliorating the effects of social risk factors.

Establishing the conceptual relationship to meet this criterion can be informed by the academic literature such as theories from the epidemiologic or social sciences literature, or by clinical expertise. For example, Link and Phelan use their fundamental cause theory to establish a relationship between race and health outcomes, while Epstein and colleagues used clinical criteria to establish an association between race and renal transplant utilization (Epstein et al., 2000; Phelan and Link, 2015). If the only conceptual rationale is that the social risk factor is correlated with an otherwise unmeasured factor, it would be preferable to have a direct measure for that factor. However, if the unmeasured factors cannot be measured, then, while not ideal, it may be justifiable to include the confounded factor as a proxy. Establishing a conceptual relationship takes into account several practical considerations.

One consideration is that some factors that are conceptually related to the outcome might nonetheless be unacceptable for inclusion in risk adjustment or alternative methods because of concerns regarding face validity or acceptability. For example, if people who profess a particular religious affiliation had systematically lower-quality scores, it might be unacceptable for a hospital’s payment to be in any way influenced by its patients’ religious affiliations. Similarly, it would be problematic if all the social risk factors included in a model were selected because of social norms or political considerations rather than an established conceptual relationship. Another practical issue would be to consider whether and how the construct works in a population of interest. This may be particularly relevant when identifying the appropriate indicator and measure used to assess a given social risk factor. For example, current occupation would not be a good indicator of SEP among beneficiaries who qualify for Medicare based on disability, because not working is an eligibility requirement.

**Criterion 2: Empirical Association with the Outcome of Interest**

An empirical relationship means that there is a statistical association of a meaningful magnitude between the social risk factor and the set of outcomes of interest (i.e., performance indicators used in VBP) that is unlikely to be caused by chance. Empirical support for a conceptual relationship between a social risk factor and an outcome can come in part from the literature.

A common method to identify an empirical relationship is to assess the association or correlation between the two variables. For example, mortality is higher for those with lower income. The correlation in this example is known as a bivariate relationship, as it refers to the association of two vari-
ables (mortality and income). The committee considers a bivariate relationship the minimum standard necessary to meet this criterion. A multivariate association is one that considers more than two variables at a time. For example, in a bivariate association, low-income older adults have higher Medicare expenditures than high-income older adults. However, low income is also associated with health status. Specifically, low-income older adults are sicker than high-income older adults. Thus, if the third variable of health status is added to create a multivariate model, after the association between income and expenditures is adjusted for underlying differences in health status, low-income older adults may have expenditures that do not differ from higher-income older adults. As seen in this example, assessment of the empirical relationship using the bivariate relationship can lead to a different conclusion than assessment in a multivariate context. In general, evidence of multivariate associations may be considered stronger evidence of an empirical association as multivariate evidence is closer to establishing a unique association between the social risk factor under consideration and the outcome. Such multivariate evidence also rules out the possibility that the additional variables in the model completely explain the bivariate association.

This discussion raises one of several practical considerations for implementation that are specific to the setting under consideration. First, when relying on the literature to establish an empirical relationship, the setting of the empirical association in the literature may not be generalizable to the particular setting to which it is being applied with respect to VBP. Relatedly, evidence of bivariate or multivariate associations of a social risk factor with an outcome is more compelling and relevant if it has been established within different reporting units within the setting in question (Elliott et al., 2001; Jha and Zaslavsky, 2014; Zaslavsky et al., 2001). For example, one might consider education as a social risk factor for flu immunization in Medicare health plans. Suppose that flu immunization is lower overall for those with less education. If no such association exists after controlling for the health plan in which a Medicare beneficiary is enrolled, then there is no within-plan association—the initial overall association would be entirely “between-plans.” In this scenario, the observed association between education and immunization rates reflects only differences in immunization rates between plans that differ in their members’ education. In other words, the observed association between education and immunization may be capturing the unmeasured influence of a provider (health plan) characteristic linked to overall quality as a proxy and may reflect an ecological fallacy (incorrectly drawing inferences about individuals within a group from inferences about the group to which those individuals belong). Therefore, the between-plan association provides only weak evidence of the effect of education itself on immunization rates.
If, however, beneficiaries with lower education were less likely to receive flu immunizations than beneficiaries with more education in the same health plans, this would be evidence of a within-plan association of education and flu immunization. Here, the observed association between education and immunization rates reflects differences in patient characteristics rather than health plan characteristics. Thus, this within-plan association supports the hypothesis that the health plans achieve worse outcomes with patients with low education compared to patients with high education on average. Given that this criterion is meant to confirm the hypothesized conceptual relationship, this within-plan association therefore provides stronger evidence of the hypothesized relationship between patient education and flu immunization than only an overall or between-plan association in the context of health plans.

This raises a related consideration. A particular multivariate model in the literature may reduce the association of interest due to a variable that might not be included in the model being built for Medicare payment adjustment. Thus, it may be important to statistically assess the empirical association of a specific social risk factor within the particular multivariate setting in which it is being applied. In particular, social risk factors should contribute unique variation in the outcome of interest. Social risk factors will not affect scores or payment unless they both (a) vary across units, and (b) predict performance indicators used in VBP within reporting units after considering other retained social risk factors. For example, gender might not vary much across health plans (situation a), whereas one measure of socioeconomic position (SEP) might not predict any performance measures strongly if another measure of SEP strongly correlated with it were already included (situation b). Thus, some social risk factors might be “redundant” for some or all performance measures in a given setting at a given time. To the extent that the goal is prediction/adjustment rather than explanation/causal inference, which the committee believes to be the case (as described in the first criterion regarding establishment of a conceptual relationship), prediction/adjustment is not harmed by the inclusion of redundant social risk factors. To the extent that the data collection of a particular risk factor is costly or burdensome to collect, the government may choose not to measure a risk factor that appears to explain little of the variation in relevant outcomes, but this criterion should be applied weakly and should not be used to exclude social risk factors that are important to some performance measures. Moreover, if a disparity associated with a social risk factor has been eliminated, consideration should be given to continuing to include the factor to preserve incentives, in addition to monitoring disparities associated with the social risk factor.

Finally, when applying this criterion, it will be important to consider whether accurate data on the social risk factor is feasible to collect and use.
This consideration should take into account privacy laws (such as those relating to the Health Insurance Portability and Accountability Act of 1996, also known as HIPAA) and privacy concerns regarding data collection, use, and disclosure (IOM, 2014). This may be especially relevant when accounting for social risk factors, because social risk factors touch upon numerous sensitive issues and because individual-level data is needed to identify within-plan differences (IOM, 2014). This consideration should also take into account data that is both currently available and used, available but underutilized data, as well as future sources of data. It is important to note that current literature can only provide evidence of descriptive (i.e., observed) relationships. It should be noted that these descriptive relationships do not represent necessary relationships, and as noted, these relationships may change over time.

It is critical to consider whether the data exist in data sources that are underused. For example, electronic health records (EHRs) collect substantial amounts of data about individuals that are not used in performance measurement for VBP. Additionally, CMS already conducts data collection through CAHPS surveys that could be applied to other outcomes at an aggregated level. For example, Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) collects data on a sample of patients at a given hospital, and thus could be a source of hospital-level data that could be used to account for differing populations with different levels of social risk factors. The valid use of this approach may currently be very limited, as it cannot be used to establish within-hospital associations or to develop within-hospital adjustments. However, in future, if HCAHPS data could be linked to other patient data and there remains sufficient sample size at the intersection of these data sets, it might be possible to use this data to account for social risk factors.

With respect to future sources of data, collecting accurate data is important and should be balanced against data burden and feasibility. Other considerations include whether the missing data elements regarding social risk factors may be issues that are more subjective and therefore potentially subject to manipulation. Additionally, providers may have the ability to gather information on risk factors, but the desire to collect data providers report should be balanced against the need for objective sources of data. Data sources are the topic of the committee’s next and fourth report.

Criteria Category B: The Social Risk Factor Precedes Care Delivery and Is Not a Consequence of the Quality of Care

Factors that reflect a model of care delivery (e.g., nurse staffing levels in a hospital), a treatment decision, or the direct consequences of care or treatment decision are not appropriate adjustors, as they reflect true differ-
ences in quality of care or other outcomes. In addition, adjusting for some modifiable risk factors may discourage some means of quality improvement and disparity reduction. To achieve goals of VBP as stated above, it is critical to consider whether risk factors are the consequence of provider efforts. If a factor can be influenced by the provider, then accounting for it may diminish incentives to improve that risk factor. For example, if health literacy improves health care outcomes and can be improved by providers or health plans, using the level of health literacy in risk adjustment would diminish incentives to do so. At the same time, it may still be appropriate to account for health literacy in other ways if improving health literacy or if aligning the demands of the health system to patients’ skills and abilities to facilitate their access, understanding, and use of health information and services is costly and/or low-literacy patients require more resources (e.g., the use of navigators) to achieve the same health care outcomes.

Criterion 3: Risk Factor Is Present at the Start of Care

While not a guarantee of avoiding selection of social risk factors that are a consequence of the care provided, identifying factors that are present at the start of care are unlikely to be affected by the care they are about to receive. Note that for some criteria, it is possible to have reasonable confidence that a factor was present at the start of care even if measured later—such as educational attainment for Medicare beneficiaries. This criterion may be inadequate for highlighting some risk factors that are the consequence of care in the context of repeated use of the same provider or arrangements that hold providers accountable for population health. In these contexts, the “start of care” may also be the “end of care” one period earlier.

Often the timing of a risk factor must be carefully considered in a particular application. If one adjusts for a factor as it was present at the start of care, one is accounting for its influence on or associations with outcomes for the duration of a particular hospitalization, a particular year of outpatient care from a plan, or some other limited period. One would have to acknowledge that if a patient sees the same provider for many years, such an adjustment does not control for any effects that provider had on the factor before the start of the episode of care in question. For this reason, it may be helpful to prioritize slowly-changing factors over rapidly-changing factors. This may be particularly challenging when a risk factor can change quickly in response to the circumstance under consideration. For example, marital status and living alone are indicators of social support. Both indicators can change quickly, especially in older persons. For example, if a husband and wife live together and the husband dies, the woman would suddenly be widowed and living alone. In that case, the measured risk fac-
tor could change. Social risk factors that are subject to rapid change may be more likely to be a consequence of the care provided. Similarly, it is important to consider whether a factor represents a cumulative life cycle effect or a transient effect. For example, poverty has a cumulative effect over a lifetime, whereas transportation unavailability might be transient.

**Criterion 4: Risk Factor Is Not Modifiable Through Provider Actions**

To avoid selecting factors that are the consequence of the quality of care, in addition to avoiding factors that are not present at the start of care, it is important to critically assess whether that factor is something that a provider can modify either directly or indirectly. Although such factors are often highly correlated with outcomes, accounting for such factors contravenes the goal to account for factors that are either largely beyond a provider’s control or only modifiable at great expense and with great difficulty. The absence of air conditioning in the patient’s home, for example, could be an indicator of a patient’s environmental context as a social risk factor for poor outcomes that can be present at the start of care. At the same time, if purchasing air conditioners for their high-risk patients were somehow to become an indicator of high-quality care, absence of air conditioning could be a characteristic of the care provided. If air conditioning were then to be adjusted for in quality measurement, providers with more patients without air conditioning would receive a higher payment. At the same time, providers that purchased air conditioners for their high risk patients to improve quality would not fully benefit in terms of VBP because, although outcomes may improve, these providers would also have lower risks and thus risk adjustment would lower their payment. Applying this criterion together with the preceding one (the risk factor is present at the start of care) could help avoid the challenge of identifying factors that may be present at the start of care, but can also be a characteristic of the care provided.

It is important to distinguish between factors that can themselves be modified or influenced and those that are unmodifiable themselves, but can be addressed by appropriately tailored approaches that improve outcomes without changing the underlying disadvantage. Unmodifiable factors include race and ethnicity, nativity, and gender. Although themselves unmodifiable, these factors and indeed all efforts at disparity reduction and quality improvement for socially at-risk patients are predicated on the assumption that tailored, appropriate care for those with any particular risk factors is possible. Other factors, like income, wealth, occupation, language, housing, and transportation are potentially modifiable, but doing so likely requires substantial effort and cost. Health care providers can advocate for the inclusion of health in all policies to address underlying social conditions as root causes of health care outcomes, but the responsibility to improve
transportation and education systems, reduce poverty, teach English, and ensure a living wage and sufficient affordable housing stock lies outside of the health care system. At the same time, the committee acknowledges that health care providers are increasingly held responsible for addressing social risk factors by, for example, partnering with social service agencies, public health agencies, and community-based organizations. Examples of these interventions are described in detail in the committee’s second report (NASEM, 2016b) (see Appendix B). Although such interventions mitigate the effects of social risk factors on certain health care outcomes, they do not change the underlying social conditions. Both unmodifiable factors and factors that are potentially modifiable but beyond the purview of the health care system would meet this criterion. Methods of adjusting or otherwise accounting for social risk factors, as described in Appendix C4, can account for unmodifiable risk factors while rewarding providers who provide better, appropriate, tailored care that minimize the impact of social risk factors on certain health care outcomes.

The critical challenge of applying this criterion is that it can be difficult to identify the extent to which care provision might affect a particular risk factor in practice. While it is fairly easy to determine whether a risk factor is present at the start of care, a great deal of judgment may come into play when deciding whether a risk factor could be altered by higher-quality care particularly as care providers become responsible for population health and may engage in interventions that are not contained within the provider’s health care setting.

Criteria Category C: The Social Risk Factor Is Not Something That the Provider Can Manipulate.

Criterion 5: The Risk Factor Is Resistant to Manipulation or Gaming

Gaming is unproductive behavior by the agent being evaluated (e.g., the provider) that distorts measurement to improve the agent’s performance measure score (better measured care or outcomes) without a corresponding improvement in the intended care or outcome for which the performance measure is capturing (better actual care or outcomes) (Bevan and Hood, 2006). In this case, the focus is not on gaming a performance measure but rather on gaming a measure of a social risk factor that will in some way change the interpretation of the performance measure inappropriately. Gaming the measure of a social risk factor results in obscuring rather than clarifying true performance.

The rationale for this criterion is to protect against including social risk factors that might create perverse incentives for providers to engage in unproductive behavior or deliver suboptimal care for the purpose of the
payment system rather than for the purpose of quality of care. Such a perverse incentive might include the possibility that a target could be achieved by reducing the quality of care for patients with low social risk rather than improving the quality of care for socially at-risk patients and overall. Any provider or health plan should be expected to maximize payment within legal limits (McGuire, 2000). This has been documented extensively in terms of coding patient diagnoses more completely in order to ensure higher payments (Dafny, 2003; Kronick and Welch, 2014). Selecting the most advantageous patients within any given group has been documented as well (Newhouse et al., 2012). Note that this criterion to address potential gaming is not an ethical judgment about health care providers. Rather, these providers operate within systems in which quality improvement and disparities reduction goals are not aligned with the payment system. Consequently, these systems may not optimally allocate resources to improve quality and reduce health disparities and may therefore embed perverse incentives for providers.

Gaming the measurement of social risk factors may be less likely if measures are externally collected and reported. Gaming may be more likely if measures used for accounting purposes were based on provider reporting. For example, if hospitals reported patients who were referred to receive meal delivery as a measure of food insecurity and indicator of financial stress, hospitals might “over-refer” patients who do not need this type of support. Additionally, if the indicator (or measure) were based on a sample of patients, the sample could be taken in a way that was not representative of the provider’s entire pool of patients.

Gaming can be practically addressed in several ways. First, continuous measures are preferable to discrete ones because there are no large gains from threshold level changes. For example, if adjustment only accounted for the population below 100 percent of the federal poverty level (FPL), then systems might have a lot to gain from capturing income at a particular low point that would increase the number of people falling below 100 percent of FPL than if adjustment were continuous at all levels of income. Second, one could prioritize specific coding over vague coding. In diagnostic criteria, measure developers limited the potential for gaming by giving greater weight, for example, to a diagnosis of cancer that could be verified by a biopsy result in a chart review, than to a symptom report of fatigue. Similarly, more weight was given to an acute myocardial infarction than to a non-specific chest pain diagnosis. These principles can be generalized and applied to social risk factors. For example, one could consider a measure that indicates enrollment in specific nutritional assistance programs that are means-tested rather than using a subjective measure of food insecurity captured at the time of hospital readmission. Third, one could pay particular attention to potentially influential (high-leverage) risk factors. Risk factors
that are not prevalent but highly predictive of outcomes can be particularly influential. As such, they may be particularly tempting with regard to gaming if such gaming is possible. Such measures therefore require particular scrutiny with regard to gaming. Nonetheless, such factors may be particularly important if gaming can be avoided, as a failure to account for such factors could greatly disadvantage providers who care for large proportions of patients with high levels of social risk factors.

The committee’s criteria along with the rationale and potential challenges of each criterion are summarized in Table C2-1.

GUIDANCE REGARDING PROCESS FOR USING SELECTION CRITERIA.

Given that there is more than one appropriate way of accomplishing the same ideal objective, the committee does not offer a formula for using the criteria specified above. However, the committee does offer guidance on how to apply these criteria. With respect to applying criteria to individual social risk factors, indicators, or measures, the committee proposes:

- The rationale for selecting a factor, as well as alternatives considered, is transparent.
- Trade-offs with respect to how well a factor meets the criteria are discussed and weighed in the final determination of whether to include a factor.
- Although a social risk factor may meet all five criteria, it may still be excluded from inclusion due to practical considerations—for example, if it lacked face validity or due to data limitations.

The committee also offers guidance on developing a set of social risk factors that could be used together for accounting purposes:

- Priority should be given to how a set of indicators perform together over the performance of each indicator on its own.
- When criteria are met, common measures across outcomes are preferred as this would be more practical and may improve the face validity of the models.
- Where possible and appropriate, it is preferred to use a common set of adjusters across the different measures in a given setting.

For both individual social risk factors (and respective indicators and measures) and also a set of social risk factors, the committee offers the following considerations:
• In terms of how measures are implemented and concerns of misuse:
  o Stakeholders such as providers and patient advocates have an opportunity to weigh in on the measures.
  o The opportunities for gaming and misuse are discussed and considered. Often, potential stakeholders may have more insights into this process than modelers.
• It is critical to monitor the application of the selected risk factors.
  o How and whether a social risk factor meets the criteria may require continuous evaluation and reassessment of criteria; these criteria are applied in a dynamic setting. As health care evolves and health care disparities get addressed, the justification for certain measures may lapse and others may become more important.
  o Monitoring is also necessary to assess whether the use of social risk factors in Medicare payment strategies is appropriately incentivizing both improved quality and reduction in health disparities. Yet the criteria themselves are meant to be stable and reapplied to allow for an adaptive system.

The next chapter (see Appendix C3) returns to the social risk factor framework presented by the committee in its first report and applies the criteria outlined above to specific measures of social risk.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rationale</th>
<th>Challenges/Limitations</th>
<th>Practical Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Conceptual relationship with the outcome of interest</td>
<td>A conceptual relationship informed by research and experience ensures that there is a reasonable conceptual basis for expecting a systematic relationship.</td>
<td>A conceptual relationship may not be consistent over time or across settings. It is not always possible to distinguish unique causal role of factor so usefulness in an adjustment model does not necessarily imply that outcomes would improve through interventions on risk factor.</td>
<td>Acceptability and face validity: Some factors may be indicated empirically, but would need to be excluded because it has poor face validity or because data would be unacceptable to collect and include.</td>
</tr>
<tr>
<td>2. Empirical association with the outcome of interest</td>
<td>An empirical association confirms the conceptual relationship. Without this criterion, an adjustor (social risk factor) may have no effect.</td>
<td>Empirical evidence may not be generalizable to the particular setting. Relationship may not hold in multivariate model.</td>
<td>Data limitations often represent a practical constraint to what factors are included in risk models. The aim is to reliably and feasibly capture accurate data. The challenge is to push for greater reliability and feasibility of factors that may be important to include, even if factors are excluded today, because it is currently infeasible. Privacy laws and concerns about patient confidentiality may also be an issue.</td>
</tr>
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Contribution of unique variation in the outcome (i.e., not redundant or highly correlated with another risk factor): Prevent overfitting and unstable estimates, or coefficients that appear to be in the wrong direction; reduce data collection burden.
### B. Social risk factor precedes care delivery and is not a consequence of the quality of care.

3. The risk factor is present at the start of care.  
If a risk factor is present at start of care, then it is less likely that it would be the result of care provided.  
Does not eliminate a risk factor being a consequence of care delivery in dynamic settings or under population health settings.  
Prioritize slowly changing factors over rapidly changing variables: Measurement would have to be more frequent, but rapidly changing variables would not fully disqualify a measure.  
Consider whether a factor represents a cumulative life cycle effect or a transient effect.

4. The risk factor is not modifiable through the provider actions.  
The goal is to adjust for factors independent of the care provided. Adjusting for the care provided contravenes this goal.  
It may be difficult to identify in practice the extent to which care provision might affect a particular social risk factor.

### C. The social risk factor is not something that the provider can manipulate.

5. The risk factor is resistant to manipulation or gaming.  
This criterion ensures validity of performance score as representing quality of care (versus, for example, upcoding).  
It is often difficult to anticipate how a measure might be manipulated.  
Prioritize specific coding over vague coding: vague codes are more vulnerable to manipulation; however, there are vaguely coded variables that may be important nevertheless, so this would not fully disqualify an indicator.  
Prioritize continuous over dichotomous measures of the same constrict where applicable to reduce “edge” gaming.

Carefully monitor high-leverage factors (i.e., risk factors that are not prevalent but highly predictive of outcomes), as they may be important but especially attractive for gaming.
REFERENCES


Applying Selection Criteria to Social Risk Factors and Health Literacy

In its first report (see Appendix A), the committee presented a conceptual framework that illustrates the primary hypothesized conceptual relationships by which five social risk factors—socioeconomic position (SEP); race, ethnicity, and cultural context; gender; social relationships; and residential and community context—as well as health literacy may directly or indirectly affect measures of health care use, health care outcomes, and resource use outcomes among Medicare beneficiaries (NASEM, 2016a). The conceptual framework applies to all Medicare beneficiaries, including beneficiaries with disabilities and those with end-stage renal disease (ESRD). Although the committee acknowledges heterogeneity among Medicare beneficiaries (including among beneficiaries age 65 and older), the committee expects the effect of social risk factors to be similar for all Medicare subpopulations. As described in its first report, the committee considers variations in the effect of social risk factors among beneficiaries under age 65 with disabilities, beneficiaries age 65 and older, and beneficiaries with ESRD to fall within a continuous spectrum of effects. Notably, Medicare beneficiaries with disabilities differ systematically from persons with disabilities more generally, because eligibility for federal disability benefits requires that a person is unable to work, has a low income, and meets certain medical criteria (SSA, n.d.). Therefore, Medicare beneficiaries with disabilities are by definition a socially at-risk group. Additionally, the Centers for Medicare & Medicaid Services (CMS) uses the same measures to assess quality, outcomes, and resource use for Medicare beneficiaries regardless of the origin for entitlement (i.e., whether an individual qualified because of age, disability, or ESRD). The committee still holds these assumptions to be true.
In its first report, the committee also identified specific indicators that correspond to the five social risk factors. These indicators represent ways to measure the latent constructs of the social risk factors and are distinct from specific measures. For example, education is an indicator of socioeconomic position that can be measured in multiple ways (e.g., highest degree attained, years of education). Figure C3-1 presents a modified version of the committee’s conceptual framework, expanded to include indicators of each social risk factor. The framework also groups the domains that the committee embraced in its expanded definition of “health outcomes” in its first report (health care use, health care outcomes, and resource use) under the umbrella of performance indicators for value-based payment (VBP).

In this chapter, the committee applies the criteria identified in Appendix C2 of this report to these social risk factors and health literacy (and their respective indicators), and also identifies the rationale and limitations of each factor and indicator relative to those criteria. To review, the committee identified three broad categories of criteria for selecting social risk factors that could be accounted for in Medicare VBP programs:

A. The social risk factor is related to the outcome;
B. The social risk factor precedes care delivery and is not a consequence of the quality of care; and
C. The social risk factor is not something the provider can manipulate.

The committee also identified practical considerations. These are empirical questions that may be best assessed using specific measures and data. Additionally, data collection and measurement is the subject of the committee’s fourth and next report. Because the committee can recommend new data sources and new methods of data collection in this next report (and is therefore not limited to existing measures and data sources), the criteria related to practical considerations such as issues of measurement feasibility are not discussed exhaustively in this report.

**Socioeconomic Position**

Socioeconomic position describes an individual’s absolute and relative position in a society’s stratification system. SEP captures a combination of access to material and social resources as well as relative status—prestige- or rank-related characteristics (Krieger et al., 1997). As described in the committee’s first report (NASEM, 2016a) (see Appendix A), the committee prefers socioeconomic position to the more common phrase socioeconomic status, because socioeconomic position is a broader term encompassing resources as well as status (Krieger et al., 1997). SEP is commonly measured using indicators including income and wealth, education, and occupation.
and employment. In the medical field, insurance status (whether someone has insurance and the type of insurance—i.e., public or private) is also used as a proxy for SEP.

**Income**

Individual income can affect health and health care outcomes through multiple pathways (Braveman et al., 2005). It can affect health directly as a means of purchasing health care and indirectly as a means of acquiring health promoting resources, such as better education, housing, and nutrition (Adler and Newman, 2002). This effect is stronger at lower levels of income (i.e., poverty and deprivation). However, the association between income and health is graded such that increases in income are associated with increases in health status above a threshold of material deprivation (i.e., poverty level) (Adler et al., 1994; Braveman et al., 2010; NASEM, 2016a). Thus, literature supports a conceptual relationship between income and health-relevant measures of interest to Medicare quality and payment programs. As identified in the committee’s first report, literature indicates that income may influence health care utilization, clinical processes of care, health care costs, health outcomes, and patient experience (NASEM, 2016a). Therefore, literature also supports an empirical association as well. Income is generally not a consequence of health care. Income is potentially susceptible to rapid changes as a consequence of a health event across individual trajectories. However, income’s average association with health care outcomes is not likely to change rapidly. In other words, income precedes care delivery and is not a consequence of the quality of care.

Income is the most commonly used measure of economic resources (Braveman et al., 2005), largely because there are available measures, but also because income has strong face validity. When self-reported, measuring income can be sensitive to collect, but reliable methods exist to accurately, reliably, and feasibly collect income data (Moore and Welniak, 2000). These measures are likely to be resistant to gaming or manipulation. Although there may be less variation in income among older populations, especially the very old (age 80 and older), because income includes both earned and unearned income, there is likely to be sufficient variation in income among the Medicare population (albeit a narrower range than among the general population) to capture the full variation in SEP (HHS, 2015c). In sum, income is related to health care outcomes of interest, precedes care delivery and is not a consequence of the quality of care, is not something the provider can manipulate, and meets practical considerations.
SOCIAL RISK FACTORS

Socioeconomic Position
- Income
- Education
- Dual Eligibility
- Wealth
- Occupation

Race, Ethnicity, and Cultural Context
- Race and Ethnicity
- Language
- Nativity
- Acculturation
- Documentation Status

Gender
- Gender Identity
- Sexual Orientation

Social Relationships
- Marital/Partnership Status
- Living Alone
- Emotional and Instrumental Social Support

Residential and Community Context
- Neighborhood deprivation
- Urbanicity
- Housing
- Other Environmental Measures

PERFORMANCE INDICATORS FOR VALUE-BASED PAYMENT

Access
Clinical and Behavioral Risk Factors
Health Literacy and Numeracy

Health Care Use
Health Care Outcomes
Resource Use
FIGURE C3-1 Conceptual framework of social risk factors and performance indicators for value-based payment (VBP).

NOTE: This conceptual framework illustrates primary hypothesized conceptual relationships. For the indicators listed in bullets under each social risk factor, bold lettering denotes measurable indicators that could be accounted for in Medicare VBP programs in the short term; italicized lettering denotes measurable indicators that capture the basic underlying constructs and currently present practical challenges, but are worth attention for potential inclusion in accounting methods in Medicare VBP programs in the longer term; and plain lettering denotes indicators that have considerable limitations.

As described in the conceptual framework outlining primary hypothesized conceptual relationships between social risk factors and outcomes used in value-based payment presented in the committee’s first report (NASEM, 2016a), health care use captures measures of utilization and clinical processes of care; health care outcomes capture measures of patient safety, patient experience, and health outcomes; and resource use captures cost measures.
Wealth

Wealth is an alternate measure of economic resources that represents total accumulated economic resources (assets). Wealth is likely to be as important for health and health care outcomes as is income as a means of acquiring health care and health-promoting resources (Braveman et al., 2005; Deaton, 2002; NASEM, 2016a). Moreover, whereas income may capture less variation in economic attainment among Medicare beneficiaries, especially the very old, wealth may capture more variation. Therefore, wealth may be a more sensitive indicator of SEP for the very old (Allin et al., 2009). Wealth can also buffer the effects of changes in income (such as those due to unemployment or illness) (Cubbin et al., 2011). However, wealth may still be susceptible to changes as a consequence of health events among individuals (Lee and Kim, 2008). For example, onset of a new chronic condition may require out-of-pocket medical expenditures and costs associated with rearranging housing or transportation. These costs can lead an individual to incur both a sudden increase in health-related costs as well as costs that accrue over time, both of which could deplete wealth. This may be particularly relevant for low-income persons who also share a disproportionate disease burden. However, as with income, the association between wealth and health at a population level is unlikely to be a consequence of health care. An additional challenge of using wealth as an indicator of SEP is that there are substantial differences by subgroups, especially racial and ethnic subgroups and by gender. For example, blacks have significantly less wealth compared to whites even at the same income levels (Kochhar and Fry, 2014; Shapiro et al., 2013). Moreover, relatively few studies have examined the relationship between wealth and health care outcomes (Braveman et al., 2005; NASEM, 2016a). Hence, there is little evidence documenting an empirical association. This may be due in large part to the difficulty of measuring net worth. Like income, it can be sensitive to assess. Unlike income, although some good measures exist, missing data at the upper and lower ends of the wealth distribution can be problematic (Cubbin et al., 2011; Eckerstorfer et al., 2015; Eggleston and Klee, 2015). Collecting self-reported net worth is challenging because many individuals do not know the value of their net worth or what assets they have (Braveman et al., 2005; Eggleston and Klee, 2015). Some studies have used simplified or proxy measures such as home or car ownership, but there remains little empirical evidence on the association between wealth and health care outcomes (Braveman et al., 2005). Literature supports a conceptual relationship between wealth and health care outcomes of interest, but a lack of available measures and thus evidence of an empirical association present limitations for using wealth as an indicator of SEP. Practical considerations present challenges for collecting accurate wealth data.
Insurance Status: Dual Eligibility

In health research, numerous studies assess the effects of insurance coverage on health status (see, for example, IOM, 2009a), but its use here is restricted to its use as a proxy for resources to support health and health care and thus as an indicator of SEP. For the Medicare population, Medicaid eligibility—also referred to as dual (Medicare and Medicaid) eligibility—is an indicator of insurance status that can be used as a proxy that captures elements of both income and wealth. Dual eligibility captures elements of income, because Medicaid eligibility requires an income below a certain threshold (set at a national minimum level of 133 percent of the federal poverty level [FPL]) (CMS, n.d.-a). However, like any measure of insurance, it is generally an imperfect proxy of income, because it does not capture the full continuum of SEP. This is particularly true for dual eligibility, which is a dichotomous measure representing high or low income. Additionally, individuals with low incomes that exceed Medicaid income thresholds may be eligible for Medicaid coverage under “spend down” rules that allow medically needy individuals to spend down (or, subtract) medical expenses from their income (CMS, n.d.-b). Dual eligibility also captures elements of wealth, because Medicaid eligibility also includes asset limits (CMS, n.d.-a). Similar to income, individuals with few assets that nonetheless exceed the Medicaid asset threshold may “spend down” their assets to become eligible for Medicaid coverage. Because dual eligibility status interacts with the health system in this way, it is a measure that captures both income and wealth in a particular functional form (that of the eligibility criteria) that may or may not be the best predictor of performance indicators used in VBP. Importantly, because states establish Medicaid eligibility, what dual eligibility represents also varies by state. Similarly, Medicaid covers long-term care for those who meet additional eligibility requirements, in which case dual eligibility would capture still another functional form of health-related resources among institutionalized persons.

Dual eligibility may also capture dimensions of health status that are unmeasured by other data sources, because it represents insurance coverage as a concept distinct from SEP. For example, dual eligibles receive more generous health coverage through Medicare and Medicaid than uninsured or underinsured persons who have relatively higher SEP, but who are ineligible for Medicaid coverage because they have income and/or wealth just above the eligibility threshold. Relatedly, dual eligibility may capture clinical characteristics covering those who are under age 65 and eligible for Medicaid coverage based on disability. As noted in the introduction, the committee expects social risk factors to operate similarly among all Medicare beneficiaries including disabled persons. However, the committee notes that in its use here as a proxy measure for SEP as a social risk factor that could
be accounted for in Medicare quality measurement and payment (and not as a characteristic of the population to which the social risk factor framework applies), dual eligibility may capture health status–related elements of disability because of eligibility criteria for Medicaid coverage based on disability. Because dual eligibility captures elements of income, wealth, and health status, dual eligibility can be considered a broader measure of health-related resource availability that captures medical need.

Dual eligibility is empirically associated with health and health care outcomes including health care utilization, clinical processes of care, and patient experience (NASEM, 2016a). Dual eligibility also has face validity, particularly among health and medicine researchers, and is a relatively easy to measure and collect. Additionally, dual eligibility is not a consequence of care and likely to be resistant to gaming and manipulation at the population level. Hence, dual eligibility is an available proxy measure of resources available for goods and services to support health and health care.

**Occupation**

Occupation includes both employment status (whether an individual participates in the paid labor force or not, and if so, to what degree), as well as the type of occupation among the employed (Adler and Newman, 2002; NASEM, 2016a). Additionally, occupation can be collected in its current state or in a past state, as primary lifetime occupation. Among Medicare beneficiaries, fewer of whom participate in the paid work force than the general population—especially disabled Medicare beneficiaries who by definition cannot work—employment status may be more relevant than job type. Occupation can affect health through exposure to environmental health hazards as well as through psychosocial risks associated with job strain, lack of control, and increased stress (Kasl and Jones, 2000; Theorell, 2000). Additionally, literature suggests that employment and occupation are associated with health outcomes including unhealthy behaviors, morbidity, and mortality (NASEM, 2016a). Literature therefore supports a conceptual relationship between occupation and performance indicators used in VBP. However, there is relatively little empirical evidence on the association between employment or occupation and health care outcomes, especially using U.S. data (NASEM, 2016a). This is likely because of the difficulty of collecting and classifying occupation in the United States. Measures of occupation and employment are likely to be resistant to gaming and manipulation and the United States maintains a Standard Occupational Classification System, but many of the categories are too heterogeneous to be meaningful (Braveman et al., 2005). Additionally, some groups such as retired persons and homemakers may not have an employment related to occupation, making it difficult to identify their SEP. Despite these measure-
ment challenges, occupation and employment are not logical consequences of the quality of care, although like other measures of SEP, employment is potentially susceptible to changes as a consequence of a health effect, such as losing a job because one becomes too ill to work. However, again, at the population level, occupation is unlikely to be a consequence of health care quality. In short, like wealth, occupation is a conceptually powerful indicator of SEP, but practical considerations limit its potential use.

**Education**

Education is important for health because it shapes future employment and economic resources (Adler and Newman, 2002; IOM, 2014; NASEM, 2016a). Education can therefore affect health indirectly through other indicators of SEP—employment, occupation, and income. At the same time, education can also affect health by enabling individuals to access and understand health information and health care and to make decisions that promote health and reduce health risks, and by contributing to a patient’s ability to advocate for him- or herself in health care (Cutler and Lleras-Muney, 2006; IOM, 2014). Thus, literature supports a conceptual relationship between education and performance indicators used in VBP. Education is strongly associated with health behavior, health status, morbidity, and mortality (IOM, 2014). However, the relationship between health and health care outcomes may vary across age cohorts owing to changes in the distribution of education over time (Lynch, 2003). Nevertheless, as identified in the committee’s first report, literature indicates that education may influence health care utilization, health outcomes, and patient experience, thus providing support for an empirical association (NASEM, 2016a). Education has face validity, precedes care delivery, and is not a logical consequence of care. Education can be measured as continuous or categorical years of schooling completed or as educational attainment measured by credentials of formal schooling (e.g., high school diploma, college degree) (Braveman et al., 2005; IOM, 2014). These measures are feasible to collect and likely to be resistant to gaming. In short, education is related to health care outcomes of interest, precedes care delivery and is not a consequence of the quality of care, is not something the provider can manipulate, and meets practical considerations.

**Summary**

Income and education are promising indicators. Wealth is likely to be strongly associated with health and health care outcomes, but accurate data is difficult to collect. Dual eligibility meets practical criteria and can be considered a proxy for SEP as a measure of resources available for goods
and services to support health and health care. Occupation is likely to be strongly associated with performance indicators used in VBP, but practical considerations limit its potential use.

RACE, ETHNICITY, AND CULTURAL CONTEXT

Race and Ethnicity

Race and ethnicity are social categories that represent dimensions of a society’s stratification system by which resources, risks, and rewards are distributed. Categories of race and ethnicity capture a range of health-relevant dimensions, especially those related to social disadvantage. These include access to social institutions and rewards; behavioral norms and other sociocultural factors; inequitable distribution of power, status, and material resources; and psychosocial exposures like discrimination and bias (Phelan and Link, 2015; Williams, 1997). Race and ethnicity are strongly associated with health and health care outcomes, even after accounting for measures of SEP (Krieger, 2000; LaVeist, 2005; NASEM, 2016a; Williams, 1999; Williams et al., 2010). This effect may be caused by the lack of comparability of a given SEP measure across racial and ethnic groups (for example, as described above, wealth is differentially correlated with income by race), the importance of other unmeasured social factors that are patterned by race and ethnicity (for example, neighborhood environments, discrimination, immigration-related factors, language), and measurement error in SEP (NASEM, 2016a). Together, this literature supports a conceptual relationship between race and ethnicity and health. In its first report (see Appendix A), the committee identified literature indicating that race and ethnicity may influence health care utilization, clinical processes of care, health care costs, health outcomes, patient safety, and patient experiences of care (NASEM, 2016a). Thus, literature supports an effect. Race and ethnicity precede care delivery and are not logical consequences of care. However, observed differences by race and ethnicity may represent differences in the quality of care received, including differences related to poor communication, poor cultural competence, discrimination, and bias (IOM, 2003a).

Race and ethnicity are typically identified through self-reported categories, and measures of race and ethnicity are resistant to gaming or manipulation. Refinement of standardized race and ethnicity measures is still needed. In health research, Hispanic ethnicity is frequently combined with racial categories. The most commonly used “racial” categories are non-Hispanic white, non-Hispanic black, Hispanic, and Asian (see, for example, AHRQ, 2016; CMS, 2016). This categorization is problematic because it conceals substantial heterogeneity within certain categories. In particular, there are substantial differences across Asian groups from
different countries. Additionally, Hispanic groups from different (Latin American) countries use racial classifications that differ from U.S. racial classifications (for example, who is considered black), because they reflect different sociopolitical constructs (Wade, 1997). Some existing standards include federal standards from the White House Office of Management and Budget, which the Department of Health and Human Services (HHS) is increasingly adopting (CDC, 2010; IOM, 2009c; OMB, 1995), and those recommended in a 2009 Institute of Medicine (IOM) report (IOM, 2009c). Because race and ethnicity are conceptually distinct, these standards recommend using separate items for collecting race and ethnicity. In sum, race and ethnicity are related to health care outcomes, precede care delivery and are not a consequence of the quality of care, are not things a provider can manipulate, and meet practical considerations. At the same time, the committee acknowledges that causal pathways by which race and ethnicity influence health include mechanisms that can be related to quality of care.

Language

Language typically represents language barriers, such as speaking a primary language that is not English, having limited English proficiency, or otherwise needing interpreter services. This includes deaf American Sign Language users. Language barriers are strongly associated with health and health care outcomes—in particular, poorer access to health care, poorer health status, poorer quality care, including less recommended care, and more adverse health events (NASEM, 2016a). Thus, literature supports both a conceptual relationship and an empirical association between language and health care outcomes. Language is not a consequence of health care. Measures of language are resistant to gaming or manipulation and are also relatively easy to assess. The same 2009 IOM report recommending standards for collecting and measuring race and ethnicity data also included recommended standards for language data (IOM, 2009c). Language is thus related to health care outcomes, precedes care delivery and is not a consequence of the quality of care, is not something the provider can manipulate, and meets practical considerations.

Nativity, Immigration History, and Acculturation

Nativity refers to country of origin. Immigration history includes refugee and documentation status, as well as duration in the United States. Acculturation describes the extent to which an individual adheres to the social norms, values, and practices of his or her own ethnic group or home country or to those of the United States (NASEM, 2016a). Because acculturation is expected to increase with the amount of time spent in the
United States, duration in the United States is also used as a proxy for acculturation. Nativity and duration in the United States may influence health and health care outcomes through differences in language, communication, and health care use (IOM, 2014). Nativity and immigration history may also expose individual to different health risks or protective factors prior to arriving in the United States. Risks include environmental exposures, infectious diseases, and poverty, whereas protective factors may arise from cultural differences that shape health behaviors such as smoking, diet, and physical activity (IOM, 2014). These characteristics are likely to have important interactions with race and ethnicity (Jerant et al., 2008; Newhouse et al., 2012). Literature therefore supports several pathways by which nativity, immigration history, and acculturation may affect health. In its first report, the committee identified literature indicating that nativity may influence clinical processes of care and patient experience, supporting an empirical association (NASEM, 2016a). Evidence on the relationship between acculturation and health care outcomes is not well established, in part due to measurement challenges (Abraido-Lanza et al., 2006; IOM, 2014; NASEM, 2016a). These factors are not logical consequences of health care or health events.

Measures of nativity include identifying a specific country of origin or a dichotomous measure comparing foreign-born to U.S.-born individuals. These measures of nativity and measuring duration in the United States could therefore feasibly be collected during an office visit or in an electronic health record. Measures of nativity and time in the United States are also less sensitive than measures of documentation status or citizenship (IOM, 2014). Because there is a strong interaction between acculturation and race and ethnicity, measures of acculturation frequently assess acculturation among specific subgroups (e.g., Hispanic immigrants) (HHS, 2014). Nativity, duration in the United States, and measures of language can be crude proxies for acculturation. Measures of nativity, immigration history, and acculturation are likely to be resistant to gaming or manipulation. All told, measures of nativity and immigration history are related to health care outcomes, precede care delivery and are not a consequence of the quality of care, are not things a provider can manipulate, and meet practical considerations. Literature supports a conceptual relationship between acculturation and health care outcomes of interest, but existing measures pose challenges to feasibility. Consequently, there is a lack of empirical evidence about the relationship between acculturation and performance indicators used in VBP.

**Summary**

Race, ethnicity, language (especially limited English proficiency), and nativity are promising indicators, particularly in combination (Goodell
and Escarce, 2007). Literature supports a conceptual relationship between acculturation and health care outcomes of interest, but existing measures have limitations and empirical evidence is lacking. Documentation status as a measure of immigration history is likely to be sensitive to collect.

GENDER

The committee uses the term gender broadly to capture the social dimensions of gender as distinguished from biological effects of sex. Gender captures both normative gender identity and gender minorities, including individuals who identify as transgender, intersex, or otherwise non-conforming gender. Normative gender categories (men and women) are strongly associated to health and health care outcomes (NASEM, 2016a). However, deconstructing the effects of gender and sex can be challenging. Frequently, investigators do not specify which construct they are measuring and use the terms interchangeably (for example, incorrectly referring to sex differences as gender differences), and because sex and gender may interact to produce health outcomes (Krieger, 2003). Nevertheless, gender has face validity, is not a consequence of care, and there are good self-reported measures that are resistant to gaming. For accountability purposes in Medicare payment, gender is already included as a risk factor in clinical adjustment.

Gender Identity

Gender minorities may experience differences in health and health care outcomes, but there remains little empirical evidence. Additionally, although gender identity is not a consequence of health care, what evidence does exist suggests that differential health care outcomes may arise from miscommunication, lack of cultural competence, or bias in the patient-provider encounter (IOM, 2011). The lack of evidence is due in part to the lack of a good existing measure, although, based on recommendations from a 2011 IOM report, HHS has been actively working to improve data collection. In recent years, questions on gender identity have been included in national surveys such as the Behavioral Risk Factor Surveillance System, National Health Interview Survey, National Survey of Family Growth, National Survey on Drug Use and Health, and National Health Service Corps Patient Satisfaction Survey (Copen et al., 2016; HHS, 2015b; Ward et al., 2014). Additionally, the Office of the National Coordinator’s (ONC’s) final rule specifying meaningful use criteria included gender identity measures (HHS, 2015a). Measures of gender identity are likely to be resistant to gaming or manipulation, but because there is a very low prevalence of gender minorities, gender identity is unlikely to have a significant effect in adjustment models and other methods of accounting for social risk factors. Emerging
literature supports a relationship between gender identity and health care outcomes of interest, but existing measures pose challenges to feasibility. Hence, the empirical association is poorly established.

**Sexual Orientation**

Sexual orientation includes individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise non-conforming. Sexual orientation is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011). Like gender minorities, sexual minorities may experience differences in health and health care outcomes although there is currently little empirical evidence (NASEM, 2016a). Moreover, as with gender identity, emerging evidence suggests that differential health care outcomes among sexual minorities may be largely attributable to drivers related to the quality of care provided (e.g., miscommunication, poor cultural competence, discrimination) (Elliott et al., 2015; IOM, 2011). Similar to the practical challenges of establishing better evidence between gender identity and health care outcomes, there are no good existing measures, although the HHS has also included sexual orientation items in the surveys discussed above, and ONC also recommended inclusion of sexual orientation in its meaningful use criteria (CDC, 2010; HHS, 2015a,b). One limitation of existing measures is that they frequently only capture one dimension of sexual orientation, and identifying the dimension or dimensions most relevant to the outcome of interest can be conceptually challenging (IOM, 2011). Specifically, some individuals do not present consistently across the three dimensions of sexual orientation. For example, some men report that they have sex with other men, but do not identify as gay. In cases of such inconsistency across dimensions, identifying the dimension or dimensions most relevant for the outcome of interest will be important to accurately classify individuals. Taken together, like gender identity, emerging literature supports a relationship between sexual orientation and health care outcomes of interest, but poor existing measures have limited available evidence.

**Summary**

Normative gender categories (men and women) are strong candidates for inclusion in accounting methods, despite the fact that effects of gender are difficult to separate from biological effects of sex in measurement. However, the committee notes that gender is already included in clinical risk adjustment. Promising measures of gender identity and sexual orientation that HHS is currently testing and collecting data on could be revisited for potential inclusion when there is more empirical evidence supporting the relationship between gender identity and sexual orientation and health
care outcomes. Certainly, in the short term, there is likely to be a very low prevalence of individuals who have non-normative gender identities. In addition, the relationship of these constructs to health care outcomes is not well established. Thus, accounting for variations in gender identity is unlikely to have a significant effect in accounting methods.

SOCIAL RELATIONSHIPS

Many dimensions of social relationships are important to health, health care use, and health care outcomes (Berkman and Glass, 2000; Cohen, 2004; Eng et al., 2002; Holt-Lunstad et al., 2010; House et al., 1988; Umberson and Montez, 2010). These include access to social networks that can provide access to resources, including material resources and emotional and instrumental social support. Social relationships may be especially relevant to health care access and outcomes among older adults and persons with limitations in activities of daily living (ADLs) and instrumental activities of daily living (IADLs) (Cornwell and Waite, 2009; Hawton et al., 2011; Houser et al., 2010; Seeman et al., 2001; Tomaka et al., 2006). Hence, literature supports a conceptual relationship between social relationships and health care outcomes of interest. In health research, social relationships are typically assessed using three indicators: marital/partnership status, living alone, and emotional and instrumental social support.

Marital/Partnership Status

Marital or partnership status is a foundational structural element of social relationships that is also often considered an important indicator of social support. Being married or partnered is associated with better health care outcomes, while being single, widowed, or otherwise unpartnered is associated with worse health care outcomes (NASEM, 2016a). Literature suggests that this relationship holds true for both heterosexual partners and same-sex couples (Liu et al., 2013). Additionally, the relationship between marriage and health outcomes interacts with gender. Not only might marriage affect health in different ways by gender, but some evidence also suggests that marriage is more beneficial to men than women (IOM, 2014). Thus, there is a conceptual relationship between marital/partnership status and health. In its first report (see Appendix A), the committee identified literature indicating that marital status may influence health care utilization, clinical processes of care, health care outcomes, patient experiences of care, and health care costs (NASEM, 2016a). Thus, there is evidence of an empirical association. It is important to note demographic shifts in family structure over the past several decades—marriage rates have declined while the number of cohabiting individuals and persons who never mar-
ried has increased (Wang and Parker, 2014). Some evidence suggests that the relationship between marital status and health is changing along with these demographic shifts (Liu and Umberson, 2008). It will therefore be important to monitor the empirical association between marital/partnership status and health and revisit assumptions about their conceptual relationship over time.

Marital or partnership status is not a logical consequence of care, but is potentially susceptible to rapid changes—both gaining and losing a partner—across individual trajectories. However, at the population level, marital/partnership status is not likely to be susceptible to rapid changes. Marital and partnership status is likely to contribute to unique variation in outcomes of interest, especially among older adults. Additionally, there is likely to be greater variability in the future with the increase in the never-married and cohabiting populations, which are increasingly tied to SEP, race, ethnicity, and community of residence (Aughinbaugh et al., 2013; Tamborini, 2007; Wang and Parker, 2014). Measures of marital or partnership status include dichotomous measures of whether someone is married or not and whether someone is partnered or lacks a partner. Other measures include more categories, such as individuals who are single, widowed, and divorced. These measures are relatively easy and acceptable to collect via self-report and are likely to be resistant to gaming. Marital or partnership status is therefore related to health care outcomes, precedes care delivery and is not a consequence of the quality of care, is not something the provider can manipulate, and meets practical considerations. However, demographic changes suggest that monitoring the relationship between marital/partnership status and health outcomes over time is needed.

Living Alone

Living alone is a structural element of social relationships. In health research, living alone is typically an indicator of social isolation or loneliness, which have been shown to have important consequences for health (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988; Wilson et al., 2007). Living alone is also likely to at least partly capture elements of social support. Thus, literature supports a conceptual relationship between living alone and health care outcomes. Living alone is strongly associated with health, although literature on the association between living alone and health care outcomes is sparse (NASEM, 2016a). Nevertheless, the committee identified literature indicating that living alone may influence health care utilization, clinical processes of care, and health outcomes in its first report (NASEM, 2016a). Living alone is potentially susceptible to rapid changes, including changes resulting from a health care interaction. For example, an ill parent may
temporarily move in with his or her child following a health event or the advice of a doctor. However, living alone is not likely to be susceptible to rapid changes on average. Living alone is unlikely to vary across reporting units substantially, although there may be specific geographic regions with substantially higher prevalence of older adults living alone. Therefore, it may be important to measure living alone with regional interactions. Living alone can be fairly easily and feasibly assessed in the clinical setting using a dichotomous measure (living alone or not) or more finely graded household composition measures (e.g., living alone, with one other person, two other persons, and so on). Thus, living alone is related to performance indicators used in VBP, precedes care delivery and is not a consequence of the quality of care, is not something the provider can manipulate, and meets practical considerations.

### Emotional or Instrumental Social Support

Social support is a key function of social relationships and includes emotional elements (such as through caring and concern) as well as instrumental components (such as material and other practical supports). Emotional social support may affect health through psychosocial mechanisms—for example, boosting self-efficacy to practice health-promoting behaviors like quitting smoking or to follow a treatment regimen (Berkman and Glass, 2000). Emotional social support may also buffer negative effects of health risks or facilitate health behaviors (IOM, 2014). At the same time, social support can have a negative effect on health, for example, from distress caused by negative social interactions or because negative influences promote risky health behaviors (Uchino, 2006). Instrumental social support can support access to health-promoting resources (e.g., delivery of nutritious meals) and health care (e.g., providing transportation to a doctor’s appointment) (Berkman and Glass, 2000). Hence, literature supports a conceptual relationship between social support and performance indicators used in VBP. In its first report, the committee identified literature indicating that social support may influence health care utilization, clinical processes of care, health outcomes, and patient experiences of care (NASEM, 2016a). Generally, higher levels of social support are associated with better health care outcomes while lower levels of social support are associated with poorer health care outcomes (NASEM, 2016a). Thus, there is evidence of an empirical association.

Similar to indicators of SEP, social support is potentially susceptible to rapid changes, including changes that result from health care interactions. For example, a person who previously lacked social support may gain it following a health event, because members of their social network reach out to help the person in their recovery. Or, a physician may provide
instrumental support such as organizing meal deliveries or transportation services during a clinical encounter. However, on average, social support is not a consequence of the quality of care. For this reason, researchers often measure an individual’s perceived or potential social support through measures of social connections or social integration, which may represent potential sources of social support (IOM, 2014).

Measures of social support are likely resistant to gaming and manipulation, but they may pose feasibility issues. Some measures have many items and are burdensome to collect or may only assess one element of social support (e.g., instrumental but not emotional support; perceived support versus actual support). Additionally, because social support is multidimensional, identifying the measure that represents the most relevant dimension for a given health care outcome can be challenging. Despite these limitations, measures of social support are still likely to capture elements of social relationships that are relevant for health care outcomes. Taken together, emotional or instrumental social support is related to health care outcomes, precedes care delivery and is not a consequence of the quality of care, is not something the provider can manipulate, and generally meets practical considerations, with some limitations.

Summary

Marital status and living arrangements (living alone) are likely to influence health and health care outcomes, are easy to measure, and may at least partly capture elements of emotional and instrumental social support. Some evidence suggests that the relationship between marital/partnership status and health is changing along with demographic shifts, which point to a need to reassess the empirical associations and revisit assumptions about the conceptual relationship over time. Emotional social support and instrumental social support are likely to influence health care outcomes. However, because social support is multidimensional, identifying the measure that represents the most relevant dimension for a given health care outcome may pose both conceptual and practical challenges for data collection and measurement.

RESIDENTIAL AND COMMUNITY CONTEXT

Residential and community context refers to a broad set of characteristics that could be important to health and health care processes. These include compositional characteristics that represent aggregate characteristics of neighborhood residents, characteristics of physical and social environments (i.e., environmental measures), as well as policies, infrastructural resources, and opportunity structures that influence individuals’ everyday lives (NASEM, 2016a).
Compositional Characteristics

Compositional characteristics of communities include, for example, dimensions of SEP, the proportion of racial and ethnic minority residents, foreign-born residents, single-parent households, and English language-proficient residents. Compositional characteristics can be interpreted to represent a combination of environmental effects, group-level effects, and as a proxy for effects of individual characteristics. Compositional characteristics might affect health care outcomes in similar ways to their individual-level correlates. For example, lower education or lower income on average may influence health and health care outcomes through differences in accessing health-promoting and health care resources. Compositional characteristics might also affect health care outcomes through genuine group-level effects.

For example, one study found that for foreign-born Latinos, living in neighborhoods with high-proportions of foreign-born Latinos was protective for health, potentially through greater levels of social support or through lower levels of acculturation and its related health-damaging effects (e.g., less nutritious diets, less physical activity) (Acevedo-Garcia and Bates, 2008). Thus, literature supports a conceptual relationship. Studies have shown that community composition may affect health behaviors and other risk factors, morbidity, and mortality (Diez Roux and Mair, 2010). In its first report, the committee identified literature indicating that compositional characteristics may influence health care utilization, clinical processes of care, health care outcomes, and patient safety (NASEM, 2016a). Thus, literature also supports an empirical association between compositional characteristics and performance indicators used in VBP. Neighborhood compositional characteristics are not logical consequences of care (NASEM, 2016a).

Compositional characteristics can be assessed and used individually—for example, neighborhood racial and ethnic composition or neighborhood SEP. Compositional characteristics can also be assessed using composites, such as a summary indicator of neighborhood deprivation or neighborhood SEP. For example, Roblin (2013) developed a summary measure to assess the neighborhood SEP of a managed care organization’s enrollees measured at the census tract level using seven indicators: percent of households with income below the FPL, percent of households receiving public assistance, percent of households with low income, percent of unemployed adult males, percent of adults with low educational attainment, median household income, and median home value. Of note, the level of aggregation (e.g., census tracts, block groups, zip codes) is important when measuring compositional characteristics, because effects may vary based on the units of aggregation used (e.g., Krieger et al., 2002). Additionally, compositional characteristics can be messy to measure, because they can represent an individual characteristic or a genuine area-level effect. Furthermore, when
used as a proxy for individual-level effects, they may also pick up area-level (environmental) effects. Measures are likely resistant to gaming or manipulation and relatively easy to assess (IOM, 2014). In total, despite some measurement issues, compositional characteristics of residential and community context are related to performance indicators used in VBP, precede care delivery and are not a consequence of the quality of care, are not things a provider can manipulate, and generally meet practical considerations.

Environmental Measures

Environmental measures are indicators of residential and community context. They represent dimensions of residential environments including the physical or built environment (e.g., housing, walkability, transportation options, and proximity to services—including health care services) as well as social environments (e.g., safety and violence, social disorder, the presence of social organizations, and social cohesion). Neighborhood environments can affect health through the distribution of health-relevant resources (e.g., access to recreational spaces, healthy foods, or health care services) or by exposing residents to environmental hazards (e.g., air pollution) (Diez Roux and Mair, 2010; IOM, 2003b). Neighborhood environments can also expose residents to physical and social exposures (e.g., decay, safety and violence, discrimination, segregation) that negatively affect health through stress and other psychosocial processes (Diez Roux and Mair, 2010; IOM, 2003b). Thus, there is a conceptual relationship between environmental measures of residential and community context and health care outcomes of interest. Additionally, environmental characteristics are not logical consequences of care.

Although environmental measures are likely to be associated with health and health care outcomes, evidence is currently limited (NASEM, 2016a). Environmental measures are potentially easy to collect, although measures need to be tested further. These measures are also likely to be resistant to gaming or manipulation. For example, a growing body of literature shows that some neighborhoods have substantially fewer safe recreation spaces, purveyors of healthy foods, and health care resources (Blustein et al., 2010; Diez Roux and Mair, 2010). However, evidence regarding the effect of these factors on health care outcomes is still lacking. This is therefore an emerging area of research that could be reevaluated for potential inclusion as more evidence emerges. In sum, environmental measures are conceptually powerful, but this is an emerging area of research and the empirical association with health care outcomes is poorly established. Two environmental measures for which there is more empirical evidence—urbanicity and housing—are discussed in more detail.
Urbanicity

Urbanicity describes where an individual’s place of residence falls on the spectrum from urban to rural. On one end of the spectrum, rural areas are associated with poorer access to health care owing to both distance and availability. Rural areas are also associated with increased risks from environmental hazards associated with rural industries such as pesticides in farming (IOM, 2003b). On the other end, urban areas may have regions with concentrated disadvantage that expose residents to negative effects of poverty, negative psychosocial exposures, and physical decay. Cities may also expose residents to environmental hazards associated with air pollution and safety hazards of old or densely populated buildings (IOM, 2003b). Thus, urbanicity is conceptually related to health care outcomes of interest. In its first report (see Appendix A), the committee identified literature indicating that urbanicity may influence health care utilization, clinical processes of care, health care costs, and patient experiences of care, particularly at the far ends of the spectrum (NASEM, 2016a,b). This supports an empirical association. Urbanicity is not a logical consequence of care.

Urbanicity can be measured dichotomously (i.e., urban or rural), trichotomously (i.e., urban, suburban, rural), or on a graded spectrum (e.g., percent urban). Urbanicity can be measured as a provider or patient characteristic. Urbanicity as a provider characteristic (e.g., urbanicity of a hospital) can only measure between-unit effects, whereas patient urbanicity (e.g., rural versus urban patients) can be used to assess both within- and between-unit effects. However, patient urbanicity may differ in significant ways across provider urbanicity because, for example, rural patients who receive care from urban hospitals are likely to differ significantly from rural patients who receive care at rural hospitals. Measures are resistant to gaming and manipulation, and they are relatively easy to collect. However, assessing urbanicity may pose some potential measurement issues related to identifying the appropriate size to avoid misclassification (Krieger et al., 2002). For example, at the census tract level, there can be substantial variation in population and geographic size. Additionally, census tracts may be too small to capture truly rural or urban areas, misclassifying, for example, areas within a large metropolitan county as “rural” or small towns in rural areas as “urban” (Hart et al., 2005). Taken together, urbanicity is related to health care outcomes, precedes care delivery and is not a consequence of the quality of care, is not modifiable through provider action, and generally meets practical considerations, with some limitations.
Housing

Health-relevant elements of housing include housing stability homelessness, and quality and safety. Homelessness and housing instability (lack of access or threats to reasonable quality housing) (Frederick et al., 2014) are associated with lower access to care and higher physical and mental morbidity, as well as increased mortality (NASEM, 2016a). Additionally, poor housing conditions can expose individuals to harmful exposures such as lead or poor air quality, infectious disease, poor sanitation, and injury (IOM, 2003b; NASEM, 2016a). Thus, literature supports a conceptual relationship. Substantial literature supports associations between poor housing, housing instability, and homelessness with a wide range of health conditions covering physical and mental health (IOM, 2003b; Krieger, 2003). However, the empirical association between housing and health care outcomes is less well established. Literature suggests that homeless persons have high hospital readmission rates (Buck et al., 2012; Doran et al., 2013). In its second report (see Appendix B), the committee also identified case studies in which housing conditions—stairs and loose wires—were considered risk factors for poor health care outcomes (e.g., falls) (NASEM, 2016b). In its first report, the committee identified a small number of studies examining the relationship between type of residence (namely, private or institutional post-discharge residence) and readmissions, and these studies found no association with either short-term (30-day) or long-term (1-year) readmissions (NASEM, 2016a). To that end, housing is potentially susceptible to rapid changes as a consequence of health care. For example, after a serious health event, a hospital may discharge a patient to an institutional setting such as a skilled nursing facility, which may have resources and conditions that differ substantially from the patient’s residence in the community. However, at the population level, housing is unlikely to be susceptible to rapid changes.

Measures of housing and homelessness are likely to be resistant to gaming or manipulation, but currently present some practical limitations. Homelessness is typically assessed using counts, which require large teams to physically count homeless persons residing within a given geographic area (HUD, 2012). Some measures of housing insecurity also exist (e.g., how often an individual was worried about paying rent in the past month) (CDC, 2013), but these measures tend to be proxies for financial stress or SEP rather than assessing housing adequacy. Other measures, such as housing characteristics collected through the Medicare Current Beneficiary Survey (CMS, 2006) and those the Department of Housing and Urban Development uses to assess housing quality under its Section 8 program include many items requiring comprehensive inspections and can therefore be burdensome to collect (HUD, 1998).
Summary

Compositional characteristics and environmental measures of residential and community context are related to health care outcomes, precede care delivery and are not a consequence of the quality of care, are not modifiable through provider action, and generally meet practical considerations, with some limitations. A measure of census-tract neighborhood deprivation (i.e., a composite measure of neighborhood compositional characteristics) is likely a good proxy for a range of individual and true area-level constructs (compositional and environmental) relevant to performance indicators used in VBP. These measures are also feasible to obtain. Measures of urbanicity and housing are also available. Environmental measures are an emerging area of research and other measures could be revisited for potential inclusion when there is more empirical evidence and better measures.\(^1\)

HEALTH LITERACY

Health literacy is “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (IOM, 2004, p.32). The committee does not conceive of health literacy as a social risk factor, but rather as the product of an individual’s skills and abilities (e.g., reading and other critical skills), social and cultural factors, education, health system demands, and the health care context (IOM, 2004). However, the committee included health literacy in its conceptual framework and retained it for consideration in this report because health literacy is included in the committee’s charge and because it is specifically mentioned in the Improving Medicare Post-Acute Care Transformation (IMPACT) Act and therefore of interest to Congress. Additionally, social risk factors like education and

\(^1\) The committee sees no conflict between this report and the 2013 IOM report Variation in Health Care Spending: Target Decision Making, Not Geography, which recommended against using area-level payment adjustments to account for regional practice patterns. That committee’s charge was to evaluate whether area-level differences in per-beneficiary spending were real and if so, to develop explanations for the variation. That report examined whether health care markets (characterized using relatively large geographies such as hospital service areas, hospital referral regions, or metropolitan statistical areas) were characterized by persistent patterns of spending driven by commonalities in medical decision making or other provider behavior and concluded that area spending variability was mainly due to price markups in the commercial insurance market and variation in the use of post-acute care in Medicare. In contrast, this report focuses on differences in performance indicators used in VBP (including variations in health care utilization and resource use, but also quality) driven by differences in social characteristics of a provider or other risk-bearing entity’s patient population. The use of area-level measures is therefore at much smaller geographic units (e.g., Census tracts of patient place of residence) and serves to more accurately characterize providers’ patient populations in Medicare quality measurement and payment programs.
language influence health literacy. The committee’s conception of health literacy also captures the related concept of numeracy, or the ability to understand information presented in mathematical terms and to use mathematical knowledge and skills in a variety of applications across a variety of settings (IOM, 2014).

By definition, health literacy and numeracy are conceptually related to health care outcomes. Furthermore, in part because health literacy and numeracy are defined as barriers to accessing health care and adhering to treatment regimens, they may have strong face validity, especially among health care professionals. Low health literacy is associated with poorer knowledge of disease management and health-promoting behaviors and poorer health status (IOM, 2004). In its first report, the committee also identified literature indicating that health literacy may influence health care utilization, clinical processes of care, health care cost, and patient experiences of care (NASEM, 2016a). This literature supports an empirical association. There is less evidence on effects of numeracy on health and health care outcomes (NASEM, 2016a). Available measures of health literacy and numeracy exist, but some of these instruments are long and may be burdensome to collect in the clinical setting (IOM, 2009b). Others capture limited components of health literacy—for example, reading and writing skills, but not listening and speaking skills, or an individual’s lack of background knowledge or cultural differences that may influence his or her understanding (IOM, 2004). The committee expects these measures to be resistant to gaming and manipulation.

Although the committee acknowledges that the burden of improving health literacy does not fall solely on the health care system, the health care system does carry significant responsibility. Health care providers can mitigate the effects of low health literacy (IOM, 2004; Pleasant et al., 2016). For example, a systematic review identified methods that are effective at improving patient health literacy (Berkman, 2011). Thus, taking a universal precautions approach, which assumes that it may be difficult for all patients to understand health information and access health services, health care providers can tailor care to each patient’s level of health literacy and numeracy to ameliorate the effects that low health literacy and numeracy have on health care outcomes (Kripalani et al., 2014). Similarly, health literate health care organizations can align the demands of the health care system with patients’ skills and abilities to make it easier for patients to access, understand, navigate, and use health information and health care services (Brach et al., 2012; IOM, 2012). Thus, health literacy is something providers can act upon and can be a consequence of the quality of health care provided.
Summary

Health literacy is related to health care outcomes of interest and generally meets practical considerations. However, provider actions can mitigate the effects of low health literacy. Thus, to preserve incentives to provide effective care to patients with low health literacy, it would not be desirable to adjust or otherwise account for differences in health literacy in performance indicators used in VBP. Nevertheless, it may be desirable to reward or incentivize the greater effort or greater costs required to provide health literate care and thereby produce good health care outcomes in other ways.

SYNOPSIS

Table C3-1 summarizes the social risk factors as well as health literacy, along with their rationale for inclusion in methods to account for them and potential limitations. In the table, specific criteria as they apply to indicators of social risk factors are indicated using the criteria numbers from the previous chapter (in parentheses). To review, the criteria are as follows:

A. The social risk factor is related to the outcome.
   1. The social risk factor has a conceptual relationship with the outcome of interest.
   2. The social risk factor has an empirical association with the outcome of interest.

B. The social risk factor precedes care delivery and is not a consequence of the quality of care.
   3. The social risk factor is present at the start of care.
   4. The social risk factor is not modifiable through provider actions.

C. The social risk factor is not something the provider can act upon and manipulate.
   5. The social risk factor is resistant to manipulation or gaming.

After applying the selection criteria to indicators of the five social risk factors and health literacy, the committee made the following conclusions:

Conclusion 2: There are measurable social risk factors that could be accounted for in Medicare value-based payment programs in the short-term. Indicators include

- Income, education, and dual-eligibility;
- Race, ethnicity, language, and nativity;
- Marital/partnership status and living alone; and
- Neighborhood deprivation, urbanicity, and housing.
### TABLE C3-1 Application of Selection Criteria to Indicators of Social Risk Factors and Health Literacy

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socioeconomic Position</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not a consequence of care (3, 4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
<td></td>
</tr>
<tr>
<td>Wealth</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
<td></td>
</tr>
<tr>
<td>(as an alternate measure</td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
<td></td>
</tr>
<tr>
<td>of economic resources)</td>
<td>Not a consequence of care (3, 4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
<td></td>
</tr>
<tr>
<td>Insurance</td>
<td>Specifically, Medicaid status/dual eligibility in Medicare payment context (represents eligibility requirements) Has a conceptual relationship with performance indicators used in VBP (1)</td>
<td></td>
</tr>
<tr>
<td>(as a proxy for income)</td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not a consequence of care (3, 4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not a consequence of care (3, 4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Can cover both employment status (whether or not and to what degree an individual is employed) as well as the type of occupation among the employed; can be collected for current state or as primary lifetime occupation</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
</tr>
<tr>
<td>Potential Limitations/Challenges</td>
<td>Other Considerations</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Potentially susceptible to (rapid) changes as a consequence of a health event (3)</td>
<td>May be less salient especially among the very old (80+) where there is less variation in income—although income includes both earned and unearned income, so there is still sufficient variation (albeit narrower than the general population) among Medicare beneficiaries</td>
<td></td>
</tr>
<tr>
<td>Although measures are available, they may be sensitive to collect (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salient for Medicare beneficiaries, but sensitive to collect (people often don’t know the value of their assets, or what assets they have); missing data at ends of distribution (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potentially susceptible to (rapid) changes as a consequence of a health event (3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less precise indicator of SEP; captures less variation, captures insurance coverage (1)</td>
<td>Implications for health may vary across age cohorts due to changes in the distribution of education over time.</td>
<td></td>
</tr>
<tr>
<td>Interacts with elements of the health system—e.g., spend down to meet income requirements (5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult to collect and classify in U.S. context (2)</td>
<td>Many Medicare beneficiaries are out of the labor force (including all who are eligible based on disability); some groups such as older women may not have an employment-related occupation, making it difficult to identify SEP</td>
<td></td>
</tr>
<tr>
<td>Potentially susceptible to (rapid) changes as a consequence of a health event (3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE C3-1 Continued

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other measures</td>
<td>Other proxy measures of access to economic resources include food sufficiency/insecurity, self-reported financial burden, and financial barriers</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Not a consequence of care (3, 4)</td>
</tr>
</tbody>
</table>

**SUMMARY**

*Income and education are promising measures. Dual eligibility/Medicaid status is also an available measure of resources available for goods and services to support health and health care capturing elements of income and wealth and is thus a crude proxy for SEP. Wealth is also promising, but collecting accurate data especially at the ends of the distribution is currently difficult. Occupation is conceptually strong, but measuring occupation in the United States poses substantial practical challenges.*

**Race, Ethnicity, and Cultural Context**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race and ethnicity</td>
<td>Social categories that are dimensions of society’s stratification system by which resources, risks, and rewards are distributed; capture a range of health-relevant dimensions related to social disadvantage (e.g., access to social institutions, power/status/material resources, psychosocial exposures), also behavioral norms, sociocultural factors</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Has an empirical relationship with performance indicators used in VBP (2) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td>Language</td>
<td>Typically represents language barriers such as speaking a primary language other than English, having limited English proficiency or otherwise needing interpreter services; can also serve as crude proxy for acculturation</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Has an empirical relationship with performance indicators used in VBP (2) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</td>
</tr>
</tbody>
</table>
### Potential Limitations/Challenges

<table>
<thead>
<tr>
<th>Potential Limitations/Challenges</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of evidence of associations with outcomes (2)</td>
<td>Practical considerations will depend on the specific measure</td>
</tr>
<tr>
<td>Refinement of standardized race and ethnicity measures is still needed; there can be substantial heterogeneity within categories (especially Hispanic ethnicity, Asian/Pacific Islander race) (2)</td>
<td>Some existing standards include White House Office of Management and Budget standards and IOM recommendations (IOM, 2009)</td>
</tr>
</tbody>
</table>

Likely to have important interactions with race and ethnicity

*continued*
### TABLE C3-1  Continued

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nativity, immigration history, and acculturation</td>
<td>Includes country of origin (specific country or foreign-born versus U.S.-born), immigration status (including refugee and documentation status), duration in the United States, and measures of acculturation (i.e., the extent to which an individual adheres to the social norms, values, and practices of his own ethnic group or home country or to those of the United States): nativity can be a rough proxy for acculturation</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Has an empirical relationship with performance indicators used in VBP (2) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</td>
</tr>
</tbody>
</table>

**SUMMARY**  
*Race, ethnicity, language, and nativity are promising measures, particularly in combination. Documentation status as a measure of immigration history is likely to be sensitive to collect. Literature supports a conceptual relationship between acculturation and health care outcomes of interest, but existing measures have limitations and empirical evidence is lacking.*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Represented social dimensions of gender, distinguished from biological effects of sex</th>
<th>Has a conceptual relationship with performance indicators used in VBP (1) Has an empirical relationship with performance indicators used in VBP (2) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (normative)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender identity (non-conforming)</td>
<td>Includes individuals who identify as transgender, intersex, queer, questioning, and otherwise non-conforming</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Present at the start of care (3) Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td>Sexual orientation</td>
<td>Includes individuals who identify as lesbian, gay, bisexual, queer, questioning</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Present at the start of care (3) Resistant to gaming/manipulation (5)</td>
</tr>
</tbody>
</table>
### Potential Limitations/Challenges

<table>
<thead>
<tr>
<th>Potential Limitations/Challenges</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting data on documentation status as an indicator of immigration history may be highly sensitive (2)</td>
<td>Likely to have important interactions with race and ethnicity</td>
</tr>
<tr>
<td>Measures of acculturation are probably not feasible to collect in the clinical setting, and links to health care outcomes are likely not well established (2)</td>
<td></td>
</tr>
<tr>
<td>Hard to decompose gender effects from biological sex effects (2)</td>
<td>Already included in clinical adjustment</td>
</tr>
<tr>
<td>Lack of empirical evidence and a good existing measure (2). Differential health outcomes may arise from provider–patient encounter (miscommunication, lack of cultural competence, bias) (4)</td>
<td>Very low prevalence, unlikely to have a significant effect in adjustment models: CMS is piloting measures for sexual orientation that could be revisited for potential inclusion when there is more data</td>
</tr>
<tr>
<td>Lack of empirical evidence and a good existing measure (2). Differential health outcomes may arise from provider–patient encounter (miscommunication, lack of cultural competence, bias) (4)</td>
<td>CMS is piloting measures for sexual orientation that could be revisited for potential inclusion when there is more data</td>
</tr>
</tbody>
</table>

**continued**
### TABLE C3-1  Continued

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUMMARY</strong></td>
<td>Normative gender identity (men and women) is promising, but already included in clinical risk adjustment models. Gender identity and sexual orientation could be revisited when there are better measures and data. However, in the short term, prevalence of individuals who have a non-conforming gender identity is likely to be low and thus would not substantially affect adjustments.</td>
<td></td>
</tr>
</tbody>
</table>

#### Social Relationships

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital/partnership status</td>
<td>Foundational structural element of social relationships; often considered an important indicator of social support</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not a consequence of care (3, 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td>Living alone</td>
<td>Structural element of social relationships, typically an indicator of social isolation or loneliness in health care and health services research</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not a consequence of care (3, 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td>Emotional and instrumental social support</td>
<td>Key function of social relationships, includes emotional elements (e.g., through caring and concern) as well as instrumental components (i.e., material and other practical support)</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not a consequence of care (3, 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistant to gaming/manipulation (5)</td>
</tr>
</tbody>
</table>

**SUMMARY** Marital/partnership status and living arrangements (living alone) are feasible to measure and may at least partly capture social support elements. Emotional and instrumental social support are strongly related to health care outcomes; some measures exist, but because they are multidimensional and causal mechanisms are poorly understood, measuring social support can be difficult both conceptually and practically.
**SUMMARY**

Normative gender identity (men and women) is promising, but already included in clinical risk adjustment models. Gender identity and sexual orientation could be revisited when there are better measures and data. However, in the short term, prevalence of individuals who have a non-conforming gender identity is likely to be low and thus would not substantially affect adjustments.

**Social Relationships**

**Marital/partnership status**

- Foundational structural element of social relationships; often considered an important indicator of social support
- Has a conceptual relationship with performance indicators used in VBP (1)
- Has an empirical relationship with performance indicators used in VBP (2)
- Not a consequence of care (3, 4)
- Resistant to gaming/manipulation (5)

**Living alone**

- Structural element of social relationships, typically an indicator of social isolation or loneliness in health care and health services research
- Has a conceptual relationship with performance indicators used in VBP (1)
- Has an empirical relationship with performance indicators used in VBP (2)
- Not a consequence of care (3, 4)
- Resistant to gaming/manipulation (5)

**Emotional and instrumental social support**

- Key function of social relationships, includes emotional elements (e.g., through caring and concern) as well as instrumental components (i.e., material and other practical support)
- Has a conceptual relationship with performance indicators used in VBP (1)
- Has an empirical relationship with performance indicators used in VBP (2)
- Not a consequence of care (3, 4)
- Resistant to gaming/manipulation (5)

**APPENDIX C**

### Potential Limitations/Challenges

<table>
<thead>
<tr>
<th>Potential Limitations/Challenges</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potentially susceptible to rapid changes (3)</td>
<td></td>
</tr>
<tr>
<td>Potentially susceptible to rapid changes (3)</td>
<td>Changes in living status (positive or negative) may result from health care interactions (3, 4)</td>
</tr>
<tr>
<td>Potentially susceptible to rapid changes (3)</td>
<td>Unlikely to vary across reporting units substantially, but there may be specific geographic regions with substantially higher prevalence of older adults living alone; may be important to measure with regional interactions</td>
</tr>
<tr>
<td>Potentially susceptible to rapid changes (3)</td>
<td>Changes in social status (positive or negative) may result from health care interactions (3, 4)</td>
</tr>
</tbody>
</table>

*continued*
### TABLE C3-1  Continued

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
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<tbody>
<tr>
<td><strong>Residential and Community Context</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Compositional characteristics</strong></td>
<td>Includes dimensions of SEP, the proportion of racial and ethnic minority residents, foreign-born residents, single parent households, English language-proficient residents, either individually or in composite (e.g., in a summary neighborhood deprivation measure)</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Has an empirical relationship with performance indicators used in VBP (2) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td><strong>Environmental measures</strong></td>
<td>Dimensions of residential environments including the physical environment (e.g., housing, walkability, transportation options, and proximity to services) and social environments (e.g., safety and violence, social disorder, presence of social organizations, and social cohesion)</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td><strong>Urbanicity</strong></td>
<td>Describes where a place (of an individual’s residence) falls on the spectrum from urban to rural</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Has an empirical relationship with performance indicators used in VBP (2) Not a consequence of care (3, 4) Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td><strong>Housing</strong></td>
<td>Health-relevant dimensions of housing include housing insecurity, homelessness, and quality and safety.</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1) Resistant to gaming/manipulation (5)</td>
</tr>
<tr>
<td><strong>SUMMARY</strong></td>
<td>A measure of census-tract neighborhood deprivation is likely good proxy for a range of individual-level and true area-level constructs relevant to outcomes of interest and feasible to obtain. Environmental measures are an area of emerging research that could be revisited when there is more empirical evidence and better measures. Measures of urbanicity and housing are also available.</td>
<td></td>
</tr>
<tr>
<td>Potential Limitations/Challenges</td>
<td>Other Considerations</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Can be a messy measure: When used as a proxy for individual-level effects, may also pick up area-level effects (1)</td>
<td>Can be used as proxy for individual characteristics or as area-level measure; can be assessed using individual characteristics or as a composite</td>
<td></td>
</tr>
<tr>
<td>Lack of evidence, but potentially easy to measure/collect (2) Measures need to be tested further (2)</td>
<td>Effects are small (at population level, may be unlikely to rise above SEP)</td>
<td></td>
</tr>
<tr>
<td>Some potential measurement challenges; need to measure at the appropriate size to avoid misclassification (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of evidence (2) Potentially susceptible to (rapid) changes as a consequence of a health event (3) Potentially a characteristic of care (4) Measures need to be tested further (2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE C3-1  Continued

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Definitional Issues</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health literacy (and numeracy)</td>
<td><strong>Health literacy</strong> is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions; <strong>numeracy</strong> describes the ability to understand information presented in mathematical terms and to use mathematical knowledge and skills in a variety of applications across a variety of settings</td>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resistant to gaming/ manipulation (5)</td>
</tr>
</tbody>
</table>

**SUMMARY**  
*Health literacy is the result of social risk factors and the effects of low literacy can be mitigated via actions that are squarely within the purview of the health care system. Thus, risk adjustment is likely to reduce incentives to tailor care to or improve patients’ health literacy.*

---

**NOTE:** CMS = Centers for Medicare & Medicaid Services; IOM = Institute of Medicine; SEP = socioeconomic position; VBP = value-based payment.
**Indicators Definitional Issues Rationale**

<table>
<thead>
<tr>
<th>Health Literacy</th>
<th>Health (and Numeracy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions; numeracy describes the ability to understand information presented in mathematical terms and to use mathematical knowledge and skills in a variety of applications across a variety of settings.</td>
<td></td>
</tr>
<tr>
<td>Has a conceptual relationship with performance indicators used in VBP (1)</td>
<td></td>
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<tr>
<td>Has an empirical relationship with performance indicators used in VBP (2)</td>
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</tr>
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<td>Resistant to gaming/manipulation (5)</td>
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</tbody>
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**SUMMARY**

Health literacy is the result of social risk factors and the effects of low literacy can be mitigated via actions that are squarely within the purview of the health care system. Thus, risk adjustment is likely to reduce incentives to tailor care to or improve patients' health literacy.

**NOTE:** CMS = Centers for Medicare & Medicaid Services; IOM = Institute of Medicine; SEP = socioeconomic position; VBP = value-based payment.

**APPENDIX C 401**

<table>
<thead>
<tr>
<th>Potential Limitations/Challenges</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validated measures exist, but may be burdensome to collect (2)</td>
<td>Health literacy and numeracy are outcomes of social risk factors (like SEP, language)</td>
</tr>
<tr>
<td>Malleable in individuals and can be improved as a consequence of the quality of care provided (3)</td>
<td></td>
</tr>
<tr>
<td>Providers can act upon to ameliorate effects; thus, potentially a characteristic of care (4)</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion 3: There are some indicators of social risk factors that capture the basic underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in accounting methods in Medicare value-based payment programs in the longer term. These include

- Wealth,
- Acculturation,
- Gender identity and sexual orientation,
- Emotional and instrumental social support, and
- Environmental measures of residential and community context.

IMPLEMENTATION CONSIDERATIONS

The committee applied selection criteria to each social risk factor and relevant indicators of these factors individually. However, as discussed in Appendix C2, the goal is to identify a set of measures that perform well together. To that end, a combination of measures might perform differently than the sum of its parts. Additionally, some social risk factors may have regional interactions. For example, as previously described, living alone may not vary substantially across reporting units except in certain communities with exceptionally high proportions of older adults living alone. Furthermore, as discussed with regard to measures of neighborhood deprivation and indicators of social support, proxy measures may cover multiple indicators. Finally, as described in Appendix C2, the committee expects the relationships between social risk factors and health and health care outcomes to change over time. Thus, it will be important to continuously evaluate the individual risk factors, indicators, and measures as well as the overall set of measures over time. These are empirical issues to test and apply when using real data.

REFERENCES


Methods to Account for Social Risk Factors in Medicare Value-Based Payment

When developing and selecting methods to account for social risk factors in Medicare quality measurement and payment applications, understanding the type of incentive design is important in evaluating the potential benefits and challenges of various accounting methods. The incentive design will interact with the method used to account for social risk factor(s) and produce certain potential harms. Selecting the appropriate method (or, methods) to account for social risk factors will require weighing these potential harms. Given that the Medicare payment landscape is evolving and the Centers for Medicare & Medicaid Services (CMS) is moving toward more comprehensive population-based alternative payment models (APMs), the committee developed methods that could apply to any Medicare quality measurement and/or payment program, not just the existing ones. The chapter begins with a brief review of the current Medicare payment landscape, with a focus on capitated payments to Medicare Advantage (also known as Medicare Part C) and Medicare Part D plans and on value-based payment (VBP) programs that tie payment to performance in traditional Medicare and Medicare Advantage, and the planned developments. The chapter proceeds with describing the potential benefits and harms of the status quo (not accounting for social risk factors) and compares them to the potential benefits and harms of accounting for social risk factors generally. The chapter then proposes alternative methods for accounting for social risk factors. The chapter closes with guidance on an approach to applying the methods to achieve simultaneous goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly.
INCENTIVE DESIGN IN MEDICARE PAYMENT PROGRAMS

The Patient Protection and Affordable Care Act of 2010 (ACA), and subsequent legislation such as the Improving Medicare Post-Acute Care Transformations (IMPACT) Act of 2014 and the Medicare and CHIP Reauthorization Act of 2015 (MACRA) require CMS to implement VBP programs. VBP aims to align payment and care delivery goals to improve health care quality and outcomes, while also controlling costs (Rosenthal, 2008). Together these reforms shift focus from delivery of and payment for individual services to a system that focuses on population health management and holds providers accountable for both quality and cost (McGinnis, 2016; Rajkumar et al., 2014).

In addition to congressionally mandated requirements to implement VBP programs, in 2015, Secretary of Health and Human Services (HHS) Sylvia Burwell announced a goal for CMS to have 30 percent of Medicare payments in APMs by the end of 2016 and 50 percent by the end of 2018, as well as to have 85 percent of Medicare payments tied to quality or value by 2016 and 90 percent by 2018 (Burwell, 2015). As described in the committee’s first report, CMS currently administers eight VBP programs and has two in planning (NASEM, 2016a). Additionally, CMS is continually developing and reorganizing more VBP programs, and the Center for Medicare & Medicaid Innovation (CMMI) also tests innovative payment models.

CMS payment models cover a spectrum of approaches from traditional fee-for-service to population-based payment models. As described in Appendix C1 and in the committee’s first report (see Appendix A), VBP models fall into two broad categories, which the committee roughly categorizes as financial incentives and APMs (NASEM, 2016a). Financial incentives such as pay-for-performance programs link financial bonuses and/or penalties to quality or value (NASEM, 2016a). APMs include episode-based payments and population-based (global) payments, shifting greater financial risk to providers to hold them accountable for the quality and efficiency of care they provide, as well as health outcomes achieved (NASEM, 2016a). Additionally, although not considered entirely VBP models nor do they classify strictly as financial incentives or APMs, Medicare Advantage and Part D have design features that tie quality and cost performance to payment, and thus are relevant for purposes of accounting for social risk factors in payment. They also include risk sharing that necessitates consideration of risk adjustment for the capitation amount or global spending target or may include VBP mechanisms such as bonus payments. Moreover, the study sponsor, the Office of the Assistant Secretary for Planning and Evaluation of HHS, included Medicare Advantage and Medicare Part D as relevant payment models in its presentation to the committee at the first meeting.
CMS VBP programs and their specific incentive designs are described briefly below.

**Current Financial Incentive Programs**

**Penalties for Poor Performance**

**Hospital-Acquired Condition Payment Reduction Program**  Implemented beginning fiscal year (FY) 2015, the Hospital-Acquired Condition Payment Reduction Program reduces payments to acute care hospitals paid under the Inpatient Prospective Payment System based on their performance on select hospital-acquired condition quality measures, including the Agency for Healthcare Research and Quality Patient Safety Indicator 90 and the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network infection measures. The bottom 25 percent worst performing hospitals receive a payment reduction of 1 percent for all discharges in those hospitals.

**Hospital Readmissions Reduction Program**  Begun in 2012, the Hospital Readmissions Reduction Program (HRRP) is a penalty program for acute care hospitals paid under the Inpatient Prospective Payment System. The HRRP requires CMS to reduce a share of the base operating payments to hospitals that have excess readmissions (CMS, 2014b). For FY 2013 and FY 2014, CMS calculated excess readmissions for three conditions: acute myocardial infarction, heart failure, and pneumonia. In FY 2014, CMS refined the measures to account for planned readmissions, and in FY 2015, the program was expanded to include excess readmissions from chronic obstructive pulmonary disease and total hip arthroplasty or total knee arthroplasty. The program further expanded to include coronary artery bypass graft surgery for FY 2017 (HHS, 2014; NASEM, 2016a). For FY 2013, the maximum reduction was 1 percent of the hospital’s base operating payment; for FY 2014, the maximum reduction was 2 percent; and in FY 2015, the maximum reduction was 3 percent (CMS, 2014b). For FY 2016, the maximum reduction remains 3 percent (HHS, 2014; NASEM, 2016a).

**Rewards and Penalties for Performance**

**Hospital Value-Based Purchasing Program**  The Hospital Value-Based Purchasing Program is the only Medicare hospital incentive program that offers both rewards and sanctions. Beginning FY 2013, acute care hospitals paid under the Inpatient Prospective Payment System became eligible for rewards and penalties based on performance on quality, patient experience, and efficiency (Medicare spending per beneficiary). Incentives could total up to 1 percent in FY 2013 and increase in 0.25 percent increments annually to
2 percent in FY 2017 and subsequent years (MLN, 2013). The program is a budget neutral program, so total incentive payments must equal the total payment reductions (penalties).

**Physician Value-Based Modifier Program** Required by the ACA and established by CMS beginning in 2015, the Physician Value-Based Modifier is a budget-neutral, pay-for-performance program (CMS, n.d.-d). In this program, physicians can receive incentive payments or penalties based on performance on quality, costs, and patient experiences of care. The program divides physicians into two categories based on whether physicians meet minimum reporting requirements using the Physician Quality Reporting System (category 1) or not (category 2). In category 1, physicians are eligible to receive either upward or downward adjustments based on their performance on quality and costs. Physicians in category 2 are subject to a modifier payment set at a fixed downward adjustment (1 percent in 2015 and 2 percent in 2016). Because the program is budget-neutral, total upward adjustments for category 1 must equal total downward adjustments for categories 1 and 2 combined.

**Current Alternative Payment Models**

**APM with Downside Risk**

**End-Stage Renal Disease Quality Improvement Program** The Medicare Improvements for Patients and Providers Act (MIPPA) of 2008 authorized the End Stage Renal Disease (ESRD) Quality Improvement Program. MIPPA requires CMS to reduce payments to outpatient dialysis facilities treating ESRD patients based on the clinical measures that assess a facility’s performance and reporting measures (i.e., whether facilities have met reporting requirements) (CMS, 2015a). Beginning in 2012, CMS reduced the bundled payment rate to ESRD facilities with poor performance by up to 2 percent. To determine penalties, CMS first calculates both an achievement and improvement score for each clinical measure (except the CDC National Healthcare Safety Network Bloodstream Infection in Hemodialysis Outpatients measure, which receives only an achievement score) (CMS, 2014a). Facilities that meet a minimum total performance score receive full payment, while those that fall under this threshold are subject to a reduction between 0.5 percent and 2.0 percent (CMS, 2014a, n.d.-a).

**APM with Upside Gainsharing and Downside Risk**

**Medicare Shared Savings Program** The Medicare Shared Savings Program (MSSP) is a key provision of the ACA that establishes accountable care...
organizations (ACOs), a payment and delivery system model that aims to motivate better care coordination, better quality care, and more efficient care through payment reforms (CMS, 2015d). CMS is phasing in the program with two tracks: a one-sided model (shared savings only) and a two-sided model (shared savings and losses). Before each performance year, CMS calculates a risk-adjusted, historical benchmark for per-beneficiary costs. At the end of each performance period, CMS compares the actual spending of each MSSP ACO to the calculated benchmark. Organizations that meet a minimum saving threshold qualify for shared savings, while those that meet a minimum loss threshold must share losses.

Other Current Value-Based Payment Models and Mechanisms

Medicare Advantage/Part C Bonus Payments

Medicare Advantage is the insurance program that covers Part A (inpatient care) and Part B (outpatient care) benefits, typically offers Part D prescription drug coverage, and may also offer additional benefits and services for additional cost (MedPAC, 2015a). For beneficiaries enrolled in MA plans (30 percent of all Medicare beneficiaries in 2015), CMS pays MA plans an annual capitated rate based on national and regional historical benchmarks that are risk adjusted using the CMS hierarchical condition category model. MA plans that achieve higher quality ratings under Medicare’s Five Star Quality Rating System are also eligible for quality bonus payments. In 2016, these bonus payments equal 5 percent of the county-level rate per beneficiary.

Part D

Medicare Part D is a pharmaceutical drug reimbursement program administered by CMS and run by Medicare-approved private insurance plans. CMS pays these plans in several ways, including direct subsidies, low-income subsidies for cost sharing and premiums (costs above the direct subsidy an enrollee otherwise pays for out of pocket), and two risk-sharing mechanisms: individual reinsurance and risk corridor adjustments. Through individual reinsurance, Medicare subsidizes 80 percent of drug spending above an out-of-pocket threshold (enrollee costs including the deductible and cost sharing, also known as the catastrophic cap), while the insurance plan pays 15 percent and the enrollee pays 5 percent (Medicare.gov, n.d.; MedPAC, 2014). Risk corridor adjustment limits plans’ potential gains or losses by financing costs that are higher than expected and recouping profits deemed excessive (MedPAC, 2015b). CMS calculates risk corridor adjustments at the end of each benefit year, comparing the plan’s actual costs to
its bid. Up to 5 percent above or below the bid, plans keep all profits and losses. Between 5 and 10 percent above or below the bid, plan share half of savings and losses with Medicare. Above or below 10 percent, Medicare covers 80 percent of the risk and plans are at risk of 20 percent.

Future and Developing Value-Based Payment Programs

Home Health Value-Based Purchasing

In its calendar year 2016 Home Health Prospective Payment Final Rule, CMS proposed a home health value-based purchasing model that would subject home health agencies to upward or downward payment adjustments based on quality and efficiency measures (HHS, 2015). CMS randomly selected nine states (Arizona, Florida, Iowa, Maryland, Massachusetts, Nebraska, North Carolina, Tennessee, and Washington) representing nine regional groups for model participation beginning January 1, 2016. CMS requires all home health agencies within the states to participate. Beginning in 2016, CMS assesses and reports performance. CMS proposed implementing payment adjustments beginning in 2018, with proposed maximum adjustments increasing incrementally from 3 percent in 2018, 5 percent in 2019, 6 percent in 2020, 7 percent in 2021, and 8 percent in 2022 (HHS, 2015). CMS proposed payment adjustment scoring using both achievement and improvement scores (HHS, 2015).

Skilled Nursing Facility Value-Based Purchasing

The Protecting Access to Medicare Act of 2014 authorizes a skilled nursing facility incentive program and also specifies details about quality measures, scoring performance, the performance standards and periods, and public reporting (CMS, n.d.-c). Beginning in 2016, CMS will measure performance on the Skilled Nursing Facility 30-Day All-Cause Readmission Measure (CMS, n.d.-c). CMS will also send skilled nursing facilities feedback reports on their performance beginning in the summer of 2016 and quarterly thereafter, and CMS will publish post-performance data publicly on Nursing Home Compare starting in October 2016. Beginning in 2018 (FY 2019), Skilled Nursing Facilities (SNFs), defined broadly as any institution that primarily provides skilled nursing or rehabilitative services, will receive incentive payments based on the quality of care they provide. CMS submitted a report to Congress detailing their implementation plan and has proposed several incentive design options, including paying for attainment, paying for improvement, and a hybrid attainment and improvement model (HHS, 2012).
The Medicare and the Children’s Health Insurance Program
Reauthorization Act

Among other provisions, MACRA streamlines current public reporting programs and incentivizes the development and uptake of VBP models through establishment of a new Merit-Based Incentive Payment System (MIPS) and incentive payments for participation in certain APMs (Conway et al., 2015). In 2019, quality incentive programs including the Physician Value-Based Modifier, the Physician Quality Reporting System, and the Medicare Electronic Health Records Incentive Program (also known as the Meaningful Use program) will end. MIPS will combine these separate programs into a single initiative. MIPS requires the Secretary of HHS to develop a composite performance score that combines performance on each of four weighted categories: quality, resource use, meaningful use, and clinical practice improvement activities (CMS, 2015b). Based on this score, providers may receive an upward or downward adjustment, or no adjustment. Maximum adjustments will be 4 percent in 2019, 5 percent in 2020, 7 percent in 2021, and 9 percent from 2022 forward (CMS, 2015b). From 2019 to 2024, the highest performers will also receive an additional payment adjustment. The program is budget neutral, so total upward adjustments must equal total downward adjustments.

MACRA encourages provider participation in APMs through incentive payments. Qualifying participants are excluded from MIPS payment adjustments and instead receive a lump sum equaling 5 percent of the preceding year’s estimated total Part B expenditures (CMS, n.d.-b; Conway et al., 2015). To qualify for these payments, in 2019 and 2020, qualifying participants must have 25 percent of their payments or patients through an eligible payment entity (CMS, n.d.-b). In 2021 and 2022, the threshold increases to 50 percent of payments or patients and in 2023 and subsequent years, the threshold rises to 75 percent. In early 2016, CMS identified 10 APMs, including MSSP (described above) and several innovative models such as Next Generation ACOs and Bundled Payment Care Improvement, described in the following section (CMS, 2016e).

Select Innovative Payment Models

CMMI designs and tests innovative payment and care deliver models. Three such payment models that tie payment to quality and efficiency of care delivered to Medicare beneficiaries, and thus for which accounting for social risk factors may be relevant, are described below.
**Bundled Payments for Care Improvement**

The Bundled Payments for Care Improvement (BPCI) initiative incentivizes coordinated, efficient, and high quality care across clinicians and care settings by linking payments for clinical services related to a single episode of care (Press et al., 2016). BPCI tests four types of bundled payments (Press et al., 2016). In model 1, the episode of care includes all diagnostic-related groups for the duration of an inpatient stay at an acute care hospital (CMS, 2016a). The first cohort of model 1 began in April 2013 and concluded in March 2016; the remaining participants conclude in December 2016. In models 2, 3, and 4, participating providers choose the episode of care for one or more of 48 conditions as well as the duration of the episode (hospitalization and related readmissions only, hospitalization and postacute care up to 90 days, or postacute care up to 90 days only) (Press et al., 2016). The elected duration determines the model (CMS, 2016a). Although the payment methodology varies somewhat by model, in each, Medicare compares actual costs to a target bundled rate. Providers whose actual costs are under the target can keep savings, while those with costs over the target must compensate Medicare for the difference (Froimson et al., 2013). As of April 1, 2016, more than 1,500 health care providers were participating in BCPI Phase 2, including 681 skilled nursing facilities, 385 acute care hospitals, 283 physician group practices, 99 home health agencies, 9 inpatient rehabilitation facilities, and 1 long-term care hospital (CMS, 2016a).

**Advanced APMs**

**Next Generation ACOs**

Next Generation ACOs build on experience from earlier ACO models such as the MSSP described above and Pioneer ACOs. These Next Generation ACOs offer a range of payment mechanisms from fee-for-service to capitation (referred to in the model as all-inclusive population-based payments), which allow participating organizations to take on substantially more financial risk—up to 100 percent (CMS, 2016d; HHS, 2016). This provides the participating organizations with the potential to share a greater proportion of savings, although this also puts the organiza-

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1 The Pioneer ACO Model is a CMMI accountable care initiative with higher levels of savings and risk compared to MSSP, which also allows eligible participants to elect to move from fee-for-service to a population-based payment model (prospective per beneficiary per month payment) in the third year of participation (CMS, 2016d). CMS also requires Pioneer ACOs to cover at least 15,000 beneficiaries (5,000 for rural ACOs) and encourages them to negotiate VBP arrangements with other payers by the second year of participation. See https://innovation.cms.gov/initiatives/Pioneer-ACO-Model/Pioneer-ACO-FAQs.html (accessed May 19, 2016).
tions at greater financial risk for losses. Also unlike previous models, CMS will calculate a prospective (rather than retrospective) benchmark, and participating organizations receive a prospective budget (i.e., before the performance year) (HHS, 2016). The Next Generation ACOs also include a set of delivery system tools to enhance beneficiary engagement. These include potential reward payments to beneficiaries for receiving care through the ACO and affiliated providers and increased access to care coordination services, such as access to telehealth, postdischarge home visits, and skilled nursing facility services, among others (CMS, 2016d). In 2016, 21 organizations are participating in the model (HHS, 2016).

Comprehensive Primary Care Plus The Comprehensive Primary Care Plus (CPC+) model is a regionally based, advanced primary care medical home model comprising multipayer payment reform and delivery system reforms that build on the existing Comprehensive Primary Care initiative (Ayanian and Hamel, 2016; Dale et al., 2016). With respect to care delivery, participants meet a series of incremental requirements to achieve five functions: access and continuity, care management stratified by patient risk, preventive care and planned care for chronic conditions, patient and caregiver engagement, and coordinated and comprehensive care (CMS, 2016c; Sessums et al., 2016). For practices with more experience delivering advanced primary care, CPC+ has a separate track that requires these providers to provide additional services, such as identifying psychosocial needs of patients with complex needs and providing resources and other supports to meet those needs (Sessums et al., 2016). To facilitate this care delivery, CPC+ aligns payment, claims and feedback provision, and quality measures across commercial and public payers in a given region (Sessums et al., 2016). CPC+ also includes several payment mechanisms including a prospective monthly care management fee, performance-based incentive payments, and, for track 2 (experienced) models, an upfront comprehensive primary care payment for evaluation and management (CMS, 2016c). CMS also aims to aggregate cost and utility data across all payers as well as to convene health information technology vendors to facilitate providing data and tools to participants to inform practice redesign and quality improvement (Sessums et al., 2016). CMS expects to select up to 5,000 practices in 20 regions to begin a 5-year model in January 2017 (CMS, 2016b; Sessums et al., 2016).

POTENTIAL HARMS OF THE STATUS QUO COMPARED TO ACCOUNTING FOR SOCIAL RISK FACTORS

Although adjustment for social risk factors could have important benefits, any proposal to account for social risk factors in Medicare payment programs will entail its own advantages and disadvantages that need to be
carefully considered. Current Medicare VBP programs that do not account for social risk factors could result in tangible harms to populations with social risk factors and to the providers who serve them (Friedberg et al., 2010; Gilman et al., 2015; Joynt and Jha, 2013). Patients with social risk factors may require more intensive care and greater costs to overcome barriers they face to achieving the same health outcomes as patients with fewer risks. By not accounting for the greater cost of caring for these patients, existing payment systems may contribute to disparities in access and quality of care (Joynt and Rosenthal, 2012; Woolhandler and Himmelstein, 2015).

Under current APMs, physicians and hospitals that disproportionately care for socially at-risk populations receive payments that may undervalue the resources and effort required to provide high-quality care for these individuals (Chien et al., 2007). Similarly, it may be difficult for even dedicated providers who disproportionately care for socially at-risk populations (including safety-net providers, minority-serving institutions, critical access hospitals, and community health centers) to gain (or not lose) revenue under quality incentive schemes (e.g., pay-for-performance), because it can be more costly to help patients with social risk factors achieve quality benchmarks (Joynt et al., 2014).

When providers who disproportionately serve patients with social risk factors lose revenue, quality of care and access for patients could decline (Chien et al., 2007; Cunningham et al., 2008; Grealy, 2014; Ryan, 2013; Volpp et al., 2006). In the short term, these providers may be required to limit staffing or reduce the variety of services provided to patients with social risk factors (Lindrooth et al., 2006). Over the longer term, revenue shortfalls could contribute to financial distress for providers and to the closure of hospitals, clinics, and physician offices in underserved communities (Kane et al., 2012; Lipstein and Dunagan, 2014). These closures, in turn, would make it difficult for patients with social risk factors to access care in their communities, contributing to delays in use of clinically beneficial treatments (Bazzoli et al., 2012; Buchmueller et al., 2006; Walker et al., 2011).

Similarly, payments to insurance plans that do not account for social risk factors could lead insurers to avoid covering underserved populations. For example, as described in the previous section, Medicare Advantage plans receive a risk-adjusted annual capitated rate and receive bonuses for achieving quality benchmarks based on performance measures risk adjusted for clinical, behavioral, and some social risk factors under the Five-Star Quality Rating System. However, even after adjustment, plans that have a large number of individuals with social risk factors find it more difficult to achieve the benchmarks because these individuals have lower adherence and greater difficulty managing illnesses, making it difficult for the insurer to obtain star ratings comparable to other plans (Young et al., 2014). In response, plans could decide to withdraw from insurance markets in which
populations with social risk factors reside (Chien et al., 2007). When insurers leave markets, this has the effect of diminishing choice and competition, leading to potentially higher premiums for beneficiaries (Gaynor and Town, 2011). VBP could also reduce incentives for hospitals to care for socially at-risk populations if penalties are larger than hospitals’ margins to care for these patients (Joynt and Jha, 2013).

Finally, under the status quo, plans and providers that serve mixed populations that include individuals with both low and high levels of social risk factors may find that they have incentives to improve care only for patients with low levels of social risk factors (Casalino et al., 2007). For example, to reach a target rate for hemoglobin A1C control among diabetic patients, a physician practice may find it is less costly to focus on improving care for patients that have access to better quality diets and who are more easily able to attend regular checkup visits. As a result, those patients with greater social risk factors may not receive effective interventions available to patients with better social and economic resources.

In summary, the status quo has disadvantages that include incentives for providers and insurers to avoid serving patients with social risk factors, underpayment to providers who disproportionately serve socially at-risk populations, and underinvestment in quality of care. While proposals that do account for social risk factors would likely diminish these harms, there are also some potential ways in which accounting for social risk factors could incrementally introduce new harms.

First, incentives to improve the quality of care for patients with social risk factors could be diluted under some approaches that adjust for social risk factors. Setting lower benchmarks for patients with social risk factors relative to those without social risk factors can, in some circumstances, diminish provider incentives to exceed the established benchmarks. This could be problematic in settings where providers are capable of delivering the same standard of care for patients with and without social risk factors.

Second, any method for accounting for social risk factors that sets lower-quality improvement benchmarks for patients with social risk factors or otherwise holds providers and insurers to different standards for these populations can have a negative symbolic value. While certainly not intended, these adjustments may create the perception that patients with social risk factors are entitled to a lower quality of care. These perceptions are particularly acute because of a well-documented history of exclusion and inequitable treatment in health care settings of racial and ethnic minorities and low-income populations (HealthyPeople.gov, 2016; IOM, 2003). Even if these concerns are unfounded, perceptions of inequitable treatment can further erode trust in the health care system among patients with social risk factors.
Third, adjustment for social risk factors will not necessarily help patients find providers who will deliver the best quality of care for them. For example, star ratings are intended to guide patients to providers who provide an excellent average quality of care to patients. When only one single summary measure of quality is created for a provider or plan (such as a star rating), unadjusted results convey information about providers’ unadjusted performance for their whole patient population, which varies across reporting units. Adding social risk factors to existing risk-adjustment methods may provide more accurate information about the relative performance across reporting units if they were faced with an average patient. However, neither summary score provides information about which provider is better for a patient based on his or her level of social risk factors unless all providers are equally good or bad with all patients. This may be especially true when patients with social risk factors comprise a small number of patients in a practice. Only stratification by social risk factors will reveal such insights.

Finally, some methods of accounting for social risk factors could obscure differences due to poor quality care, such as failure to tailor care or provide culturally competent care, which may result in uneven relative allocation of rewards relative to effort.

**Conclusion 4:** It is possible to improve on the status quo with regard to the effect of value-based payment on patients with social risk factors. However, it is also important to minimize potential harms to these patients and to monitor the effect of any specific approach to accounting for social risk factors to ensure the absence of any unanticipated adverse effects on health disparities.

**METHODS TO ACCOUNT FOR SOCIAL RISK FACTORS IN VALUE-BASED PAYMENT PROGRAMS**

Any approach chosen to account for social risk factors should aim to minimize the potential harms described in the previous section. In particular, accounting for social risk factors, especially adjustment, is not intended to obscure disparities that do exist. Disparities should be brought to light, and the payment system should be sure to include sufficient incentive for quality improvement for both socially at-risk populations and for patients overall. Hence, the use of these factors in quality measurement and payment schemes should not disincentivize providers from doing all they can to overcome the influence of these factors on outcomes. Incentivizing providers to find strategies to overcome barriers to better outcomes in socially at-risk populations is critical to the reduction of health disparities. At the same time, incentivizing quality improvement and efficient care for all patients is
an important goal of including social risk factors in VBP. Finally, achieving good outcomes (or improving outcomes over time) may be more difficult for providers caring for patients with social risk factors precisely because the influence of some social risk factors on health care outcomes is beyond provider control. Similarly, achieving good outcomes may also be more costly for providers caring for patients with social risk factors owing to additional costs required to tailor care appropriately or because these patients have fewer resources outside the health systems available to contribute to outcomes. Accounting for these factors in performance measurement and payment mechanisms under VBP would level the playing field by ensuring that provider compensation is commensurate with the true quality of care they deliver (i.e., fair and accurate). Thus, the committee’s review of methods to account for social risk factors in Medicare VBP programs takes as the point of departure that the goal of Medicare payment and reporting systems are reducing disparities in health care access, affordability, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers for the services they provide.

Observed differences in quality by social risk factors may reflect a combination of drivers, including

- mechanisms that occur during the patient–provider encounter (e.g., inadequate tailoring of care to account for social risk factors, discrimination and bias);
- provider characteristics such as having fewer financial resources (e.g., lower margins, historically lower reimbursement rates) and having fewer and lower-quality clinical/health care resources (e.g., fewer technological resources and lower information technology capacity, fewer and less qualified clinicians);
- differences in patient preferences; and
- barriers to access and financial constraints for disadvantaged persons (NASEM, 2016b).

In practice these mechanisms may occur simultaneously and also interact; it is difficult if not impossible to decompose observed differences into these components quantitatively. The committee therefore proposes approaches that do not require disentangling the mechanisms of these multiple pathways for social risk factors. The fact that some units (e.g., providers)
do well with socially at-risk populations does not imply that it is equally easy to do so on average, and such population differences may also affect the relationship between provider quality and observed provider scores. The standard for taking such factors into account should not be that it is impossible to provide optimal care, but that it is more difficult on average. Taking such factors into account need not “adjust away” disparities. Lower levels of performance for any group should not be considered sufficient or qualify a provider to receive maximum rewards. However, a provider that does not achieve performance on par with top performers (i.e., optimal care) could still be eligible for some reward because, for example, it improved substantially relative to its own benchmark.

Conclusion 5: Characteristics of a public reporting and payment system that could accomplish the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly include

1. Transparency and accountability for overall performance and performance with respect to socially at-risk members of the population;
2. Accurate performance measurement—with high reliability and without bias (systematic error) related to differences in populations served;
3. Incentives for improvement overall and for socially at-risk groups, both within reporting units (i.e., the provider setting that is being evaluated—hospitals, health plans, etc.) and between reporting units.

The committee reviewed literature on a range of methods to account for social risk factors in public reporting and payment systems for which inclusion of social risk factors may be appropriate, with the aim to be more inclusive. These methods are described briefly in the following text and in more detail in Table C4-1.

- Finding: The committee identified four categories—(A) public reporting; (B) adjustment of performance measure scores; (C) direct adjustment of payments; and (D) restructuring payment incentive design—encompassing ten methods to account for social risk indicators used in VBP. Evidence described in Appendix C3 includes documented associations of social risk factors on performance indicators used in VBP above and beyond effects of social risk factors on health status. The committee’s approaches do not require disentangling pathways mediated through health status.
factors in that could be used to address policy goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly.

Public reporting seeks to make overall quality visible—to consumers, providers, payers, and regulators (IOM, 2007). It may lead to quality improvement via reputation incentives, and particularly when linked to behavioral nudges, by increasing market share (i.e., influencing choice of provider) for higher-quality reporting units (IOM, 2007). Public reporting methods that could be used to account for social risk factors include (1) stratification by patient characteristics within reporting units (i.e., for population subgroups by social risk factors) and (2) stratification by reporting unit characteristics (i.e., comparisons to peers, such as those with a similar share of low-income patients). (Methods are described in more detail in Table C4-1.) If publicly reported performance is stratified by indicators of social risk, public reporting can also be important for monitoring disparities, particularly when applied together with risk and/or payment adjustment.

Adjusting performance measure scores seeks to “level the playing field,” to estimate true reporting-unit quality—that which would occur if all units had the population average patient. As described in Appendix C2, social risk factors can be considered confounders of true performance if they are beyond provider control and unevenly distributed across units and thereby distort (bias) comparisons. Adjustment is a means to account for social risk factors statistically in an effort to more accurately measure true performance. Methods include

- risk adjustment for mean within-provider differences (e.g., to account for the average disparity between population subgroups with high and low levels of social risk factors);
- risk adjustment of performance data for within- and between-provider differences (e.g., to account for all patient-level differences in performance associated with social risk factors); and
- adding quality measures tailored (and only meaningful) to socially at-risk groups in addition to overall performance. Applicable statistical methods may include linear or logistic regression with or without mixed effects, doubly robust estimation, and direct and indirect standardization (Elliott et al., 2001, 2009a,b; Lytratzopoulos et al., 2012; Zaslavsky and Jha, 2015; Zaslavsky et al., 2001).

Any effects of risk adjustment on payment are indirect and require consideration of the particular form of the payment function.
### TABLE C4-1 Methods to Account for Social Risk Factors in Medicare VBP Programs

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Prerequisites/Optimal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Public Reporting Methods</strong></td>
<td><em>Stratification by itself does not influence payment, but reporting may influence choice or provider, leverage reputational incentives, and/or be important for monitoring disparities in conjunction with methods B and/or C.</em></td>
<td></td>
</tr>
<tr>
<td>1. Stratification by patient characteristics within reporting units a</td>
<td>Present performance data for population subgroups. b</td>
<td>Social risk factors can be represented by discrete strata (e.g., high and low income, Black and white patients). Works best if there are only a few key dimensions and few interactions among dimensions or reporting will become complex. Requires sufficient sample sizes.</td>
</tr>
<tr>
<td>2. Stratification by reporting unit characteristics c (e.g., safety-net hospitals)</td>
<td>Present performance data for subsets of reporting units (e.g., reporting quality performance separately for physicians located in Health Provider Shortage Areas).</td>
<td>Requires a meaningful method of classifying providers, hospitals, or health plans according to the population they serve.</td>
</tr>
</tbody>
</table>
### Methods to Account for Social Risk Factors in Medicare VBP Programs

<table>
<thead>
<tr>
<th>Method Description</th>
<th>Potential Advantages</th>
<th>Potential Disadvantages</th>
<th>Special Considerations for Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Public Reporting Methods</td>
<td>All data can be seen. Disparities can be monitored. High and low performers for at-risk groups visible.</td>
<td>Too many dimensions or strata may lead to ambiguity and information overload.</td>
<td>Interpretation of cost differences for at-risk population complicated by demand effects: patients with higher income consume more services all else equal either due to income effects, price effects for un-/underinsured or access constraints for those receiving Medicaid. Likewise, other characteristics of patients with more social risk factors such as low educational attainment, may cause underuse of services relative to need.</td>
</tr>
<tr>
<td>1. Stratification by patient characteristics within reporting units</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Present performance data for population subgroups. b) Social risk factors can be represented by discrete strata (e.g., high and low income, Black and white patients).</td>
<td>Works best if there are only a few key dimensions and few interactions among dimensions or reporting will become complex. Requires sufficient sample sizes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Stratification by reporting unit characteristics (e.g., safety-net hospitals)</td>
<td>Comparisons made within peer groups: different types of providers and health plans have different capabilities for attaining and improving performance owing to patient differences and resource constraints.</td>
<td>Does not illuminate within reporting unit differences (for example, differences due to quality compared to those due to patient mix), which might also be important. Reporting units could try to manipulate their patient mix in order to change strata. “Notch” effects are possible, and units near a notch may especially distort their behavior. Finally, the correlation between the mix of social risk factors and resource constraints may be limited.</td>
<td></td>
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<tr>
<td></td>
<td>Stratification at the unit level requires only unit-level data (characterization of the unit rather than each patient contributing to performance data).</td>
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*continued*
### Table C4-1 Continued

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Prerequisites/Optimal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B. Adjustment of performance measure scores</strong>&lt;sup&gt;4&lt;/sup&gt;  &lt;br&gt;&lt;i&gt;Seeks to improve measurement and estimate provider quality under similar patient populations. Any effects on payment are indirect and one must consider the particular form of the payment function.&lt;/i&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. Risk adjustment for mean within-provider differences</strong>&lt;sup&gt;e&lt;/sup&gt;</td>
<td>Statistical methods are used to account for (remove) the average disparity between high- and low-social risk factor groups.</td>
<td>Social risk factors can be measured at the patient level. Mean within-provider differences represent what is typically achievable.</td>
</tr>
<tr>
<td><strong>2. Risk adjustment of performance data for within- and between-provider differences</strong></td>
<td>Statistical methods are used to account for (remove) all differences in performance associated with social risk factors at the patient level.</td>
<td>Social risk factors can be measured at the patient level. Providers have little control over either social risk factors or their impact on performance. There is no true difference in the quality of providers seen by those with and without social risk factors.</td>
</tr>
<tr>
<td><strong>3. Add quality measures for performance for at-risk groups in addition to overall measure relates to A1</strong></td>
<td>Tailors performance data to target populations through measures that are only meaningful for target populations.</td>
<td>Adequate sample sizes in at-risk groups.</td>
</tr>
<tr>
<td>Potential Advantages</td>
<td>Potential Disadvantages</td>
<td>Special Considerations for Cost</td>
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<tr>
<td>Scores improve with improvement in care to any group. Avoids adjusting for “true” between-differences in quality. May reduce disincentives to avoid patients with social risk factors compared to no adjustment. Better quality measurement may better focus “nudges” into better plans to reduce between-plan SES disparities. May capture full effects of social risk factors on quality measures if caring for at-risk patients reduces quality via resources or some similar mechanism. Allows unit-level adjustors.</td>
<td>Effects on payment may be limited. Depending on payment functions, could reduce incentives to improve. Under-adjusts if between-provider differences are caused by patient characteristics. Does not make disparities visible without also using method (A). Does not allow unit-level adjustors.</td>
<td>Adjustment will typically increase estimated costs for at risk populations. Unclear interpretation of disparity. Depending on payment functions, could reduce incentives to improvement. Does not make disparities visible without also using method (A).</td>
</tr>
<tr>
<td>Fewer model assumptions than adjusted models; direct measure of performance for at-risk groups.</td>
<td>Will not be available for all units—how to pay then? How much to pay relative to overall score? May be strongly correlated with overall performance.</td>
<td></td>
</tr>
<tr>
<td>Method</td>
<td>Description</td>
<td>Prerequisites/Optimal Conditions</td>
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<tr>
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</tr>
<tr>
<td>C. Direct Adjustment of Payments</td>
<td><strong>By themselves do not affect performance measure scores</strong></td>
<td></td>
</tr>
<tr>
<td>1. Risk adjustment in payment formula without adjusting measured performance[1]</td>
<td>Alter the payment threshold or increment of bonus/penalty based on mix of social risk factors —specifically increase the return on investment for improving performance for at-risk populations.</td>
<td>Social risk factors (social risk factors) can be measured at the patient level.</td>
</tr>
<tr>
<td></td>
<td>Approach may be based on B(1) or B(2) methods; magnitude might be calibrated to less or more than the indirect effect via measurement.</td>
<td>Social risk factors result in differential cost of improvement that needs to be compensated for equal “incentive” or the value of improvement is greater for at-risk populations.</td>
</tr>
<tr>
<td>2. Stratification of benchmarks used for payment[6]</td>
<td>First determine payments according to any pay-for-performance approach, including the current one. Second, select reporting unit strata based on social risk factors. Third, multiply payments by factors that result in equal mean payouts for each stratum (as in A2).</td>
<td>Meaningful strata of social risk factors exist (high and low income, safety-net versus other, academic medical center versus community). Not too many strata. Social risk factors and their consequences are beyond the control of provider/health plan.</td>
</tr>
<tr>
<td>Potential Advantages</td>
<td>Potential Disadvantages</td>
<td>Special Considerations for Cost</td>
</tr>
<tr>
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<td>---------------------------------</td>
</tr>
<tr>
<td>Resources are allocated in a manner more favorable to institutions serving at-risk populations.</td>
<td>Does not improve the accuracy of publicly reported quality measures.</td>
<td>Adjustment will typically reduce payments associated with at-risk populations through bundled, global or shared savings mechanisms. Such adjustment would freeze in place patterns of use known to be reflective of underuse at least for some services.</td>
</tr>
<tr>
<td>Improvement in care for at-risk populations is differentially rewarded. Magnitude of adjustment can be directly controlled.</td>
<td>Providers/health plans can be rewarded despite poor outcomes/performance.</td>
<td></td>
</tr>
<tr>
<td>Comparisons are possible across a wider range—stretch goals may be more apparent, while ensuring that resource allocation does not punish institutions that serve at-risk groups. Incentives may strengthen for at-risk groups.</td>
<td>For payment if benchmarks are stratified, the number of social risk factor dimensions would be limited. Incentives may weaken for groups not at risk.</td>
<td>Adjustment will typically increase payments associated with at-risk populations.</td>
</tr>
<tr>
<td>Reporting units could try to manipulate their patient mix in order to change strata. “Notch” effects are possible, and units near a notch may especially distort their behavior. Finally, the correlation between the mix of social risk factors and resource constraints may be limited.</td>
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*continued*
### TABLE C4-1  Continued

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Prerequisites/Optimal Conditions</th>
</tr>
</thead>
</table>
| C. Restructure Payment Incentive Design  
*Measures of social risk factors not explicitly used but implicitly accounted for* | 1. Pay for improvement relative to own benchmark (to a greater extent or exclusively), including “growth models”
Payment formula is based in part or wholly based on percentage improvement relative to prior period rather than absolute level of performance. | Good measurement of prior performance of well-defined unit (how to handle mergers, etc.). |
### Restructure Payment Incentive Design

<table>
<thead>
<tr>
<th>Potential Advantages</th>
<th>Potential Disadvantages</th>
<th>Special Considerations for Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure of social risk factors not explicitly used but implicitly accounted for</td>
<td>Does not explicitly recognize absolute level of performance.</td>
<td>Rewards units that have high baseline costs where improvement is more feasible.</td>
</tr>
<tr>
<td>1. Pay for improvement relative to own benchmark (to a greater extent or exclusively), including “growth models”</td>
<td>No guarantee that providers disproportionately serving socially at-risk populations are more likely to achieve improvement compared to achievement targets (though they do in some work in progress).</td>
<td></td>
</tr>
<tr>
<td>Payment formula is based in part or wholly based on percentage improvement relative to prior period rather than absolute level of performance.</td>
<td>Do you ratchet-improve versus best ever or do you allow rewards for alternation?</td>
<td></td>
</tr>
<tr>
<td>Good measurement of prior performance of well-defined unit (how to handle mergers, etc.)</td>
<td>How to handle ceiling effects (high-performing units that may have little room to improve during the performance period) is unclear.</td>
<td></td>
</tr>
<tr>
<td>Strongly controls for unobserved social risk factors. Clear incentives for improvement.</td>
<td>Depends on functional form of both the payment formula and the effort required to improve from different baselines.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Measuring improvement is noisier than comparing performance to a fixed (achievement) benchmark—particularly for rare events like mortality.</td>
<td></td>
</tr>
</tbody>
</table>

*continued*
### TABLE C4-1 Continued

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
<th>Prerequisites/Optimal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Downweight social risk factor-sensitive measures in payment</td>
<td>In payment formula measures can be weighted differentially to alter their importance to providers.</td>
<td>Some quality measures—like readmissions and intermediate outcomes—are strongly associated with social risk factors. Some performance measures—like inpatient safety measures—can be expected to have little relationship to social risk factors. Ideally, the measures not affected by social risk factors signal high quality/value overall.</td>
</tr>
<tr>
<td>3. Add bonus for low disparities&lt;sup&gt;c&lt;/sup&gt;</td>
<td>In addition to other rewards and penalties explicitly measure and reward the magnitude of difference between groups.</td>
<td>Adequate sample sizes in low-risk and high-risk groups.</td>
</tr>
</tbody>
</table>

NOTE: SES = socioeconomic status.

<sup>a</sup> Casalino et al., 2007; Martino et al., 2013; NQF, 2014; Price et al., 2015.


<sup>c</sup> Casalino et al., 2007; MedPAC, 2013; NQF, 2014.

<sup>d</sup> Examples of applicable statistical methods: linear or logistic regression with or without mixed effects, doubly robust estimation, indirect and direct standardization (Elliott et al., 2001, 2009a,b; Lyratzopoulos et al., 2012; Zaslavsky and Jha, 2015; Zaslavsky et al., 2001).

<sup>e</sup> Casalino et al., 2007.

<sup>f</sup> CMS, 2015c.

<sup>g</sup> Damberg et al., 2015.

<sup>h</sup> The Medicare Advantage and Hospital Value-Based Purchasing payment arrangements currently include a measure of improvement (or failure rate reduction) in their payment formula.
### Method Description

<table>
<thead>
<tr>
<th>Potential Advantages</th>
<th>Potential Disadvantages</th>
<th>Special Considerations for Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>May reallocate resources appropriately without providing incentives to cherry pick patients.</td>
<td>Does not improve quality measurement.</td>
<td>Social risk factor-sensitive measures may be important dimensions of quality that are not picked up by social risk factor-insensitive ones.</td>
</tr>
<tr>
<td></td>
<td>Social risk factor-sensitive measures may be important dimensions of quality that are not picked up by social risk factor-insensitive ones.</td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Directly rewards equity.</td>
<td>Requires other components to address improvement or overall level of performance.</td>
<td>Might reward cost increases for at-risk populations that may or may not be warranted.</td>
</tr>
<tr>
<td></td>
<td>Disparity could be reduced by making better off group worse unless steps are taken to avoid this.</td>
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</table>

(CMS, 2012). The committee lists this approach here to acknowledge the benefits and risks of such an approach vis à vis accounting for social risk factors in other Medicare payment systems. The committee also notes that increasing the weight given to improvement or altering the particular approach to scoring improvement (e.g., in terms of absolute improvement versus failure rate reduction for Hospital Value-Based Purchasing) is a method open to CMS for obtaining a different balance of incentives in programs that currently incorporate improvement (Casalino et al., 2007; Rosenthal et al., 2004).

\[\text{In simple linear scoring, this is equivalent to giving greater than proportional weight to performance with the high-risk (H) group relative to the low-risk (L) group. If FL, FH is fraction in the groups (FL + FH = 1), Y = mean performance in a group (YL, YH), then the proportionally weighted score is } FL^*YL + FH^*YH \text{ with a linear penalty on disparity } YL – YH, \text{ the score is } FL^*YL + FH^*YH – C*(YL – YH) = (FL – C)^*YL + (FH + C)^*YH \text{ (Blustein et al., 2011; Casalino et al., 2007).}\]
VBP incorporates explicit or implicit (as in the case of bundled or global payment including shared savings) rewards or penalties based on performance on quality and/or cost of care. This can be achieved through three underlying conceptual approaches. First, payers could pay for more to those that are doing a better job in the measurement period (i.e., pay for achievement). Second, payers could pay for the mix of patients the reporting unit treats, that is, pay more to those that treat greater numbers of socially at-risk patients under the assumption that they simply need more resources. This approach lacks incentives to improve unless some other system for accountability is superimposed. Third, payers could pay for improvement, that is, pay more to those who improve to a greater degree.

The committee also expands upon how VBP could incorporate measures of social risk factors. Payments could be directly adjusted using social risk factors, or incentive design could be restructured. Direct adjustments of payment explicitly use measures of social risk factors, but by themselves do not affect performance measure scores. Methods include (1) risk adjustment in the payment formula without adjusting measured performance (i.e., applying a different payment threshold or increment for rewards or sanctions based on the reporting unit’s mix of social risk factors), or (2) stratification of benchmarks used for payment (i.e., applying payment multipliers to reporting-unit strata based on social risk factors). Restructured payment incentive designs do not explicitly use measures of social risk factors, but implicitly account for social risk factors. Methods include (1) paying for improvement (rather than attainment), (2) downweighting social-risk factor-sensitive measures in payment (i.e., weighting measures differentially in the payment formula to alter their importance to providers), or (3) adding a bonus for achieving low disparities.

Table C4-1 summarizes the four categories of methods that could be used individually or in combination to account for social risk factors in Medicare value-based purchasing programs. The table also lists the possible methods within each category described briefly above and describes them in more detail along with prerequisites or optimal conditions for implementation, as well as potential advantages and disadvantages. Because considerations for cost performance may differ compared to quality performance, the table also notes special concerns for cost-related incentive programs, including bundled and global payment.

APPLYING METHODS TO ACCOUNT FOR SOCIAL RISK FACTORS

In many cases, methods from multiple categories can be used together. In some cases, multiple methods from a single category can be used in combination. In this respect, each approach has some advantages and disadvantages and a combination of approaches may yield a better result than
any one method alone. As described in the previous section, the committee underscores that the benefits and harms of any single or composite method of accounting for social risk factors should be assessed in reference to the status quo or some other feasible alternative rather than a perfect world in which social risk factors do not confound efforts to improve the quality and efficiency of health care delivery (referred to by some as a “full information” scenario). As illustrations, Table C4-2 compares the potential harms of accounting for social risk factors relative to the status quo. Box C4-1 describes a hypothetical example of stratification by social risk factors and a simple risk adjustment of a performance measure for mean within-provider differences between groups with high and low levels of social risk factors. This example also describes potential advantages and disadvantages of this approach relative to the status quo (no adjustment for social risk factors).

**Conclusion 6:** To achieve goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly, a combination of reporting and accounting in both measures and payment are needed.

Considerations around the trade-offs of various methods of accounting for social risk factors are different for cost-related performance compared to quality performance. Costs in the context of VBP can refer to the costs of improving quality or achieving good outcomes for socially at-risk patient or to the cost of care billed to a payer. As noted earlier, because achiev-

<table>
<thead>
<tr>
<th>Status Quo</th>
<th>Accounting for Social Risk Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient dumping/avoidance</td>
<td>Reduces this risk relative to the status quo</td>
</tr>
<tr>
<td>Unfair to providers disproportionately serving socially at-risk populations (if factors beyond provider control—and/or the cost of improvement is higher for populations with social risk factors—cause poor performance)</td>
<td>Unfair to providers who provide high-quality care to all patients if truly poor quality causes poorer performance for socially at-risk patients</td>
</tr>
<tr>
<td>Will reduce quality and access for socially at-risk populations</td>
<td>Reduces this risk relative to the status quo</td>
</tr>
<tr>
<td>Incentives to improve care might favor focusing on patients with few social risk factors if they are easier to improve</td>
<td>Same unless payment is adjusted upward for socially at-risk populations</td>
</tr>
</tbody>
</table>
BOX C4-1
Example: Stratification by Social Risk Factors and Simple Adjustment of a Quality Measure to Reflect Varying Levels of Social Risk Factors Across Providers

This example shows the calculation of a hypothetical adjusted quality measure. The quality measure is represented as a percentage and can be thought of as the proportion of a population receiving quality care or achieving a good outcome. The adjustment process increases the score of the providers serving greater-than-average numbers of patients with social risk factors and decreases the score for providers serving lower-than-average numbers of patients with social risk factors.

For the sake of simplicity, all three providers in this example have the same total number of patients. Patients are either high risk or low risk, and each provider has a different proportion of high-risk patients (20, 40, or 80 percent in Providers A, B, and C, respectively). As shown in Table 1, the “national” average is 46.7 percent at high risk.

Table 2 presents the unadjusted overall score for each provider and nationally, as well as scores stratified by patients’ level of social risk. Here, each provider performs better for the lower social risk group than for the disadvantaged group with more social risk factors. Each provider’s unadjusted overall score is equal to the average of the scores for the two groups, weighted by the number of patients in each group.

The last row of Table 2 shows the “national” scores. The national average difference in scores between the high-risk group and the lower-risk group is –13.0% (64.3% – 77.3%). Some of this difference is a between-provider difference, reflecting the greater concentration of high-risk patients in lower-performing providers. The average within-provider difference is –12.3 percent, meaning that on average, a given provider achieves scores for high-risk patients that are 12.3 percentage points worse than those for low-risk patients. In this example adjustment is based on this average within-provider difference in scores. Specifically, a provider’s unadjusted score is increased or decreased by product of (a) this average within-provider difference, (b) the amount by which the provider’s proportion of high-risk patients exceeds or falls short of the national average, and (b) –1. The adjustment for each provider is listed in the column second from the right. For Provider A this is equal to –12.3%*(20.0% – 46.7%)/(–1) = –3.3 percent.

Each provider’s score and the national score adjusted for this national average (mean within-provider) difference is listed in the far right column. Provider C, which has a larger-than-average proportion of high-risk patients, sees its score increase through adjustment. Provider B, which is close to the national average in its proportion of high-risk patients sees a very small adjustment. Provider A, which delivers the highest-quality care to both groups, has a modest downward adjustment that reflects it is smaller than average proportion of high-risk patients. Importantly, however, with this adjustment process in place, Provider A does not have a reason to limit service to the high-risk group for fear of adversely affecting its quality score and ranking. Overall, the adjustment also has the property that increasing quality for either low- or high-risk patients increases a provider’s adjusted score to the same extent.
### TABLE 1 Patient Mix Across Providers

<table>
<thead>
<tr>
<th>Provider</th>
<th>High Level of Social Risk Factors</th>
<th>Lower Level of Social Risk Factors</th>
<th>Total Patients</th>
<th>% High-Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider A</td>
<td>20</td>
<td>80</td>
<td>100</td>
<td>20.0%</td>
</tr>
<tr>
<td>Provider B</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>40.0%</td>
</tr>
<tr>
<td>Provider C</td>
<td>80</td>
<td>20</td>
<td>100</td>
<td>80.0%</td>
</tr>
<tr>
<td>“National”</td>
<td>140</td>
<td>160</td>
<td>300</td>
<td>46.7%</td>
</tr>
</tbody>
</table>

### TABLE 2 Stratification and Adjustment of Quality Scores

<table>
<thead>
<tr>
<th>Quality Score</th>
<th>Quality Score</th>
<th>Within-Provider Differences</th>
<th>Adjusted Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Risk Group</td>
<td>70.0%</td>
<td>82.0%</td>
<td>79.6%</td>
</tr>
<tr>
<td>Provider A</td>
<td>70.0%</td>
<td>82.0%</td>
<td>79.6%</td>
</tr>
<tr>
<td>Lower-Risk Group</td>
<td>60.0%</td>
<td>70.0%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Provider B</td>
<td>60.0%</td>
<td>70.0%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Unadjusted Overall Score</td>
<td>65.0%</td>
<td>80.0%</td>
<td>68.0%</td>
</tr>
<tr>
<td>Provider C</td>
<td>65.0%</td>
<td>80.0%</td>
<td>68.0%</td>
</tr>
<tr>
<td>“National”</td>
<td>64.3%</td>
<td>77.3%</td>
<td>71.2%</td>
</tr>
<tr>
<td>“National”</td>
<td>64.3%</td>
<td>77.3%</td>
<td>71.2%</td>
</tr>
</tbody>
</table>

Under a value-based payment system, these providers might receive bonuses or penalties proportional to quality scores or might be eligible for shared savings only if they exceed a quality threshold. In the current world in which such scores are adjusted in some instances for clinical risk factors, but not social risk factors, all of these providers have incentives to limit their service to patients at high social risk. In addition, those with above average share of high risk patients are financially penalized for the poorer process or outcomes measures which may perpetuate a perverse cycle of under-reimbursement for patients that might require extra resources to treat. With an adjustment system such as the one in this example in place, that incentive is removed and the providers can improve their scores by improving care delivered to the high-risk group, low-risk group, or both.

Finally, it is important to note that the stratified scores by group also convey important information that patients may deserve. In particular, patients in the high risk group might want to know which providers deliver the highest-quality care to patients like themselves. Thus, regardless of the adjustment system used, making providers’ adjusted scores and scores by patient group available to consumers may inform their choices of provider.
ing high performance on performance indicators used in VBP may require greater investments on the part of health care providers and health plans to overcome barriers socially at-risk populations face, costs to achieve good outcomes and improve care quality for socially at-risk populations are likely to be higher than costs to achieve the same outcomes and improve care quality for more advantaged patients. Because at least some of these costs will be outside of the services that can be billed to payers like CMS, as described in an earlier section, a potential harm of not accounting for social risk factors in a VBP environment is that this increased cost may be a disincentive to care for socially at-risk populations. On the other hand, lower resource use observed in billed costs of care may reflect unmet need or barriers to access rather than the absence of waste. Thus, lower cost is not always better; whereas, higher quality is always better.

**Conclusion 7:** Strategies to account for social risk factors for measures of cost and efficiency may differ from strategies for quality measurement, because observed lower resource use may reflect unmet need rather than the absence of waste, and thus lower cost is not always better, while higher quality is always better.

**MONITORING METHODS TO ACCOUNT FOR SOCIAL RISK FACTORS**

As described earlier in the chapter, accounting for social risk factors in Medicare value-based purchasing programs is intended to achieve a balance between incentives for reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly. Both the status quo and any new approach to accounting for social risk factors will have uncertain trade-offs in terms of these goals—many unknowable factors including provider and patient beliefs and behavioral responses will affect the results that any new system yields. Monitoring data on a variety of indicators will facilitate assessment of the effects of existing and new programs on potential unintended adverse effects. Such indicators might include enrollment (for health plans), patient complaints, access to and quality of care for socially at-risk populations, and the financial sustainability of providers disproportionately caring for socially at-risk populations.

**Conclusion 8:** Any specific approach to accounting for social risk factors in Medicare quality and payment programs requires continuous monitoring with respect to the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery
for all patients; fair and accurate public reporting; and compensating providers fairly.

Finally, because behavioral and other responses to new systems may change the balance of risks and benefits over time, to take into account these behavioral and other responses, the specific approach to accounting for social risk factors may need to be reassessed.

CONCLUDING REMARKS

The committee notes that it is not within its statement of task to recommend whether social risk factors should be accounted for in VBP or how; that decision sits elsewhere. The committee hopes that the conclusions in this report help CMS and the Secretary of HHS make that important decision. In the next report, the committee tackles the question of how to gather the data that could be used to account for social risk factors in Medicare VBP.

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HHS. 2014. Medicare program; hospital Inpatient Prospective Payment Systems for acute care hospitals and the long-term care hospital Prospective Payment System and fiscal year 2015 rates; quality reporting requirements for specific providers; reasonable compensation equivalents for physician services in excluded hospitals and certain teaching hospitals; provider administrative appeals and judicial review; enforcement provisions for organ transplant centers; and electronic health record (EHR) incentive program. *Federal Register* 79(163):50094.

HHS. 2015. Medicare and Medicaid programs; CY 2016 home health prospective payment system rate update; home health value-based purchasing model; and home health quality reporting requirements *Federal Register* 80:39840.


When developing the criteria that could be used to select social risk factors that should be accounted for in Medicare value-based payment programs, the committee reviewed existing criteria for selecting risk factors for risk adjustment models from the literature. These include criteria, principles, and other guidance from:

- Centers for Medicare & Medicaid Services Hierarchical Condition Categories (CMS-HCC) model for risk adjustment of Medicare capitation payments (Pope et al., 2004);
- Consumer Assessment of Healthcare Providers and Systems (CAHPS) Hospital Survey case-mix adjustment (Elliott et al., 2009; O’Malley et al., 2005);
- Department of Health and Human Services (HHS)-HCC risk adjustment model for individual and small group markets under the Affordable Care Act (Kautter et al., 2014); and
- The National Quality Forum 2014 report Risk Adjustment for Socioeconomic Status or Other Sociodemographic Factors.

The criteria reviewed are excerpted below.

**CMS-HCC MODEL CRITERIA**

The following 10 principles guided the creation of the diagnostic classification system.
Principle 1—Diagnostic categories should be clinically meaningful. Each diagnostic category is a set of ICD-9-CM [International Classification of Diseases, 9th Revision, Clinical Modification] codes (CDC, 2013). These codes should all relate to a reasonably well-specified disease or medical condition that defines the category. Conditions must be sufficiently clinically specific to minimize opportunities for gaming or discretionary coding. Clinical meaningfulness improves the face validity of the classification system to clinicians, its interpretability, and its utility for disease management and quality monitoring.

Principle 2—Diagnostic categories should predict medical expenditures. Diagnoses in the same HCC should be reasonably homogeneous with respect to their effect on both current (this year’s) and future (next year’s) costs. (In this article we present prospective models predicting future costs.)

Principle 3—Diagnostic categories that will affect payments should have adequate sample sizes to permit accurate and stable estimates of expenditures. Diagnostic categories used in establishing payments should have adequate sample sizes in available data sets. Given the extreme skewness of medical expenditure data, the data cannot reliably determine the expected cost of extremely rare diagnostic categories.

Principle 4—In creating an individual’s clinical profile, hierarchies should be used to characterize the person’s illness level within each disease process, while the effects of unrelated disease processes accumulate. Because each new medical problem adds to an individual’s total disease burden, unrelated disease processes should increase predicted costs of care. However, the most severe manifestation of a given disease process principally defines its impact on costs. Therefore, related conditions should be treated hierarchically, with more severe manifestations of a condition dominating (and zeroing out the effect of) less serious ones.

Principle 5—The diagnostic classification should encourage specific coding. Vague diagnostic codes should be grouped with less severe and lower-paying diagnostic categories to provide incentives for more specific diagnostic coding.

Principle 6—The diagnostic classification should not reward coding proliferation. The classification should not measure greater disease burden simply because more ICD-9-CM codes are present. Hence, neither the number of times that a particular code appears, nor the presence of additional, closely related codes that indicate the same condition should increase predicted costs.

Principle 7—Providers should not be penalized for recording additional diagnoses (monotonicity). This principle has two consequences for modeling: (1) no condition category should carry a negative payment weight, and (2) a condition that is higher-ranked in a disease hierarchy (causing
lower-rank diagnoses to be ignored) should have at least as large a payment weight as lower-ranked conditions in the same hierarchy.

**Principle 8**—The classification system should be internally consistent (transitive). If diagnostic category A is higher-ranked than category B in a disease hierarchy, and category B is higher ranked than category C, then category A should be higher ranked than category C. Transitivity improves the internal consistency of the classification system and ensures that the assignment of diagnostic categories is independent of the order in which hierarchical exclusion rules are applied.

**Principle 9**—The diagnostic classification should assign all ICD-9-CM codes (exhaustive classification). Because each diagnostic code potentially contains relevant clinical information, the classification should categorize all ICD-9-CM codes.

**Principle 10**—Discretionary diagnostic categories should be excluded from payment models. Diagnoses that are particularly subject to intentional or unintentional discretionary coding variation or inappropriate coding by health plans/providers, or that are not clinically or empirically credible as cost predictors, should not increase cost predictions. Excluding these diagnoses reduces the sensitivity of the model to coding variation, coding proliferation, gaming, and upcoding.

In designing the diagnostic classification, principles 7 (monotonicity), 8 (transitivity), and 9 (exhaustive classification) were followed absolutely. For example, if the expenditure weights for our models did not originally satisfy monotonicity, we imposed constraints to create models that did. Judgment was used to make trade-offs among other principles. For example, clinical meaningfulness (principle 1) is often best served by creating a very large number of detailed clinical groupings. But a large number of groupings conflicts with adequate sample sizes for each category (principle 3). Another trade-off is encouraging specific coding (principle 5) versus predictive power (principle 2). In current coding practice, non-specific codes are common. If these codes are excluded from the classification system, substantial predictive power is sacrificed. Similarly, excluding discretionary codes (principle 10) can also lower predictive power (principle 2). We approached the inherent trade-offs involved in designing a classification system using empirical evidence on frequencies and predictive power, clinical judgment on relatedness, specificity, and severity of diagnoses, and the judgment of the authors on incentives and likely provider responses to the classification system. The DCG [Diagnostic Cost Group]/HCC models balance these competing goals to achieve a feasible health-based payment system (Pope et al., 2004).
CAHPS CASE-MIX ADJUSTMENT CRITERIA

Our criterion for selection of case-mix adjustors is the “impact factor,” which is the product of two measures: predictive power (the strength of the relationship between the candidate adjustor and the outcome variable at the individual level) and heterogeneity factor (the amount of variation among hospitals in the adjustor variable) (Zaslavsky, 1998). Predictive power quantifies the improvement in model fit (R2) attributable to a variable; unlike tests of statistical significance, it does not depend on sample size. The heterogeneity factor measures the extent to which the characteristic is unevenly distributed across hospitals and therefore potentially a source of bias in comparisons. A variable, such as gender, could be highly predictive of responses but have little impact on case-mix adjustment because its distribution is relatively homogeneous across hospitals. Conversely, a variable could have quite different distributions in different hospitals but be unrelated to the rating. By combining both predictive power and heterogeneity into a single measure, the impact factor is more informative than purely predictive measures such as R2; it approximates the magnitude of the incremental adjustments due to adding a variable to the case-mix model (O’Malley et al., 2005).

Explanatory power (Zaslavsky, 1998) was used to assess the relative importance of individual PMA [patient-mix adjuster] variables to hospital-level adjustment. Explanatory power is the product of two components: (1) the individual predictive power of a PMA variable (as measured by the improvement in R2 attributable to a candidate predictor) and (2) the hospital-level heterogeneity of a PMA variable (Elliott et al., 2009).

HHS-HCC RISK ADJUSTMENT MODEL CRITERIA

There are 264 HHS-HCCs in the full diagnostic classification, of which a subset is included in the HHS risk adjustment model. The criteria for including HCCs in the model are now described. These criteria were sometimes in conflict and trade-offs had to be made among them in assessing whether to include specific HCCs in the HHS risk adjustment model.

Criterion 1—Represent clinically significant, well-defined, and costly medical conditions that are likely to be diagnosed, coded, and treated if they are present.

Criterion 2—Are not especially subject to discretionary diagnostic coding or “diagnostic discovery” (enhanced rates of diagnosis through population screening not motivated by improved quality of care).

Criterion 3—Do not primarily represent poor quality or avoidable complications of medical care.
Criterion 4—Identify chronic, predictable, or other conditions that are subject to insurer risk selection, risk segmentation, or provider network selection, rather than random acute events that represent insurance risk.

Following an extensive review process, we selected 127 HHS-HCCs to be included in the HHS risk adjustment model. . . . Finally, to balance the competing goals of improving predictive power and limiting the influence of discretionary coding, a subset of HHS-HCCs in the risk adjustment model were grouped into larger aggregates, in other words “grouping” clusters of HCCs together as a single condition with a single coefficient that can only be counted once. After grouping, the number of HCC factors included in the model was effectively reduced from 127 to 100 (Kautter et al., 2014).

NATIONAL QUALITY FORUM CRITERIA GUIDELINES FOR SELECTING RISK FACTORS FOR ADJUSTMENT

TABLE CA-1 Guidelines for Selecting Risk Factors for Adjustment

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Rationale</th>
<th>Clinical/Health Status Factors(^a)</th>
<th>SDS Factors(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical/conceptual relationship with the outcome of interest</td>
<td>Begin with conceptual model informed by research and experience</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Empirical association with the outcome of interest</td>
<td>To confirm conceptual relationship</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Variation in prevalence of the factor across the measured entities</td>
<td>If there is no variation in prevalence across health care units being measured, it will not bias performance results</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Not confounded with quality of care, risk factors should:</td>
<td>Trying to isolate effects of quality of care</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>• Be present at the start of care and</td>
<td>Ensures not a result of care provided</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>• not an indicator or characteristic of care provided (e.g., treatments, interventions, expertise of staff)</td>
<td>Although these could explain variation in outcome, in performance measurement the goal is to isolate differences in performance due to differences in the care provided</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

continued
**TABLE CA-1  Continued**

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Rationale</th>
<th>Clinical/Health Status Factors&lt;sup&gt;a&lt;/sup&gt;</th>
<th>SDS Factors&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistant to manipulation or gaming—generally, a diagnosis or assessment data (e.g., functional status score) is considered less susceptible to manipulation than a clinical procedure or treatment (e.g., physical therapy)</td>
<td>Ensures validity of performance score as representing quality of care (versus, for example, upcoding)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Accurate data that can be reliably and feasibly captured</td>
<td>Data limitations often represent a practical constraint to what factors are included in risk models</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Contribution of unique variation in the outcome (i.e., not redundant or highly correlated with another risk factor)</td>
<td>Prevent overfitting and unstable estimates, or coefficients that appear to be in the wrong direction; reduce data collection burden</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Potentially, improvement of the risk model (e.g., risk model metrics of discrimination—i.e., sensitivity/specificity, calibration) and sustained with cross-validation</td>
<td>Change in R-squared or C-statistic may not be significant, but calibration at different deciles of risk might improve. May not appear to be a big change but could represent meaningful differences in terms of the outcome (e.g., lives, dollars). Order of entry into a model may influence this result</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Potentially, face validity and acceptability</td>
<td>Some factors may not be indicated empirically, but could improve acceptability—need to weigh against negative impact on model, feasibility and burden of data collection</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

NOTE: SDS = sociodemographic status.

<sup>a</sup> Examples of clinical and health status factors include comorbidity; severity of illness; patient-reported health status, etc.

<sup>b</sup> Examples of sociodemographic factors include income; education; English language proficiency, etc.

REFERENCES


Appendix D reproduces in its entirety the fourth report from the Committee on Accounting for Socioeconomic Status in Medicare Payment Programs. The committee made no substantive content changes. This report was originally released on October 11, 2016, as:

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**D3  DATA SOURCES AND DATA COLLECTION FOR SOCIAL RISK FACTORS**
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The Centers for Medicare & Medicaid Services (CMS) is increasingly paying providers (e.g., hospitals, health plans, provider groups) through value-based payment (VBP) programs. VBP ties quality and cost performance to payment in order to hold providers accountable for the quality and efficiency of the health care they provide and for the health care outcomes they achieve (Burwell, 2015; Rosenthal, 2008). In so doing, VBP schemes shift greater financial risk to providers. Because current VBP programs do not account for social risk factors for poor health outcomes, these programs may underestimate the quality of care provided by providers disproportionately serving socially at-risk populations. Consequently, these providers may be more likely to fare poorly on quality rankings (Berenson and Shih, 2012; Elliott et al., in press; Gilman et al., 2014, 2015; Joynt and Jha, 2013a; Rajaram et al., 2015; Ryan, 2013; Shih et al., 2015; Williams et al., 2014). When payment is tied to quality rankings under VBP, these pro-

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1 As described in the committee’s first and third reports (NASEM, 2016a,b) (See Appendices A and C), CMS payment models cover a spectrum of approaches from traditional fee-for-service to population-based payment models. The committee uses the term value-based payment to describe models that fall into two broad categories, which the committee roughly categorizes as financial incentives and alternative payment models (APMs). Financial incentives (such as pay-for-performance schemes) link financial bonuses and/or penalties to the quality and efficiency of care, whereas APMs (such as episode- or population-based payments) shift greater financial risk to providers in order to hold them accountable for the quality and efficiency of care delivered as well as for the health care outcomes achieved. For more information on specific Medicare VBP programs, the committee points the interested reader to its first and third reports (NASEM, 2016a,b).
providers may also be more likely to receive penalties and less likely to receive incentive payments (Chien et al., 2007; Joynt and Jha, 2013a,b; Joynt and Rosenthal, 2012; Ryan, 2013). Moreover, these providers have historically been less well reimbursed than providers serving more advantaged patients and have fewer resources (Bach et al., 2004; Chien et al., 2007). If providers disproportionately serving socially at-risk populations have fewer resources to begin with and are more likely to fare poorly on quality rankings and receive financial penalties under VBP, the limited resources to care for socially at-risk populations and those who care for them may be further reduced. This has led some stakeholders to raise concerns that current VBP programs may increase health disparities (Bhalla and Kalkut, 2010; Casalino et al., 2007; Chien et al., 2007; Friedberg et al., 2010; Ryan, 2013).

A primary method proposed to address these concerns is accounting for social risk factors in VBP. For an extensive discussion of concerns regarding possible effects of these approaches, the committee directs the interested reader to its first three reports (NASEM, 2016a,b,c) (see Appendixes A, B, and C). As described in the committee’s third report (NASEM, 2016b), to the extent that social risk factors influence performance indicators independently of provider actions and those factors are unevenly distributed across providers, it may be appropriate to account for social risk factors in VBP, but any approach requires monitoring for adverse effects on health disparities (NASEM, 2016b). If CMS chooses to account for social risk factors, it must first acquire accurate data on the social risk factors of Medicare beneficiaries.

STATEMENT OF TASK

In response to the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, the Department of Health and Human Services (HHS) acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to provide a definition of socioeconomic status for the purposes of application to Medicare quality measurement and payment programs; identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs; identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies; and recommend existing or new sources of data and/or strategies for data collection. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare (see Appendix E for biographical
This report builds on the committee’s earlier reports. In its third report, the committee expanded the conceptual framework introduced in the first report to include specific indicators across five domains of social risk factors. The committee concluded that there are measurable social risk factors that could be accounted for in Medicare VBP programs in the short term. Indicators include

- income, education, and dual (Medicare and Medicaid) eligibility;
- race, ethnicity, language, and nativity;
- marital/partnership status and living alone; and
- neighborhood deprivation, urbanicity, and housing.

The committee also concluded that some indicators of social risk factors capture the basic underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in the longer term. These include

- wealth,
- acculturation,
- gender identity and sexual orientation,
- emotional and instrumental social support, and
- environmental measures of residential and community context.

In this report, the committee provides guidance on data sources for and strategies to collect data on these indicators that could be accounted for Medicare quality measurement and payment programs.

**DATA SOURCES**

The committee considered three broad categories of data sources for these social risk factors: (1) existing or new CMS data; (2) data that providers and plans could report to CMS; and (3) alternative government data. Patients are the underlying source of most social risk factor data. Moreover, for some social risk factors like race, ethnicity, and gender, it is important for patients to self-identify. However, CMS, health care providers and health plans, and government agencies collect and maintain this information and,
more importantly, standardize, assess, interpret, and report this information in a valid, consistent, and reliable way. In the future, new, better, and easier methods of data collection could emerge (e.g., methods that are more accurate, less burdensome, or less costly). As these new methods emerge, an ideal system would be responsive to evolving data availability and could adapt to use new data sources. However, at this time and likely in the near term, it is unlikely that technologies and interoperable systems will be available for patients to directly, systematically, and securely submit social risk factor data to CMS for use in Medicare payment. Thus, although patients and enrollees underlie each of the three categories of data sources described above, they are not called out as a separate and unique source.

New and Existing Sources of CMS Data

CMS possesses some data on Medicare beneficiaries’ social risk factors. Existing sources include administrative records and beneficiary surveys. Administrative records include enrollment records as well as claims data. These sources have limited social risk factor data, such as beneficiaries’ race and ethnicity (ResDAC, n.d.). Enrollment data capture the basis of a beneficiary’s entitlement, which plans beneficiaries are enrolled in (Parts A, B, C, D, or alternative payment models), as well as Medicaid enrollment for those who are dually enrolled in Medicare and Medicaid (ResDAC, n.d.). Administrative records also include basic demographic information and vital statistics. Survey data from CMS refer to data derived from one of the surveys of Medicare beneficiaries that CMS routinely conducts.

The primary advantage of using existing sources of data CMS already possesses is precisely that CMS has access to and maintains accurate data it already collects using standardized measures and validated, reliable methods, and which it could apply to performance measurement and payment. If CMS collects new social risk factor data, it could design measures and data collection methodologies to ensure collection of accurate data that meet the needs of the intended method to account for those social risk factors in Medicare quality measurement and payment. New data collection would not be subject to the potentially substantial barriers of collaborating with other federal government agencies, but it would require substantial cost.

Data Sources from Providers and Plans

Data sources from providers and plans include data from electronic health records (EHRs) and administrative data that providers report or submit or could report or submit to CMS. Most EHRs capture some basic information on social risk factors, such as race and ethnicity, and EHRs are beginning to capture more robust social risk factor data. Some more
comprehensive EHRs may include data on language, education, housing, and community context (Gottlieb et al., 2015; ONC, n.d.). The Office of the National Coordinator for Health Information Technology (ONC) is the office responsible for supporting and encouraging EHR adoption and health information exchange in HHS. To date, ONC has included some social risk factors in the regulations put forth for the CMS meaningful use incentive programs. Administrative data include data captured through patient enrollment forms and claims, and may also include limited social risk factor data. For example, many health plans collect language data (Lawson et al., 2011; Nerenz et al., 2013a,b), and these data could be reported to CMS for use in performance measurement and payment.

A primary advantage of using data that providers or health plans collect is that some information on social risk factors may be clinically useful to enhance the care or services providers and plans provide. Additionally, CMS already has a reporting infrastructure for claims and performance reporting with standardized reporting requirements, processes, and systems that it could expand. However, collecting social risk factor data through EHRs could increase burdens on individual providers and health care organizations, as well as on patients.

Burdens on patients and enrollees pertain to the ability of patients to recall information about their social risks as well as privacy and security. With respect to the former, patients and enrollees may not know or be willing to share data on certain social risk factors that are sensitive in nature. Concerns about why clinicians or plans are asking about social risk factors and how such data may be used relate to concerns about the privacy and security of patient health information, especially when shared with other providers and with researchers and administrators for nonclinical uses. For a more comprehensive discussion of privacy and security issues as well as mitigation strategies, the committee points the interested reader to the Institute of Medicine’s (IOM’s) earlier reports on EHRs and health information technology (IOM, 2012, 2014).

Alternative Government Data Sources

Alternative government data sources in this report refer to administrative data and national surveys that federal agencies other than CMS (including other agencies within HHS) and state agencies oversee and maintain and that could be linked to Medicare beneficiary data. This includes data that could be linked to Medicare beneficiary data at the individual level, area-level data that could be used to describe a Medicare beneficiary’s residential environment or serve as a proxy for individual effects, and data that could help CMS to determine how to elicit information on social risk factors from Medicare beneficiaries.
The Social Security Administration (SSA) may be the best source of individual-level social risk factor data that could be linked to Medicare data. The SSA maintains data that captures demographics, vital statistics, income, and information related to eligibility for Social Security needs-based benefits, such as disabling conditions and living arrangements (McNabb et al., 2009). The American Community Survey (ACS) may be a useful source of area-level social risk factor data that could be used to assess genuine area-level effects or serve as proxies for individual-level effects. The ACS is a nationwide survey administered by the Census Bureau that gathers demographic, housing, social, and economic data on local communities (U.S. Census Bureau, 2013). Other national surveys include the Health and Retirement Study, National Health and Aging Trends Study, National Health and Nutrition Examination Survey, National Health Interview Survey, and National Survey of Family Growth. They all capture social risk factor data that could be useful to CMS when determining how best to elicit information from Medicare beneficiaries on their social risk factors.

The primary advantage of using administrative and survey data from other agencies is that these data sources contain substantial information on social risk factors, and data from these sources are collected using standardized and validated measures and methodologies. However, substantial barriers to linking such data to Medicare data include state and federal regulations and laws relating to the privacy and security that may restrict data sharing (IOM, 2014) and the substantial effort and/or cost required to ensure that data can be linked at the appropriate level.

DATA COLLECTION

The committee notes that it has not been asked to recommend whether CMS should include social risk factor adjustments in its public reporting and payment programs. The recommendations in this report indicate things CMS should do if it decides to move toward accounting for social risk factors. To assess the advantages and disadvantages of specific data sources for specific social risk factor indicators, the committee identified three characteristics to consider: (1) collection burden, (2) accuracy, and (3) clinical utility. Collection burden describes the resources (e.g., time, cost, and effort) required to collect and store data through any given source, and pertains to respondents, as well as providers collecting data, and CMS. For some social risk factors, there may be substantial barriers to data collection (such as high cost). For others, early pilot testing or modeling of an indicator in a multivariable model may suggest only marginal gains. In these cases, CMS may choose not to include the indicator in quality measurement and payment. Because literature does not indicate whether all social risk factors related to performance indicators used in VBP must be individually
accounted for to accurately adjust payment and quality measures, these are questions for ASPE/CMS to test empirically.

**Conclusion 1:** If there are substantial barriers to collecting social risk factor data (such as high cost) and/or if early pilot testing or modeling in a multivariable model suggests only marginal gains from including any given indicator in any method of accounting for social risk factors in Medicare performance measurement and payment, inclusion of that indicator may not be warranted.

Accuracy refers to the degree that a given measure captures the construct that measure represents. In this report, this characteristic also captures related constructs important for data quality, such as validity, reliability, and completeness. The committee considered the extent to which standardized measures and data collection methods for each social risk factor indicator are available and used. Standardization is important to ensure valid comparisons across reporting units and settings. Clinical utility describes whether providers can use information on a social risk factor in the management and treatment of that patient (IOM, 2014). If intervening on or otherwise addressing a social risk factor is beyond the purview of health care providers or can only be done at substantial cost, clinicians may be reluctant to collect data out of concern that patients would expect them to provide services that they do not have the capacity to offer. The committee notes that its focus is on social risk factors important for use in Medicare quality measurement and payment. The EHR may include information on social and behavioral risk factors important to the clinical encounter, but that would not be relevant or be the best source of data for application to Medicare performance measurement and payment. The committee sees no conflict between the conclusions and recommendations in this report and those in the 2014 IOM report on capturing social and behavioral domains and measures in EHRs (IOM, 2014).

The committee also considered whether an indicator is relatively stable or changes over time. This distinction is not binary, but rather describes a spectrum. Some factors, such as nativity, would not logically change over time, while other factors, such as language, could potentially change over time, but such change is likely to be relatively slow. These factors are relatively stable. Other factors are likely to change more rapidly. For example, a Medicare beneficiary’s marital status could change rapidly owing to the loss of a spouse (NASEM, 2016b).

To weigh the trade-offs between, and identify priorities among, the potential data sources for each individual social risk factor indicator, the committee identified several guiding principles.
Recommendation 1: The committee recommends the Centers for Medicare & Medicaid Services (CMS) use five guiding principles when choosing data sources for specific indicators of social risk to be used in Medicare performance measurement and payment. These guiding principles are as follows:

- CMS should first use data it already has.
- CMS should second look for opportunities to use existing data collected by other government agencies (including elsewhere in the Department of Health and Human Services).
- To the extent that a social risk factor is relatively stable, CMS should examine the feasibility of collecting additional data at the time of enrollment in Medicare.
- Where social risk factors change over time and have clinical utility, requiring data collection through electronic health records or other types of provider reporting may be the best approach.
- For social risk factors that reflect a person’s context or environment, existing data sources that can be used to develop area-level measures should be considered.

Once the committee identified potential data sources for each of the social risk factor indicators identified in its third report, the committee assessed each potential data source in terms of the three characteristics (collection burden, accuracy, and clinical utility) and identified the relative advantages and disadvantages of each source. It then weighed the trade-offs for each source to identify preferences and priorities and develop proposed data collection strategies. Based on the committee’s review and assessment of potential data sources for each of the social risk factor indicators, the committee identified the following categories of data that CMS could use for inclusion in Medicare quality measurement and payment:

1. Data sources exist that could be used in the short and long term.
2. Data sources with some limitations exist that could be used in the short term, and CMS should conduct research on new or improved data collection strategies in the long term. These include indicators for which
   a. CMS has some existing data that could be used in the short term, but CMS should research ways to improve accuracy and data collection in the long term;
   b. Area-level measures could be used in the short term, but CMS should research standardized measurement and data collection for the long term.
3. Measures and data collection methods exist, but data sources have considerable limitations and more research is needed to accurately collect data in the long term.
4. Some measures exist, but more research is needed on the effect of the social risk factor indicator on health care outcomes of Medicare beneficiaries and on methods to accurately collect data for the Medicare population.

Recommendation 2: The committee recommends that the Centers for Medicare & Medicaid Services use existing data on dual eligibility, nativity, and urbanicity/rurality in Medicare performance measurement and payment.

For the Medicare population, dual eligibility is an indicator of insurance status that can be used as a proxy measure of socioeconomic position (SEP). Because it captures elements of SEP and health status, dual eligibility can be considered a broader measure of health-related resource availability that captures medical need (NASEM, 2016b). CMS administers both Medicare and Medicaid programs, and therefore already possess existing data on dual eligibility among Medicare beneficiaries.

Nativity refers to country of origin. Measures can capture a specific country of origin or a dichotomous variable comparing foreign-born to U.S.-born individuals (NASEM, 2016b). CMS does not currently collect nativity data, nor is nativity routinely captured in EHRs. However, Medicare beneficiaries’ place of birth could be collected either by CMS or via EHRs with relatively little burden to patients, providers and plans, or CMS. Nativity is a stable social risk factor, which supports one-time collection by CMS to reduce burden, but nativity also has clinical utility, which supports collection through EHRs. The SSA collects place of birth including city and state or foreign country. These data could be paired with Medicare beneficiary records.

Urbanicity/rurality describes where a place falls on the spectrum from urban to rural (NASEM, 2016b). Because urbanicity/rurality represents a beneficiary’s residential and community context, an area-level measure based on the beneficiary’s place of residence is appropriate. The Census Bureau classifies census tracts and/or census blocks as urban areas, urban clusters, and rural, and CMS could use this classification. Medicare beneficiaries’ place of residence is available in Medicare administrative records and is also likely to be captured in administrative or EHR data by providers and plans.

Recommendation 3: Data for individual measures of race and ethnicity, language, and marital/partnership status and for area-level measures of
income, education, and neighborhood deprivation are currently available, and the committee recommends that the Centers for Medicare & Medicaid Services (CMS) use them for performance measurement and payment applications in the short term. However, owing to limitations in these data, CMS should research ways to improve accuracy and collection of individual-level measures of race and ethnicity, language, marital/partnership status, income, and education, as well as an area-level measure of neighborhood deprivation for use in the future.

Race and ethnicity are conceptually distinct albeit related constructs that are typically identified through self-reported categories. Medicare currently maintains race and ethnicity data in its administrative records. Current Medicare surveys and administrative records capture self-reported race and ethnicity using categories that adhere to federal standards issued by the White House Office of Management and Budget (OMB) (OMB, 1995; Zaslavsky et al., 2012). However, race and ethnicity information for older beneficiaries who enrolled in Medicare prior to when these standards were issued and implemented may reflect outdated racial and ethnic classifications (Zaslavsky et al., 2012). EHRs are also likely to capture race and ethnicity data. CMS should use available self-report and imputed race and ethnicity data in its existing records and methods in the short term. However, the committee acknowledges some limitations with regard to lack of standardization in current measurement and collection, and less accuracy for older age groups. Over the long term, CMS should continue to collect self-reported race and ethnicity following the OMB standards and work on standardizing measures and methods across the various self-report mechanisms it oversees—administrative forms, Medicare sample surveys, and provider and plan reporting requirements.

Language as a social risk factor typically represents language barriers, such as speaking a primary language that is not English, having limited English proficiency, or otherwise needing interpreter services (NASEM, 2016b). CMS currently maintains some data on preferred language, which has high specificity, but poor sensitivity. In the short term, CMS should use its existing data on preferred language while acknowledging its limitations. In the long term, CMS should continue efforts to standardize measures and data collection methods.

Marital/partnership status is a structural element of social relationships and an indicator of social support. CMS maintains data on marital status, because it is important for Social Security benefits, but CMS does not have partnership data. Providers, plans, and other federal government agencies also do not collect data on partnership. However, because partnership changes over time, especially among older adults, and is clinically useful, it could be collected through EHRs. Regardless of the data source CMS
chooses, it will be important for CMS to monitor the empirical association between marital/partnership status and health care outcomes and revisit assumptions about marital/partnership status as an indicator of social support over time. In the short term, CMS should use available data on marital status. In the long term, research is needed on measurement and data collection for partnership. In particular, CMS could examine whether including partnership in any method to account for social risk factors that already includes marital status and living alone adds substantial additional precision and explanatory value.

Individual income can affect health and health care outcomes directly or indirectly (Adler and Newman, 2002; Braveman et al., 2005). CMS does not currently collect or maintain income data, nor do providers and plans. In the short term, an area-level measure of income from the ACS such as median household income could be used as a proxy for individual-level income. In the long term, the SSA maintains several sources of individual-level income data (lifetime earnings, Medicare payroll taxes, Supplemental Security Income), which CMS could link to Medicare data. Several government agencies also collect and maintain income data to determine Medicare Part B and Part D premium amounts for individuals and married couples with higher incomes, which CMS could also link to Medicare data. CMS could also develop standardized measures and methods to collect income data.

Education can affect health directly (Cutler and Lleras-Muney, 2006; IOM, 2014) or through other indicators of SEP—employment, occupation, and income (Adler and Newman, 2002; IOM, 2014; NASEM, 2016a,b). Currently, CMS does not collect or maintain data on education, nor do providers and plans routinely collect it. Although some of the more comprehensive EHRs may capture educational attainment, standardized measures and data collection strategies are needed. With respect to other government sources, area-level measures are available through the ACS. Thus, in the short term, CMS should use these available area-level measures as a proxy for individual education. In the long term, CMS should develop standardized measures and methods to collect education data.

Relevant area-level constructs of neighborhood deprivation include compositional characteristics of communities such as dimensions of SEP (e.g., the proportion of racial and ethnic minority residents, single-parent households, households below the federal poverty level, and English language–proficient residents) as well as elements of residential environments including the physical or built environment (e.g., availability of services—including health care services) and social environments (e.g., safety and violence, the presence of social organizations, and social cohesion). Because neighborhood deprivation captures a beneficiary’s environment or residential context, an area-level measure based on the beneficiary’s residential address is appropri-
Accounting for Social Risk Factors in Medicare Payment

Neighborhood deprivation can be assessed using a single-item measure such as median household income or a multi-item composite measure. In the short term, the committee recommends that CMS test a composite measure (such as an existing indicator from the literature) and a simple single-indicator item (such as median household income), contrast their performance at the census tract-level, and also weigh the benefits of simplicity of a single indicator against the increased precision from a composite measure. To increase accuracy in the long term, CMS could conduct research on measurement and data collection such as measures to better capture neighborhood deprivation in rural areas, to identify an improved geospatial unit of analysis for rural settings, and to assess the performance of any given variable (single or composite) across multiple geographic areas.

**Recommendation 4:** Individual measures of wealth, living alone, and social support exist, but they are sufficiently limited to preclude their use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. Therefore, the committee recommends that CMS research ways to accurately collect data on these indicators.

Wealth represents total accumulated economic resources (assets) that, like income, can affect health directly and indirectly (Braveman et al., 2005; Deaton, 2002; NASEM, 2016a). Wealth may capture more variation than income among older persons, and may therefore be a more sensitive indicator of SEP among Medicare beneficiaries (Allin et al., 2009). Collecting self-reported net worth is difficult because it is sensitive and because many individuals simply do not know the value of their net worth or what assets they have (Braveman et al., 2005; Eggleston and Klee, 2015). Wealth data are not currently available through CMS, providers and plans, or other government agencies. Because no data sources are available for use in the short term, CMS should conduct more research on both measurement and data collection methods by CMS or through EHRs. CMS could consider whether inclusion of wealth data adds sufficient precision above and beyond income data.

Living alone is a structural element of social relationships, which is typically an indicator of social isolation or loneliness, and it is likely to capture elements of social support (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988; Wilson et al., 2007). There are no data sources that could be used in the short term. However, for the long term, because living arrangements can change rapidly for older adults and living alone has clinical utility as an indicator, living alone may best be captured in the clinical setting. CMS should develop standardized measures and methods for data collection through EHRs.
Social support is a crucial function of social relationships that includes instrumental components (e.g., material and other practical supports) and emotional dimensions (e.g., through caring and concern). Currently, no social support data are available within CMS, from providers and plans, or from other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because social support can change rapidly and has clinical utility, it may best be captured in the clinical setting. CMS should develop standardized measures and methods for data collection through EHRs.

Recommendation 5: Area-level measures exist for housing, but they have limitations for use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. The committee recommends that CMS research ways to accurately collect housing data, whether at an individual level or an area level.

Elements of housing that may influence health include housing stability, homelessness, and quality and safety. Currently neither CMS nor providers and plans routinely collect housing information, although some more comprehensive EHRs may collect or link to housing information (Gottlieb et al., 2015; ONC, n.d.). Because housing can change over time and has clinically utility, housing information could be collected through EHRs. Some area-level measures of housing are also available through the ACS and the Department of Housing and Urban Development. Because some dimensions of housing reflect beneficiaries’ environment, an area-level measure could be appropriate. In the short term, the committee recommends that CMS test area-level measures based on a beneficiary’s residential address in the Medicare record. Because other elements of housing, in particular, physical characteristics, occur at the individual level, and can change over time, individual-level housing data could be collected through EHRs in the long term, but more research is needed on measurement and data collection methods.

Recommendation 6: The committee recommends that research be conducted on the effect of acculturation, sexual orientation and gender identity, and environmental measures of residential and community context on health care outcomes of Medicare beneficiaries, and on methods to accurately collect relevant data in the Medicare population.

Acculturation describes how much an individual adheres to the social norms, values, and practices of his or her own home country or ethnic group or to those of the United States (NASEM, 2016a). Evidence on the
effect of acculturation and health care outcomes is not well established (Abraído-Lanza et al., 2006; IOM, 2014; NASEM, 2016a). Because more evidence is needed on the empirical association between acculturation and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available.

Sexual orientation captures individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming, and it is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011). Gender identity typically refers to individuals who identify as gender minorities, including those who identify as transgender, intersex, or otherwise nonconforming (IOM, 2011). Although some measures and best practices for data collection exist and CMS has included data collection of sexual orientation and gender identity in its Equity Plan for Improving Quality in Medicare, there are currently no standards for measuring and collecting data on sexual orientation and gender identity (CMS Office of Minority Health, 2015). Providers and plans also do not typically collect sexual orientation and gender identity data. However, ONC included sexual orientation and gender identity in its stage 3 meaningful use regulations (CMS, 2015). Because, in part, of a lack of standardized measures, there is currently little evidence on the effect of sexual orientation and gender identity on health care outcomes (NASEM, 2016a,b). Because more empirical evidence of an effect on health care outcomes is needed, CMS should revisit this indicator and its appropriate measurement when more evidence is available.2

Environmental measures of residential and community context capture elements of the physical or built environment such as transportation options and proximity to services (including health care and social services), as well as social environments such as safety and violence and the presence of social organizations. There is a conceptual relationship between neighborhood environments and health care outcomes, but evidence is currently limited and environmental measures need to be tested further (NASEM, 2016a). Thus, CMS should revisit such environmental measures and their appropriate measurement when more evidence is available.

Recommendation 7: The committee recommends that the Centers for Medicare & Medicaid Services collect information about relevant, relatively stable social risk factors, such as race and ethnicity, language, and education, at the time of enrollment.

2 As described in the committee’s third report (NASEM, 2016b), normative gender categories (men and women) are strongly associated with health and health care outcomes, despite the fact the gender effects are difficult to separate from biological sex effects. Thus, normative gender is a strong candidate for inclusion in methods to account for social risk factors in Medicare quality measurement and payment programs. However, the committee notes that gender is already included as a risk factor in clinical risk adjustments in Medicare.
Indicators for which data might best be captured through a revised enrollment form include race and ethnicity, language, and education. Should other methods, such as linking to data from the SSA, prove too difficult or not produce accurate information on other indicators (e.g., income and nativity), these could be considered for inclusion in the revised enrollment form. Should research demonstrate an important explanatory effect of one or more of these indicators and a pilot test shows it is feasible, CMS could supplement the information collected at enrollment with a survey of current beneficiaries, whose information would not have been captured at the time of enrollment.

Table DS-1 summarizes the availability of data for social risk factor indicators that could be accounted for in Medicare payment programs.

**GENERAL CONCLUSIONS**

The committee identified several general conclusions for CMS in its overall approach to collecting data on social risk factors for use in Medicare payment. Any given indicator may require different data collection strategies depending on its intended use. For example, risk-adjusting health plan quality measures may require data from different sources compared to risk-adjusting hospital quality measures, because social risk factors that affect the outcome or cost of a hospitalization likely differ from those that affect quality or total cost of care measures. This may be particularly relevant for data collected through EHRs, because providers vary in their stage of EHR adoption and capacity for health information exchange. However, this may also be true for other sources of data, where there are limitations to data from existing sources, where data would be collected in different settings (e.g., hospitals, clinical practices, in the home), and when data are collected by different types of individuals (e.g., clinicians and nonclinical staff). Moreover, the specific modes of data collection needed may change over time. For EHR data, needs for complementary modes may diminish with advances in EHR adoption and interoperability. An example of an existing multimodal approach is CMS’s strategy for collecting race and ethnicity data. Data from beneficiaries enrolled since the 1990s are collected via self-report, but for older beneficiaries for whom current categories collected through self-reported data are unavailable, CMS imputes race and ethnicity and also updates older data with newer self-reported data collected through surveys. Additionally, when CMS revised its race and ethnicity measures, it conducted a survey of certain Medicare beneficiaries to improve the accuracy of its data (Zaslavsky et al., 2012).

**Conclusion 2:** Different data collection strategies for the same social risk factor indicator may be warranted depending on the purpose or
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1. Available for use now
2. Available for use now for some outcomes, but research needed for improved, future use
3. Not sufficiently available now; research needed for improved, future use
4. Research needed to better understand relationship with health care outcomes and on how to best collect data
methods used to account for social risk factors in Medicare performance measurement and payment. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use.

Conclusion 3: Any specific social risk factor indicator may require a multimodal approach to data collection.

Conclusion 4: Regardless of the source, research on how to accurately and reliably collect social risk factor data across different modes and in different settings will be needed.

REFERENCES


Introduction

The Centers for Medicare & Medicaid Services (CMS) is increasingly paying providers (e.g., hospitals, health plans, provider groups) through value-based payment (VBP) programs. VBP ties quality and cost performance to payment in order to hold providers accountable for the quality and efficiency of the health care they provide and for the health care outcomes they achieve (Burwell, 2015; Rosenthal, 2008). In so doing, VBP schemes shift greater financial risk to providers. Because current VBP programs do not account for social risk factors for poor health outcomes, these programs may underestimate the quality of care provided by providers disproportionally serving socially at-risk populations. Consequently, these providers may be more likely to fare poorly on quality rankings (Berenson and Shih, 2012; Elliott et al., in press; Gilman et al., 2014, 2015; Joynt and Jha, 2013a; Rajaram et al., 2015; Shih et al., 2015; Williams et al., 2014). When payment is tied to quality rankings under VBP, these providers may

1 As described in the committee’s first and third reports (NASEM, 2016a,b) (see Appendixes A and C), CMS payment models cover a spectrum of approaches from traditional fee-for-service to population-based payment models. The committee uses the term value-based payment to describe models that fall into two broad categories, which the committee roughly categorizes as financial incentives and alternative payment models (APMs). Financial incentives (such as pay-for-performance schemes) link financial bonuses and/or penalties to the quality and efficiency of care, whereas APMs (such as episode- or population-based payments) shift greater financial risk to providers in order to hold them accountable for the quality and efficiency of care delivered as well as for the health care outcomes achieved. For more information on specific Medicare VBP programs, the committee points the interested reader to its first and third reports (NASEM, 2016a,b).
also be more likely to receive penalties and less likely to receive incentive payments (Chien et al., 2007; Joynt and Jha, 2013a,b; Joynt and Rosenthal, 2012; Ryan, 2013). Moreover, these providers have historically been less well reimbursed than providers serving more advantaged patients and have fewer resources (Bach et al., 2004; Chien et al., 2007). If providers disproportionately serving socially at-risk populations have fewer resources to begin with and are more likely to fare poorly on quality rankings and receive financial penalties under VBP, the limited resources to care for socially at-risk populations and those who care for them may be further reduced. This has led some stakeholders to raise concerns that current VBP programs may increase health disparities (Bhalla and Kalkut, 2010; Casalino et al., 2007; Chien et al., 2007; Friedberg et al., 2010; Ryan, 2013).

A primary method proposed to address these concerns has been to account for social risk factors in quality measurement and payment programs, including VBP. Proponents of such methods view social risk factors as difficult to address through provider actions and may also believe that the costs of addressing social risk factors are high. Thus, they suggest that social risk factors must be accounted for in VBP even if it is appropriate to expect providers to address social risk factors. Opponents are concerned that methods like risk adjustment could obscure real disparities and thereby reduce incentives to improve care and reduce health disparities. Thus, they might argue that providers disproportionately serving socially at-risk populations should be held responsible for providing services in a manner that compensates for social risk factors. For a more extensive discussion of these concerns, the committee directs the interested reader to its first three reports (NASEM, 2016a,b,c). As described in the committee’s third report (NASEM, 2016b), to the extent that social risk factors influence performance indicators independently of provider actions and those factors are unevenly distributed across providers, it may be appropriate to account for social risk factors in VBP (NASEM, 2016b). However, any specific approach to accounting for social risk factors in Medicare quality and payment programs requires continuous monitoring to ensure the absence of any unanticipated adverse effects on health disparities (NASEM, 2016b). If CMS proceeds with accounting for social risk factors, doing so first requires accurate data on the social risk factors of Medicare beneficiaries.

STATEMENT OF TASK

In response to the Improving Medicare Post-Acute Care Transformation (IMPACT) Act of 2014, the Department of Health and Human Services acting through the Office of the Assistant Secretary for Planning and Evaluation (ASPE) contracted with the National Academies of Sciences, Engineering, and Medicine to convene an ad hoc committee to provide a
definition of socioeconomic status for the purposes of application to Medicare quality measurement and payment programs; identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs; identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies; and recommend existing or new sources of data and/or strategies for data collection. The committee comprises expertise in health care quality, clinical medicine, health services research, health disparities, social determinants of health, risk adjustment, and Medicare programs (see the Appendix E for biographical sketches). This report is the fourth in a series of five brief reports that aim to inform ASPE analyses that account for social risk factors in Medicare payment programs mandated through the IMPACT Act. In the first report, the committee presented a conceptual framework and described the results of a literature search linking five social risk factors and health literacy to health-related measures of importance to Medicare quality measurement and payment programs. In the second report, the committee reviewed the performance of providers disproportionately serving socially at-risk populations, discussed drivers of variations in performance, and identified six community-informed and patient-centered systems practices that show promise to improve care for socially at-risk populations. The committee’s third report identified social risk factors that could be considered for inclusion in Medicare quality measurement and payment, criteria to identify these factors, and methods to account for them in ways that can promote health equity and improve care for all patients. Details of the statement of task and the sequence of reports can be found in Box D1-1. The committee will release reports every 3 months, addressing each item in the statement of task in turn.

COMMITTEE PROCESS

This report builds on the committee’s earlier reports. In particular, the committee presented a conceptual framework by which five social risk factors (socioeconomic position [SEP]; race, ethnicity, and cultural context; gender; social relationships; and neighborhood and residential context) and health literacy may influence performance indicators used in VBP in its first report (NASEM, 2016a). In the committee’s third report, the committee expanded the conceptual framework to include specific indicators across the five domains of social risk factors. Indicators are ways to measure the underlying constructs of the social risk factors and are distinct from individual measures. For example, education is an indicator of SEP that can be measured in different ways (e.g., years of schooling, highest degree attained).
BOX D1-1
Statement of Task

An ad hoc committee will provide a definition of socioeconomic status (SES) for the purposes of application to Medicare quality measurement and payment programs; to identify the social factors that have been shown to impact health outcomes of Medicare beneficiaries; and to specify criteria that could be used in determining which social factors should be accounted for in Medicare quality measurement and payment programs. Further, the committee will identify methods that could be used in the application of these social factors to quality measurement and/or payment methodologies. Finally, the committee will recommend existing or new sources of data and/or strategies for data collection. The committee’s work will be conducted in phases and produce five brief reports, which build on the Institute of Medicine of the National Academies of Sciences, Engineering, and Medicine’s previous studies relevant to this study.

The first report will:
- Define socioeconomic status for the purpose of application to quality, resource use, or other measures used for Medicare payment programs.
- Identify SES factors and other social factors (such as race, health literacy, limited English proficiency) that have been shown to impact health outcomes of Medicare beneficiaries.

The second report will:
- Identify best practices of high-performing hospitals, health plans, and other providers that serve disproportionately higher shares of socioeconomically disadvantaged populations and compare those best practices to practices of low-performing providers serving similar patient populations.

The third report will:
- Specify criteria (along with their strengths and weaknesses) that could potentially be used to determine whether an SES factor or other social factor should be accounted for in Medicare quality, resource use, or other measures used in Medicare payment programs.
- Identify SES factors or other social factors that could be incorporated into quality, resource use, or other measures used in Medicare payment programs.
- Identify methods that could be used in the application of SES factors and other social factors to quality, resource use, or other measures used in Medicare payment programs.

The fourth report will:
- For each of the SES factors or other social factors described above, recommend existing or new sources of data on these factors and/or strategies for data collection, while also identifying challenges to obtaining appropriate data and strategies for overcoming these challenges.

In the fifth report:
- The committee will synthesize and interpret the four brief reports issued as described above into one report that will include comprehensive project findings, conclusion, and recommendations based on the four previous reports.
The committee also identified criteria that could be used to select social risk factors that should be included in Medicare quality measurement and payment programs, and then applied these criteria to indicators of the social risk factors and health literacy. Based on this activity, the committee concluded that there are measurable social risk factors that could be accounted for in Medicare VBP programs in the short term, for which indicators include:

- income, education, and dual eligibility;
- race, ethnicity, language, and nativity;
- marital/partnership status and living alone; and
- neighborhood deprivation, urbanicity, and housing.

The committee also concluded that some indicators of social risk factors capture the underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in accounting methods in Medicare VBP programs in the longer term. These include:

- wealth,
- acculturation,
- gender identity and sexual orientation,
- emotional and instrumental social support, and
- environmental measures of residential and community context.

In this report, the committee provides guidance on data sources for and strategies to collect data on the indicators that could be included in Medicare quality measurement and payment programs that the committee identified in its third report. Chapter 2 describes three general categories of data sources the committee considered—existing and new sources of CMS data, data sources from providers, and alternative government data sources. Chapter 2 also describes general advantages of and barriers to using each data source. Chapter 3 then presents guiding principles the committee used to assess each potential data source for each social risk factor indicator as well as the specific potential data sources that could be used for each indicator along with their advantages and disadvantages. Chapter 3 closes with general conclusions for CMS in its approach to collecting social risk factor data for use in Medicare quality measurement and payment.

REFERENCES


Potential Data Sources

In its third report, *Accounting for Social Risk Factors in Medicare Payment: Criteria, Factors, and Methods* (NASEM, 2016), the committee identified social risk factors that the Centers for Medicare & Medicaid Services (CMS) could include in quality measurement and payment, criteria to identify these factors, and methods to do so. For CMS to account for social risk factors in Medicare quality measurement and payment programs using these approaches, it is logical that it must first have accurate data on the social risk factors of Medicare beneficiaries. This chapter describes three broad categories of data sources for these social risk factors: (1) data CMS already possesses or could collect; (2) data that providers (including hospitals, health plans, provider groups, and others) could report to CMS; and (3) alternative government data sources. The chapter also presents general advantages of each potential source as well as barriers to collecting accurate data through, and using data from, these sources.

Patients are the underlying source of most social risk factor data. This is also true of most clinical data. Clinicians make assessments and diagnoses based on how patients present—e.g., their complaints, symptoms, and test results. Providers then systematically maintain and report clinical data in the form of diagnostic and clinical assessments. Most social risk factors are collected directly from patients who report their income, race, ethnicity, preferred language, etc. to CMS, health care providers, and other government agencies. Moreover, for some social risk factors like race, ethnicity, and gender, it is important for patients to self-identify. However, CMS, health care providers and health plans, and government agencies collect and maintain this information and, more importantly, standardize,
assess, interpret, and report this information in a valid, consistent, and reliable way.

In the future, new, better, and easier methods of data collection could emerge (e.g., methods that are more accurate, less burdensome, or less costly). For example, health technologies such as smartphone applications and wearable devices that could collect health and social risk factor data are rapidly developing and it is feasible that Medicare beneficiaries could directly report social risk factor data to CMS in the future. Indeed, as these new methods emerge, an ideal system would be responsive to evolving data availability and could adapt to use new data sources. However, at this time and likely in the near term over which the committee expects the Office of the Assistant Secretary of Planning and Evaluation to begin preliminary analyses and CMS to begin accounting for social risk factors in Medicare payment, it is unlikely that technologies and interoperable systems will be available for patients to directly, systematically, and securely submit social risk factor data to CMS for use in Medicare payment. Thus, although patients and enrollees underlie each of the three categories of data sources described above, they are not called out as a separate and unique source.

Finally, although social risk factor data could also be obtained from private data sources, because these sources and their data collection methods are not fully transparent and because CMS would have to purchase these data at unknown cost, the committee deemed use of such private data as out of scope.

NEW AND EXISTING SOURCES OF CMS DATA

CMS possesses a variety of data sources, some of which include data on social risk factors of Medicare beneficiaries. Existing sources of social risk factor data include administrative records and surveys of enrollees and patients. Administrative records include Medicare beneficiary enrollment records as well as claims data. These sources include limited information on social risk factors, such as beneficiaries’ race and ethnicity (ResDAC, 2016a). Enrollment information on Medicare beneficiaries includes the basis of a beneficiary’s entitlement, which plans beneficiaries are enrolled in (Parts A, B, C, D, or alternative payment models), as well as Medicaid enrollment for those who are dually enrolled in Medicare and Medicaid (ResDAC, 2016a). Administrative records also include basic demographic information and vital statistics, as well as clinical information and data on beneficiaries’ health care use and expenditures based on claims data that providers submit to CMS for payment (ResDAC, 2016a).

Survey data from CMS refer to data derived from one of the surveys of Medicare beneficiaries that CMS routinely conducts. These include the Consumer Assessment of Healthcare Providers and Systems (CAHPS)
family of surveys, the Health Outcomes Survey (HOS), and the Medicare Current Beneficiary Survey (MCBS) (ResDAC, 2016b). CAHPS surveys aim to assess patient experiences of care from a variety of care settings—hospital, health plan, clinicians and groups, home health, hospice, and so on (AHRQ, 2016; CMS, 2016a). The Medicare HOS assesses patient-reported health outcomes, including physical functioning and mental health outcomes (Haffer and Bowen, 2004; Medicare Health Outcomes Survey, 2016). The MCBS aims to assess beneficiaries’ access to, satisfaction with, and usual sources of care, as well as their expenditures and sources of payment for all health care services used, including those not covered by Medicare (CMS, 2016c,d). These surveys, especially the CAHPS surveys, include limited data on social risk factors, such as information on race and ethnicity, language, and education.

CMS could also collect new data on social risk factors. It could do so by adding items to existing sources, such as enrollment forms or survey questionnaires. In addition, CMS could collect social risk factor data through new methods or sources, such as through a new survey or administrative form. CMS could implement this for all new beneficiaries going forward, for example, at enrollment as a condition of receiving benefits. However, this would not capture social risk factor data for existing beneficiaries. Thus, to ensure accurate data on all beneficiaries, CMS could also conduct a one-time, universal survey of all currently enrolled Medicare beneficiaries.

Using CMS data has several advantages. The primary advantage of using existing sources of data that CMS already possesses is precisely that CMS has access to and maintains accurate data it already collects using standardized measures and validated, reliable methods, and which it could apply to performance measurement and payment programs. Additionally, if CMS were to collect new social risk factor data for inclusion in Medicare quality measurement and payment programs, it could design measures and data collection methodologies to ensure collection of accurate data that meet the needs of the intended method to account for those social risk factors in Medicare quality measurement and payment programs. At the same time, such new data collection on the social risk factors also need not be restricted to Medicare quality measurement and payment applications. CMS could also use these data for other purposes, including research and quality improvement. Finally, if CMS were to collect new data themselves, it also would not be subject to the potentially substantial barriers of collaborating with other federal government agencies. (These barriers are discussed in more detail in the section on other government data sources.)

At the same time, using CMS data on social risk factors in quality measurement and payment programs is not without challenges. In particular, although CMS may currently collect and maintain some existing sources of data on social risk factors, because these data are designed and used
for purposes that are not quality or performance measurement and payment, these data may not be immediately usable for such application. In particular, data on the same social risk factor across different data sets may require measurement standardization in order to be useful for inclusion in performance measurement and payment. For example, although CMS may have data on the race and ethnicity or preferred language of Medicare beneficiaries from several sources, how such data are measured and/or collected for administrative purposes may differ from how they are measured and/or collected through surveys. Additionally, some data, especially those derived from sample surveys, may not be sufficient for certain methods of accounting for social risk factors. A particular concern is small sample size. For example, CMS would need relatively large sample sizes for some methods of accounting for social risk factors, and this may be larger than what is currently collected through any existing survey. Relatedly, even if sufficient samples are available to account for social risk factors in measuring some outcomes, data on social risk factors from one source may not generalize or be able to be applied to other outcome measures from another source. In regard to new data collection, doing so would require clearance of new items to survey questionnaires or administrative form from the White House Office of Management and Budget, which is especially concerned about collection burden, and such clearance processes could be a barrier to collecting new data. Additionally, any new collection of data from all new or existing Medicare beneficiaries would require substantial cost for which there are likely to be limited resources.

DATA SOURCES FROM PROVIDERS AND PLANS

Data sources from providers include data from electronic health records (EHRs) and administrative data that providers report or could report to CMS. EHRs comprise the software providers use to collect, store, and manage patient health records as well as the databases that hold this information (IOM, 2014). EHR data sometimes (and henceforth in this report) refer to the information rather than the entire information technology system (IOM, 2014). Most EHRs capture some basic information on social risk factors, such as race and ethnicity, and EHRs are beginning to capture more robust social risk factor data. Some more comprehensive EHR systems may include or link to more data on social risk factors, such as language preferences or capabilities, education, housing, and community context (Gottlieb et al., 2015; ONC, n.d.).

The Office of the National Coordinator for Health Information Technology (ONC) is the office responsible for supporting and encouraging EHR adoption and health information exchange in the Department of Health and Human Services (HHS). To date, ONC has included some
social risk factors in the regulations it puts forth for the CMS meaningful use incentive programs. *Meaningful use* in health information technology refers to the use of EHR data for specific objectives, such as quality improvement, care coordination, and improving public and population health (CMS, 2016b; IOM, 2014; ONC, 2014b). CMS meaningful use incentive programs provide bonus payments to providers who demonstrate that their EHRs achieve certain meaningful use objectives. These programs have been implemented in stages since 2011. The Stage 2 Meaningful Use regulations published in 2012 for the incentive program beginning in 2014 require EHRs to have the capacity to include race and ethnicity and preferred language in the objective to record demographics (CMS, 2012). In the Stage 3 Final Rule published in 2015 for programs beginning in 2017, ONC added collection of sexual orientation and gender identity (CMS, 2015). Importantly, achieving meaningful use under these standards does not require providers to collect this information, only that a provider’s EHR system has the capacity to do so (CMS, 2015). Nonetheless, meaningful use regulations and related incentive payments are powerful tools to encourage adoption of social risk factor data in EHRs.

In 2014, the Institute of Medicine (IOM) published a report recommending social and behavioral domains and measures for ONC to consider including in its meaningful use regulations. Although the purpose of that report was to identify social and behavioral domains that should be captured in EHRs to enhance patient care by capturing information important to providers in providing health care, there is some overlap between the social risk factors listed in this earlier IOM report and those identified in the committee’s third report. Moreover, although the tasks for the two committees and the resulting two reports diverge, application of EHR data in Medicare performance measurement and payment can be considered another form of meaningful use and such application provides additional rationale for incentivizing widespread adoption of standardized collection and reporting of data from EHRs to CMS, including social risk factor data.

Administrative data include data captured through patient enrollment forms and claims data and may also include limited social risk factor data. For example, many health plans collect language data in order to provide appropriately tailored health care information and services to enrollees (Lawson et al., 2011; Nerenz et al., 2013a,b), and these data could be reported to CMS for use in performance measurement and payment. Such data could be attached to claims data that providers already submit to CMS using standardized reporting processes and systems for payment.

A primary advantage of using data on Medicare beneficiaries’ social risk factors that providers or health plans collect is that some information on social risk factors may be clinically useful to enhance the care or services the providers and plans provide. In addition, CMS already has a report-
ing infrastructure for claims and performance reporting with standardized reporting requirements, processes, and systems that it could build on.

Despite these advantages, a principal barrier to using data from providers is the need for standardized measurement and reporting to CMS, regardless of whether the data come from EHRs or other electronic systems. Although CMS has infrastructure for both performance and claims reporting that it could enhance to include reporting of social risk factors, because only limited social risk factor data are currently collected through EHRs, CMS would still need to identify or develop and validate measurement standards for collection of new social risk factors. In addition, data can be added to EHR and other electronic systems through different modes of collection. Clinicians and nonclinicians can collect data through clinical discussions and interviews during an office visit, patients can enter information directly through patient portals or electronic surveys, and data can be collected through paper forms and entered into electronic systems manually (IOM, 2014). Because these different modes of collection may affect the accuracy and consistency of the data collected, validated data collection methods are needed.

With respect to EHRs in particular, even if measurement and data collection standards are met where they exist, EHR systems lack interoperability, which in turn restricts health information exchange (HIE). HIE is the ability of health care professionals and patients to share patient health records securely and appropriately (ONC, 2014a); whereas, interoperability refers to the architecture and standards that enable HIE across different EHR systems (ONC, 2013). CMS promotes standardized data measurement and collection to promote interoperability and facilitates HIE for EHRs through such programs as the CMS meaningful use incentive programs and regional extension centers that provide technical advice on EHR implementation. However, there are hundreds of vendors of ONC-certified EHRs whose products differ (ONC, 2016e).

Several additional barriers to meaningful use more broadly present additional challenges for the use of EHRs as a source of social risk factor data for use in Medicare quality measurement and payment. Although the number of providers with basic and comprehensive EHRs has risen substantially since 2009 when the ONC was established, in 2015, while nearly all non-federal acute care hospitals used certified EHRs (ONC, 2016b), nearly one-quarter of primary and specialty physician practices did not demonstrate meaningful use of a certified EHR (ONC, 2016c,d). Moreover, evidence suggests that providers disproportionately serving socially at-risk populations such as safety-net hospitals, critical access hospitals, and community health centers are less likely to have either basic or comprehensive EHRs (Adler-Milstein et al., 2014, 2015; DesRoches et al., 2012, 2013a,b; ONC, 2016a,b; Shields et al., 2007). This may be especially challenging for using social risk factor
data derived from EHRs in Medicare quality measurement and payment programs because the providers whose performance scores and financial incentives are likely to be most affected by accounting for social risk factors in Medicare quality measurement and payment are precisely those who are less likely to have EHR systems with high functionality.

Second, collecting social risk factor data through EHRs could increase burdens on individual providers and health care organizations, as well as on patients. Adding social risk factors to EHRs may require software upgrades or additional programming; modifying workflows of the clinical team to collect, enter, and manage social risk factor data in the EHR; educating providers on data collection methods to ensure accurate data; ensuring data storage systems and methods to share social risk factor data with other providers and administrators or researchers are secure; and, in some cases, intervening on or otherwise addressing social risk factors through tailored care approaches or referring patients to social service or public health agencies or community organizations that can address unmet social needs (IOM, 2014). Each of these tasks is costly and time consuming.

Burdens on patients and enrollees pertain to the ability of patients to recall information about their social risks as well as privacy and security. With respect to the former, patients and enrollees may not know or be willing to share data on certain social risk factors that are sensitive in nature. Concerns about why clinicians or plans are asking about social risk factors like education, income, or nativity and how such data may be used relate to concerns about the privacy and security of patient health information, especially when shared with other providers and with researchers and administrators for nonclinical uses. The Privacy and Security Rules of the Health Insurance Portability and Accountability Act of 1996 (HIPAA) establishes standards for the use and disclosure of identifiable health information as well as security safeguards to protect electronic identifiable health information. In addition to federal regulations, states and localities also have privacy and security regulations governing the use of health information, which may include social risk factor data (IOM, 2014). Although such privacy laws are important for protecting patient privacy and security, they can nevertheless be barriers to using patient health information for research or administrative purposes. The burden of collecting data on social risk factors in EHRs on patients, providers, and health care organizations, including the concerns described and extensive discussions of privacy and security issues as well as mitigation strategies are discussed in detail in the IOM’s 2014 report as well as the 2012 report on health information technology and patient safety, and the committee points the interested reader to these reports for a more comprehensive discussion (IOM, 2012, 2014).

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ALTERNATE GOVERNMENT DATA SOURCES

Alternative government data sources in this report refer to administrative data and national surveys that federal agencies other than CMS and state agencies oversee and maintain and that could be linked to Medicare beneficiary data or that CMS could otherwise use. (Note this includes other agencies within HHS.) These data include data that could be linked to Medicare beneficiary data at the individual level, area-level data that could be used to describe a Medicare beneficiary’s residential environment or serve as a proxy for individual effects, and data that could help CMS to determine how to elicit information on social risk factors from Medicare beneficiaries. The primary advantage of using administrative and survey data from other agencies is that these data sources contain substantial information on social risk factors, and data from these sources are collected using standardized and validated measures and methodologies. However, barriers to linking such data to Medicare data can be substantial. First and foremost, laws and regulations relating to the privacy and security of such data, particularly federally funded data, may restrict data sharing (IOM, 2014). Additionally, as described above, even if data can be shared, it may require substantial effort and/or cost to ensure that data can be linked at the appropriate level. Small sample sizes in surveys may be of particular concern. For example, sample sizes for small geographic areas are small, and data may need to be pooled across years. Furthermore, because data from alternative government sources are not intended for use in Medicare quality measurement and payment applications, the social risk factor variables available from these sources may not best capture the relevant latent constructs. For example, the National Health and Nutrition Examination Study (NHANES) captures sexual orientation data, but focuses on sexual behavior; whereas, the aspect most relevant to Medicare performance indicators may be sexual identity. Barriers specific to particular data sources are discussed in more detail in the following sections.

Data from the Social Security Administration

The Social Security Administration (SSA) may be the most useful source of administrative data on social risk factors outside of CMS that could be linked to Medicare beneficiary data at the individual level. The SSA maintains many different data sets, but the four most commonly used are the Master Beneficiary Record, Master Earnings File, Numident file, and Supplemental Security Record (McNabb et al., 2009). These records include data on demographics, vital statistics, lifetime earnings (i.e., income), and information related to eligibility for social security needs-based benefits, such as disabling conditions and living arrangements (McNabb et al.,
Although these data are available and could be linked to Medicare beneficiary data, doing so will likely require substantial effort and cost.

**Data from the American Community Survey**

The American Community Survey (ACS) may be a particularly useful source of area-level social risk factor data that could be used to assess genuine area-level effects or serve as proxies for individual-level effects (U.S. Census Bureau, 2016). The ACS is a continuous nationwide survey administered by the Census Bureau that provides a wide range of social risk factor data including demographic, housing, social, and economic data on local communities (U.S. Census Bureau, 2013). It replaced the Census long form beginning in 2000, with full implementation in 2005. The sample size has increased from 2.9 million housing units in 2005 to 3.3 million housing units in 2014 (U.S. Census Bureau, 2013, 2015). Data from the ACS may be particularly useful for Medicare quality measurement and payment applications, because it provides area-level data at relatively small geographies—census tracts and block groups. However, because sample sizes are small, only 5-year estimates are available for these small geographies (U.S. Census Bureau, 2016). Moreover, these estimates are derived from all persons residing in the households sampled, not only the population of older adults. Therefore, they may be appropriate measures of genuine area-level effects but less precise as proxies for individual-level effects. However, deriving census-tract level variables from the ACS exclusively from the population of older adults, under the assumption that these would serve as better proxies for individual-level effects, is likely to be unwise. The small sample sizes of older adults in most census tracts would result in considerable imprecision.

**Data from Other National Surveys**

Other national surveys could be useful to CMS to determine how best to elicit information from Medicare beneficiaries on their social risk factors, because they capture substantial information on social risk factors and may offer guidance on the potential measurement strategies—both new or alternative ways—for many of the social risk factors that CMS could include in Medicare quality measurement and payment. For example, the design of these surveys includes standardized and validated measures and data collection methods to which CMS could refer when developing and refining its own measures and strategies to collect social risk factor data. However, because sample sizes of older adults in these national surveys are small, data from these surveys is unlikely to be useful to link to Medicare beneficiary data at the individual-level for use in Medicare quality measurement and payment. At the same time, where social risk factor data from national
surveys can be linked to individual-level Medicare beneficiary data in some limited capacity, in some cases, these national surveys could serve as test beds for CMS to assess the value-added quality of more complex measures. For example, CMS could assess how much additional explanatory power wealth might have above and beyond other measures of SEP, such as education and income, with regard to performance indicators used in value-based payment.

National surveys that collect data on social risk factors and which may be useful to CMS are the Health and Retirement Study (HRS), National Health & Aging Trends Study (NHATS), NHANES, National Health Interview Survey (NHIS), and the National Survey of Family Growth (NSFG). HRS, sponsored by the National Institute on Aging (NIA) and the SSA and administered by the University of Michigan, assesses health and economic well-being among more than 37,000 adults age 50 living in 23,000 households (NIA et al., 2007; Sonnega et al., 2014). NHATS, sponsored by NIA and conducted by the Johns Hopkins Bloomberg School of Public Health with data collection by Westat, assesses late life functioning among more than 8,0000 adults age 65 and older (NHATS, 2016). Because both HRS and NHATS are surveys of older adults including Medicare beneficiaries, some Medicare data are already linked to data from the HRS and NHATS (ResDAC, n.d.-a, n.d.-b). NHIS, NHANES, and NSFG are health-related surveys overseen by the National Center for Health Statistics of the Centers for Disease Control and Prevention. NHIS is a continuous household survey of adults that assesses physical and mental health status, chronic disease, health insurance and access to health care services, health behaviors (e.g., smoking, alcohol use, physical activity, immunizations), and limitations on activity or functioning (CDC, 2015b). The NHIS sample size for surveys beginning in 2011 is expected to be 87,500 persons from 35,000 households (CDC, 2015a). NHANES assesses the health status of approximately 300,000 U.S. adults and children and includes demographic, socioeconomic, dietary, and health-related questions, as well as an examination that includes medical, dental, and physiological measurements and laboratory tests (CDC, 2014, 2015c). NSFG is a continuous survey of men and women age 15 to 49 that assesses family life, marriage and divorce, reproductive health (including pregnancy, infertility, use of contraception), and general health (CDC, 2016). The NSFG sample has ranged from 10,000 to 20,000 (CDC, 2016).

These specific data sources for individual social risk factor indicators and the committee’s recommendations are described in the next chapter.
REFERENCES


Data Sources and Data Collection for Social Risk Factors

In its first report, *Accounting for Social Risk Factors in Medicare Payment: Identifying Social Risk Factors* (NASEM, 2016a), the committee presented a conceptual framework illustrating the primary hypothesized pathways by which five social risk factors—socioeconomic position (SEP); race, ethnicity, and cultural context; gender; social relationships; and residential and community context—and health literacy may influence health outcomes of Medicare beneficiaries (NASEM, 2016a). In its third report, *Accounting for Social Risk Factors in Medicare Payment: Criteria, Factors, and Methods* (NASEM, 2016b) (see Appendix C), the committee expanded the framework to include specific indicators, or ways to measure, the social risk factors. The committee also developed five criteria for selecting social risk factors that could be accounted for in Medicare quality measurement and payment programs and applied them to the social risk factor indicators. Based on this activity, the committee concluded that the following indicators could be included in Medicare quality measurement and payment programs in either the short or long term:

- income
- wealth
- education
- dual eligibility
- race and ethnicity
- language
- nativity
- acculturation
• sexual orientation and gender identity
• marital/partnership status
• living alone
• social support
• neighborhood deprivation
• housing stability and quality
• urbanicity
• other environmental measures of residential and community context

For each social risk factor, the committee identified data sources in the categories described in Chapter 2—new and existing sources of Centers for Medicare & Medicaid Services (CMS) data, data sources from providers and health plans, and alternative government data sources—with the aim to be more inclusive. The committee’s review of data sources considered sources that CMS could use in the short and long term. The committee notes that it has not been asked to recommend whether the CMS should include social risk factor adjustments in its public reporting and payment programs. The recommendations in this report indicate things CMS should do if it decides to move toward accounting for social risk factors.

To assess the advantages and disadvantages of specific data sources for specific social risk factor indicators, the committee identified three characteristics to consider: (1) collection burden, (2) accuracy, and (3) clinical utility. Collection burden describes the resources including clinician and administrative time, financial costs, and other effort required to collect and store data through any given source. This burden can be carried by individual patients or enrollees responding to questions about their social risk, as well as providers (including organizations, individual providers, and nonclinical staff) who collect data, and CMS itself. When considering collection burden, particularly where there are substantial barriers to data collection (such as high cost), CMS may weigh an important tradeoff to further guide its selection of any given indicator or social risk factor. In some cases, data collection may be burdensome, but the indicator has high predictive value with respect to the performance indicator(s) of interest. In these instances, it may be important to include the indicator despite the burden of data collection. However, in other cases, early pilot testing or modeling of a social risk factor indicator in a multivariable model may suggest only marginal gains. Where there is high burden and only marginal gains, CMS may choose not to include the indicator in quality measurement and payment. For example, if collecting accurate data on wealth is highly burdensome to CMS, providers, and Medicare beneficiaries, and it does not substantively contribute to adjustments to performance scores when other measures of socioeconomic position like income and education are already accounted for, CMS could choose not to also include wealth. Because lit-
erature does not (and cannot) indicate whether all social risk factors related to performance indicators used in value-based payment (VBP) must be individually accounted for to accurately adjust payment and quality measures, these are questions for the Office of the Assistant Secretary of Planning and Evaluation and CMS to test empirically.

**Conclusion 1:** If there are substantial barriers to collecting social risk factor data (such as high cost) and/or if early pilot testing or modeling in a multivariable model suggests only marginal gains from including any given indicator in any method of accounting for social risk factors in Medicare performance measurement and payment, inclusion of that social risk factor may not be warranted.

Accuracy refers to the degree that a given measure captures the construct that measure represents. In this report, this characteristic also captures related constructs important for data quality, such as validity, reliability, and completeness. In particular, the committee considered the extent to which standardized, validated, and reliable measures and data collection methods for a given social risk factor indicator are available and consistently used. Standardization is important to ensure valid comparisons across reporting units and settings. Accuracy should be assessed with respect to the specific purpose of accounting for social risk factors in Medicare quality measurement and payment. In other words, the level of accuracy needed should be assessed with reference to the level of accuracy required for a specific method of accounting for social risk factors.

Clinical utility describes whether providers can use information on a social risk factor in the management and treatment of that patient (IOM, 2014). Thus, this characteristic pertains specifically to data that plans and providers could collect such as through an electronic health record (EHR) or at enrollment in a health plan. If intervening on or otherwise addressing a social risk factor is beyond the purview of health care providers or can only be done at substantial cost, clinicians may be reluctant to collect data out of concern that patients would expect them to provide services they do not have the capacity to offer. The committee notes that its focus is on social risk factors important for use in Medicare quality measurement and payment. The EHR will include information on social and behavioral risk factors important to the clinical encounter but that would not be relevant for application to Medicare performance measurement and payment. The committee sees no conflict between the conclusions and recommendations in this report and those in the 2014 Institute of Medicine (IOM) report on capturing social and behavioral domains and measures in EHRs (IOM, 2014).

The committee also considered whether an indicator is relatively stable or changes over time. The distinction between relatively stable or changes
over time is not binary, but rather describes a spectrum. Some factors, such as race, ethnicity, and nativity, would not logically change over time, while other factors, such as income (especially when measured using lifetime earnings), wealth, and language, could potentially change over time, but such change is likely to be relatively slow. These factors are relatively stable. Other factors are likely to change more rapidly. For example, a Medicare beneficiary’s marital status could change rapidly owing to the loss of a spouse.1

To weigh the trade-offs between, and identify priorities among, the potential data sources for each individual social risk factor indicator, the committee identified several guiding principles.

Recommendation 1: The committee recommends the Centers for Medicare & Medicaid Services (CMS) use five guiding principles when choosing data sources for specific indicators of social risk to be used in Medicare performance measurement and payment. These guiding principles are as follows:

- CMS should first use data it already has.
- CMS should second look for opportunities to use existing data collected by other government agencies (including elsewhere in the Department of Health and Human Services).
- To the extent that a social risk factor is relatively stable, CMS should examine the feasibility of collecting additional data at the time of enrollment in Medicare.
- Where social risk factors change over time and have clinical utility, requiring data collection through electronic health records or other types of provider reporting may be the best approach.
- For social risk factors that reflect a person’s context or environment, existing data sources that can be used to develop area-level measures should be considered.

Once the committee identified potential data sources for each of the social risk factor indicators, the committee assessed each potential data source in terms of the three characteristics (collection burden, accuracy, and clinical utility) and identified the relative advantages and disadvantages of each source. It then weighed the trade-offs for each source to identify preferences and priorities and develop proposed data collection strategies.

1 The committee distinguishes this characteristic of change over time from modifiability as described in its third report. Because all of the indicators included in this report met all of the selection criteria, including the criterion that a social risk factor not be modifiable through provider actions, they are all considered unmodifiable. Although modifiable factors are also subject to change over time, modifiability is defined in terms of provider actions whereas change over time can occur regardless of provider action (NASEM, 2016b).
Based on the committee’s review and assessment of potential data sources for each of the social risk factor indicators, the committee identified the following categories of data that CMS could use for inclusion in Medicare quality measurement and payment:

1. Data sources exist that could be used in the short and long term.
2. Data sources with some limitations exist that could be used in the short term, and CMS should conduct research on new or improved data collection strategies in the long term. These include indicators for which
   a. CMS has some existing data that could be used in the short term, but CMS should research ways to improve accuracy and data collection in the long term.
   b. Area-level measures could be used in the short term, but CMS should research standardized measurement and data collection for the long term.
3. Measures and data collection methods exist, but data sources have considerable limitations and more research is needed to accurately collect data in the long term.
4. Some measures exist, but more research is needed on the effect of the social risk factor indicator on health care outcomes of Medicare beneficiary and on methods to accurately collect data for the Medicare population.

The subsequent sections describe the data sources for individual social risk factor indicators, organized by these categories of data availability. Each section begins with a committee recommendation; supporting text follows immediately. Table D3-1, near the end of this chapter, summarizes the information. The chapter closes with general considerations for any approach to collecting social risk factor data for use in Medicare quality measurement and payment programs.

**DATA SOURCES FOR SOCIAL RISK FACTORS**

**Recommendation 2:** The committee recommends that the Centers for Medicare & Medicaid Services use existing data on dual eligibility, nativity, and urbanicity/rurality in Medicare performance measurement and payment.

**Dual Eligibility**

For the Medicare population, Medicaid eligibility—also referred to as dual (Medicare and Medicaid) eligibility—is an indicator of insurance
status that can be used as a proxy measure of SEP. Because it captures elements of SEP such as income and wealth and also health insurance, and thus elements of health status, dual eligibility is an imperfect proxy of SEP that can be considered a broader measure of health-related resource availability that captures medical need (NASEM, 2016b). CMS administers both Medicare and Medicaid programs, and therefore already possess existing data on dual eligibility among Medicare beneficiaries. This includes graded data on full or partial eligibility and is the most reliable source of available data. Thus, following the committee’s guiding principle for CMS to first use data it already has, CMS should use its existing data on dual eligibility.

Nativity

Nativity refers to country of origin and measures can capture a specific country of origin or a dichotomous variable comparing foreign-born to U.S.-born individuals (NASEM, 2016b). CMS does not currently collect nativity data, nor is nativity routinely captured in EHRs. However, Medicare beneficiaries’ place of birth could be collected either by CMS or via EHRs with relatively little burden to patients, providers and plans, or CMS. Nativity is a stable social risk factor, which supports one-time collection by CMS to reduce burden, but nativity also has clinical utility, which supports collection through EHRs. Indeed, the 2014 IOM report on capturing social and behavioral domains and measures advocated including country of birth in EHRs because of its clinical utility and the relatively low collection burden (IOM, 2014). The Social Security Administration (SSA) collects place of birth including city and state or foreign country, such as on applications for a Social Security card (SSA, 2011) or at enrollment for Social Security benefits (SSA, n.d.), and it maintains place-of-birth data in its Numident file (McNabb et al., 2009). These data could be paired with Medicare beneficiary records. Because data exist in SSA records that could be linked to Medicare beneficiary records, CMS should use this available source of data.

Urbanicity/Rurality

Urbanicity/rurality describes where a place falls on the spectrum from urban to rural (NASEM, 2016b). Urbanicity/rurality can be a patient/enrollee or provider characteristic, and a patient’s urbanicity/rurality may differ importantly from his or her provider’s urbanicity/rurality—for example, when rural patients receive care from urban hospitals. For the purpose of inclusion in Medicare performance measurement and payment, urbanicity/rurality of a beneficiary’s place of residence is likely to be a more salient indicator of his or her social risk factors. Although urbanicity/rurality is conceptually continuous, it can be measured dichotomously
(i.e., urban or rural), trichotomously (i.e., urban, suburban, rural), or on a graded spectrum (e.g., percent urban) (NASEM, 2016b). Because urbanicity/rurality represents a beneficiary’s residential and community context, an area-level measure based on the beneficiary’s place of residence is appropriate.

A Medicare beneficiary’s place of residence is available in Medicare administrative records and is also likely to be captured in administrative or EHR data by providers and plans. Following the principle for CMS to first use its existing data, CMS should use beneficiaries’ residential address in its administrative records. The committee notes that although Medicare beneficiaries are required to select a single primary place of residence (CMS, 2016), some beneficiaries may have more than one residence (such as those who move seasonally), and methods that account for patient urbanicity/rurality in performance measures and payment may misclassify some patients receiving care near their secondary residences.

Beginning with the 2010 Census, the U.S. Census Bureau used a trichotomous measure to classify census tracts and/or census blocks (U.S. Census Bureau, 2015). Urban areas are defined as regions with 50,000 or more people, urban clusters are regions with at least 2,500 and fewer than 50,000 people, and rural characterizes all areas not included in either urban classification (U.S. Census Bureau, 2015). For both urban classifications, at least 1,500 persons must live outside of an institutional setting (U.S. Census Bureau, 2015). Because an area-level measure of urbanicity/rurality is appropriate and a trichotomous classification of census tract-/block-level urbanicity/rurality is available through the Census Bureau, this available measure should be used based on a Medicare beneficiary’s residential address in the Medicare record.

Recommendation 3: Data for individual measures of race and ethnicity, language, and marital/partnership status and for area-level measures of income, education, and neighborhood deprivation are currently available and the committee recommends that the Centers for Medicare & Medicaid Services (CMS) use them for performance measurement and payment applications in the short term. However, owing to limitations in these data, CMS should research ways to improve accuracy and collection of individual-level measures of race and ethnicity, language, marital/partnership status, income, and education, as well as an area-level measure of neighborhood deprivation for use in the future.

Race and Ethnicity

Race and ethnicity are social categories that represent dimensions of a society’s stratification system by which resources, risks, and rewards are
Race and ethnicity are conceptually distinct, albeit related, constructs that are typically identified through self-reported categories. Medicare currently maintains race and ethnicity data in its administrative records (Filice and Joynt, 2016). Current Medicare surveys and administrative records capture self-reported race and ethnicity using categories that adhere to federal standards issued by the White House Office of Management and Budget (OMB) (Filice and Joynt, 2016; OMB, 1995). However, race and ethnicity information for older beneficiaries who enrolled in Medicare prior to when these standards were issued and implemented may reflect outdated racial and ethnic classifications (Filice and Joynt, 2016; Zaslavsky et al., 2012). Some of these records were updated to improve accuracy using a survey of select beneficiaries in the 1990s (Zaslavsky et al., 2012), and methods also exist to impute race and ethnicity to improve accuracy where self-report is unavailable (Bonito et al., 2008; Elliott et al., 2009; Filice and Joynt, 2016; Grundmeier et al., 2015). EHRs are also likely to capture race and ethnicity data. To that end, Stage 2 meaningful use standards included capturing race and ethnicity using categories that adhere to OMB standards as a part of its measure of recording demographics (CMS, 2012). Race and ethnicity also have clinical utility social risk factors and were included in the 2014 IOM report on capturing social and behavioral domains and measures. Because race and ethnicity are relatively stable factors for which Medicare already has data, CMS should use available self-report and imputed race and ethnicity data in its existing records and existing methods in the short term. However, the committee acknowledges some limitations with regard to lack of standardization in current measurement and collection, and less accuracy for older age groups. Thus, over the long term, CMS should also continue to collect self-reported race and ethnicity data following the OMB standards and to work on standardizing measures and methods across the various self-report mechanisms it oversees—including administrative forms, Medicare sample surveys, and provider and plan reporting requirements.

Language

Language as a social risk factor typically represents language barriers, such as speaking a primary language that is not English, having limited English proficiency, or otherwise needing interpreter services (NASEM, 2016b). CMS currently maintains some data on preferred language, which has high specificity, but poor sensitivity. Additionally, in its Strategic Language Access Plan, CMS included having the CMS Civil Rights Agency Liaison examine the feasibility of including collection of language preferences to existing CMS surveys as well as ways to standardize data collection on existing and future surveys (CMS, 2014). Providers and plans could also...
collect language data, because it is clinically useful for providers and plans to provide tailored care, such as providing health information in languages other than English or providing language interpreter services. Indeed, to provide such services, many health plans collect and maintain language data (Lawson et al., 2011; Nerenz et al., 2013a,b). Similarly, providers may voluntarily collect and maintain language data in adherence to national standards, such as those put forth by the CMS Office of Minority Health (CMS Office of Minority Health, 2016) and the HHS Office for Civil Rights (HHS, 2016). Capturing preferred language using the Library of Congress language codes was also included in the Stage 2 meaningful use regulations as part of the measure of recording demographics (CMS, 2012). Area-level measures, such as those from the American Community Survey (ACS) and some imputation methods, are also available as individual-level proxies where individual-level data do not exist. Although much research on language and health care outcomes has focused on limited English proficiency rather than preferred language (NASEM, 2016a), following the principle that CMS should first use its existing data, in the short term, CMS should use its existing data on preferred language while acknowledging its limitations. In the long term, CMS should continue efforts to standardize measures and data collection methods. A 2009 IOM report provides guidance on standardization of race, ethnicity, and language data (IOM, 2009).

Marital/Partnership Status

Marital/partnership status is a foundational structural element of social relationships and an indicator of social support. Marital or partnership status can be assessed using dichotomous measures (i.e., whether someone is married or not, whether someone is partnered or lacks a partner) or using measures with more categories (e.g., also including single, widowed, and divorced) (NASEM, 2016b). CMS maintains data on marital status, because it is important for Social Security benefits, but CMS does not collect or maintain data on partnership. Providers, plans, and other federal government agencies also do not collect data on partnership. However, because partnership can change over time, especially among older adults, and has clinical utility, it could be collected through EHRs. If so, validated measures of partnership exist in the literature, but CMS would need to develop standardized measures and data collection methods for its own collection or provider/plan reporting requirements. An important consideration for the longer term are ongoing demographic shifts in family structure, including the decline in marriage rates and increases in cohabiting individuals and persons who never marry (Aughinbaugh et al., 2013; Liu and Umberson, 2008; Tamborini, 2007; Wang and Parker, 2014), as well as the federal Supreme Court ruling
making same-sex marriage legal nationally. These are likely to change the relationship between marital/partnership status and health. Thus, regardless of the data source CMS chooses, it will be important for CMS to monitor the empirical association between marital/partnership status and health care outcomes and revisit assumptions about marital/partnership status as an indicator of social support over time. In the short term, CMS should use available data on marital status. In the long term, research is needed on measurement and data collection for partnership. In particular, CMS may want to examine whether including partnership in any method to account for social risk factors in Medicare quality measurement and/or payment that already includes marital status and living alone adds substantial additional precision and explanatory value. As described in Appendix D2, national surveys that can be linked to individual-level health care outcomes of Medicare beneficiaries could serve as a test bed for such an assessment.

**Income**

Individual income can affect health and health care outcomes directly as a means of purchasing health care and indirectly as a means of acquiring health promoting resources, such as better education, housing, and nutrition (Adler and Newman, 2002; Braveman et al., 2005). Measuring income is burdensome on respondents if self-reported because income can be sensitive to collect, which leads to high nonresponse rates. However, reliable methods exist to accurately collect income data (Moore and Welniak, 2000). Partly because of such available measures and data collection methods, income is the most commonly used measure of economic resources (Braveman et al., 2005).

CMS does not currently collect or maintain income data (Samson et al., 2016), nor do providers and plans collect income data through EHRs or otherwise. The SSA maintains several sources of individual-level income data, including lifetime earnings data and information on Medicare payroll taxes, as well as data on Supplemental Security Income (SSI) for those who are eligible (i.e., adults and children with disabilities who have limited income and assets, and adults age 65 and older without disabilities and who meet financial limits) (Olsen and Hudson, 2009; SSA, 2015). Lifetime earnings and SSI may be less precise measures of income. Lifetime earnings are capped at $118,500 annually, which effectively censors high incomes (SSA, 2016), and SSI may be only part of an individual’s income (SSA, 2015). By contrast, the maximum earnings cap for Medicare payroll taxes was eliminated in 1994, and thus income data based on Medicare taxable wages

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would capture more variation, especially among higher-income individuals (Olsen and Hudson, 2009).

Government agencies that collect premiums for Medicare Parts B and D (e.g., SSA, Railroad Retirement Board, and Office of Personnel Management) also have income data used for determining premium amounts. Specifically, the SSA makes an Income Related Monthly Adjustment Amounts (IRMAA) determination for Medicare beneficiaries enrolled in Medicare Part B and/or Part D, which are used to determine monthly premium amounts for beneficiaries with higher incomes (CMS, n.d.-b). For 2016, adjustments are made to incomes greater than $85,000 for individuals and $170,000 for married couples in increasing categories (CMS, n.d.-b). Although CMS currently receives monthly data on the number of beneficiaries who have different IRMAAs, it does not have individual income information. Were these government agencies to provide individual income data to CMS for use in Medicare quality measurement and payment, data that are more granular than the available income categories (all of which apply to higher incomes) would be most useful. Relatedly, eligibility for the Medicare Part D Low Income Subsidy requires having an income below 150 percent of the federal poverty level, and could be used as to measure of low and high income (CMS, 2009). However, as a dichotomous measure, it would capture less variation in and be a less precise measure of income. Moreover, it only applies to beneficiaries enrolled in a Part D plan, and thus would not capture incomes for many beneficiaries.

An area-level measure of income from the ACS such as median household income could also be used as a proxy for individual-level income. However, because individual income is the construct of interest and an area-level measure may capture genuine area- or group-level effects, an area-level proxy measure is therefore an imperfect proxy for the individual-level measure and may therefore be less preferable than a true individual-level measure. In the short term, CMS should use available area-level income data from the ACS as a proxy for individual income. In the longer term, CMS should explore the feasibility of linking to SSA income data from the uncapped Medicare payroll tax and/or develop standardized measurements and methods for new data collection.

Education

Education can affect health and health care outcomes directly by enabling individuals to access and understand health information and health

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3 Personal communication, John D. Shatto (Centers for Medicare & Medicaid Services, Office of the Actuary) to Kathleen Stratton (National Academies of Sciences, Engineering, and Medicine staff), September 8, 2016.
Education also shapes future occupational and economic resources and therefore indirectly shapes health and health care outcomes through other indicators of SEP—employment, occupation, and income (Adler and Newman, 2002; IOM, 2014; NASEM, 2016a,b). Education can be measured using continuous or categorical years of schooling completed or credentials of formal schooling (e.g., high school diploma, college degree) to assess educational attainment (Braveman et al., 2005; IOM, 2014). Currently, CMS does not collect or maintain data on education, nor do providers and plans routinely collect it. Although some of the more comprehensive EHRs may capture educational attainment, standardized measures and data collection strategies are needed. To that end, the earlier IOM report on social and behavioral domains and measures for EHRs identified education as a clinically useful social risk factor and recommended its inclusion in EHR meaningful use standards. With respect to other government sources, area-level measures are available through the ACS. Thus, in the short term, CMS should use these available area-level measures as a proxy for individual education. In the long term, because education is relatively stable for Medicare beneficiaries, CMS should develop standardized measures and methods to collect education data.

**Neighborhood Deprivation**

In its third report, the committee concluded that a measure of neighborhood deprivation (i.e., a composite measure of neighborhood compositional characteristics) at the census tract level is likely to be a good proxy for a range of both individual and true area-level constructs relevant to performance indicators used in VBP (NASEM, 2016b). Relevant area-level constructs include compositional characteristics of communities such as dimensions of SEP (e.g., the proportion of racial and ethnic minority residents, foreign-born residents, single-parent households, households below the federal poverty level, and English language-proficient residents) as well as elements of residential environments including the physical or built environment (e.g., housing, walkability, transportation options, and availability of services—including health care services) and social environments (e.g., safety and violence, social disorder, the presence of social organizations, and social cohesion).

Because neighborhood deprivation captures a patient or beneficiary’s environment or residential context, an area-level measure based on the beneficiary’s residential address is appropriate. As described in the section on urbanicity/rurality, although residential addresses are available from providers, plans, and Medicare records, the latter is preferable, because
these are the data CMS already possesses. Neighborhood deprivation can be assessed using a single-item measure such as median household income or using a multi-item composite measure. Numerous neighborhood deprivation indexes comprising multiple items (e.g., median household income, percent of residents with a high school degree, percent of unemployed residents, percent of households with an income below the federal poverty level) have been developed (Oka, 2015), and data on these area-level measures are available through the ACS. As described in the previous chapter, because of small sample sizes, ACS data will need to be pooled across years. Because neighborhoods can change rapidly, where this occurs, data that are just a few years old may not accurately reflect the neighborhood at present. Another important limitation of existing neighborhood deprivation measures and indexes is that they have been developed, tested, and applied primarily to urban contexts. It is possible that area-level factors most relevant to health care outcomes differ for urban and rural areas. For example, concentrated disadvantage may be most salient in urban contexts; whereas, availability of and distance to health care resources may be more relevant constructs in rural settings (NASEM, 2016a).

Defining the appropriate geospatial unit across urban and rural settings presents an additional challenge. Because population density and the density of available resources varies substantially between urban and rural areas, the spatial scale that is relevant for various health-related processes may differ for urban areas and rural areas. For example, census tracts may be the most relevant area for measuring urban neighborhoods (as they are used to define urban areas in the Census Bureau’s 2010 classification, as described in the earlier section on urbanicity/rurality). Although most rural research is conducted at the county level (Isserman, 2005), most counties are likely to be too heterogeneous for county-level measures of neighborhood deprivation to be useful. To be meaningful for certain methods of accounting for social risk factors in Medicare quality measurement and payment, the geographic area should have sufficient variability with respect to provider and plan performance.

Despite the challenges described above (which pertain primarily to research on area effects) even imperfect area-level measures can be useful for the purposes of accounting for social risk factors in Medicare quality measurement and payment. This is because crude (and geographically mis-specified) area-level measures will still capture some variability in health-relevant, area-level constructs (social and physical environments) and may also serve as imperfect proxies for unavailable individual-level socioeconomic data (because of strong residential segregation by class). For these reasons, the committee recommends that CMS test a composite measure (such as an existing indicator from the literature) and a simple single-indicator item (such as median household income), contrast their
performance at the census tract level, and also weigh the benefits of the simplicity of a single indicator against the increased precision from a composite measure for use in the short term. To increase accuracy in the long term, CMS could conduct research on measurement and data collection such as measures to better capture neighborhood deprivation in rural areas, to identify an improved geospatial unit of analysis for rural settings, and to assess the performance of any given variable (single or composite) across multiple geographic areas.

**Recommendation 4:** Individual measures of wealth, living alone, and social support exist, but they are sufficiently limited to preclude use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. Therefore, the committee recommends that CMS research ways to accurately collect data on these indicators.

**Wealth**

Wealth represents total accumulated economic resources (assets) that, like income, can affect health and health care outcomes directly as a means of purchasing health care and indirectly as a means of acquiring health-promoting resources (Braveman et al., 2005; Deaton, 2002; NASEM, 2016a). Because wealth accumulates over time, it can also buffer the effects of rapid changes in income, such as those caused by unemployment or illness (Cubbin et al., 2011). Thus, wealth may capture more variation than income among older persons, and may therefore be a more sensitive indicator of SEP among Medicare beneficiaries (Allin et al., 2009). Collecting self-reported net worth is difficult because it is sensitive and because many individuals simply do not know the value of their net worth or what assets they have (Braveman et al., 2005; Eggleston and Klee, 2015). Nevertheless, some reliable and validated measures and data collection methods do exist. In particular, the Health and Retirement Study (HRS) has designed measures and methods to collect data on wealth that overcome traditional barriers to collecting wealth data such as concerns about privacy and imprecise knowledge (NIA et al., 2007). More specifically, the HRS captures both the amount and composition of assets as well as current and future benefits including government benefits (such as Social Security, Medicare, and Medicaid) and employer-based benefits (like pensions and health insurance), as well as the movement of assets (such as housing within families, gifts and bequests, and savings and spendings) over time from retirement until death (NIA et al., 2007). Some HRS data are linked to Medicare records (ResDAC, n.d.), and therefore are useful for examining the effect of wealth on health care outcomes. However, as described in Appendix D2,
because samples for the HRS are small, these data are unlikely to be useful for application in Medicare quality measurement or payment. Some studies have also used simplified or proxy measures of wealth, such as home or car ownership. Because of these types of measurement challenges, there is less empirical evidence on the association between wealth and health care outcomes compared to other indicators of SEP (Braveman et al., 2005).

Wealth data are not currently available through CMS, providers and plans, or other government agencies. Medicaid programs do require assets below a certain threshold for eligibility, and this asset threshold could be used to measure wealth dichotomously (i.e., high wealth above the threshold, and low wealth at or below the threshold). However, because Medicaid is administered at the state level, eligibility criteria, including this asset threshold, vary by state. Moreover, this measure of wealth would be at least partly captured through dual eligibility status, for which there is better and available existing data (as described in the earlier section on dual eligibility).

Because no data sources are available for use in the short term, CMS should conduct more research on both measurement and data collection methods by CMS or through EHRs. Because collecting accurate wealth data is known to be difficult and burdensome and because data collected through EHRs could be done via multiple modes, which could augment potential accuracy issues, EHRs may be less preferable to centralized collection by CMS. In particular, CMS may want to consider the empirical question of whether the addition of wealth data adds sufficient precision above and beyond income data, for which some data are already available and for which methods and measures exist to collect data with less burden to warrant additional data collection for inclusion in any method to account for social risk factors in Medicare quality measurement and payment. As described in Appendix D2, national surveys such as the HRS that can be linked to individual-level health care outcomes of Medicare beneficiaries could serve as a test bed for CMS to assess this question.

Living Alone

Living alone is a structural element of social relationships, which is typically an indicator of social isolation or loneliness in health research, and which is also likely to capture elements of social support (Berkman and Glass, 2000; Brummett et al., 2001; Cohen, 2004; Eng et al., 2002; House et al., 1988; Wilson et al., 2007). Living alone can be assessed with little burden using a dichotomous measure (living alone or with others) or more finely graded measures of household composition (i.e., living alone, with one other person, two other persons, and so on). CMS currently collects data on living arrangements for some patients in postacute settings, such as
through the Home Health Outcome Assessment Information Set (AHRQ, 2014; CMS, n.d.-a), and in the Medicare Current Beneficiary Survey (CMS, 2015a). Providers and plans do not currently collect data on living arrangements, nor is national data available through other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because living arrangements can change rapidly especially for older adults and because living alone has clinical utility, living alone may best be captured in the clinical setting, and CMS should develop standardized measures and methods for data collection through EHRs.

**Social Support**

Social support is a crucial function of social relationships and includes instrumental components (such as material and other practical supports) and emotional dimensions (such as through caring and concern). Instrumental social support can facilitate access to health-promoting resources (e.g., delivery of nutritious meals) and health care services (e.g., providing transportation to a doctor’s appointment) (Berkman and Glass, 2000). Emotional social support can positively affect health through psychosocial mechanisms such as by boosting self-efficacy to practice health-promoting behaviors like quitting smoking, and social support may also buffer negative effects of health risks (Berkman and Glass, 2000; IOM, 2014). Social support can also negatively affect health such as by causing distress through negative social interactions or because negative social influences promote risky health behaviors (Uchino, 2006).

Currently, no social support data are available within CMS, from providers and plans, or from other national data via other government agencies. Thus, there are no data sources that could be used in the short term. However, for the long term, because social support can change rapidly especially among older adults and because it has clinical utility, it may best be captured in the clinical setting, and CMS should develop standardized measures and methods for data collection through EHRs. In its 2014 report on capturing social and behavioral domains and measures through EHRs, the IOM recommended inclusion of social support and recommended measures (IOM, 2014). Such measurement and data collection methods could be refined, standardized, and added to the Office of the National Coordinator for Health Information Technology’s (ONC’s) meaningful use regulations or mandated through reporting requirements to CMS to ensure accurate data. Thus, CMS should develop standardized measures and methods for data collection through EHRs for the long term.

**Recommendation 5:** Area-level measures exist for housing, but they have limitations for use by the Centers for Medicare & Medicaid
Services (CMS) in Medicare performance measurement and payment at this time. The committee recommends that CMS research ways to accurately collect housing data, whether at an individual level or an area level.

Housing

Elements of housing that may influence health and health care outcomes include housing stability, homelessness, and quality and safety. Homelessness and housing instability, defined as a lack of access or threats to reasonable quality housing (Frederick et al., 2014), can be barriers to accessing health care and are associated with poorer physical and mental health and increased mortality (NASEM, 2016a). Poor quality or unsafe housing can expose individuals to such environmental hazards as lead, poor air quality, infectious disease, and poor sanitation, and can lead to injury (IOM, 2003a; NASEM, 2016a). Currently neither CMS nor providers and plans routinely collect housing information. Some more comprehensive EHRs may collect or link to data on housing (e.g., Gottlieb et al., 2015; ONC, n.d.). However, because housing can change over time and has clinical utility, housing information could be collected through EHRs. Some area-level measures of housing are available through the ACS and the Department of Housing and Urban Development (HUD). For example, ACS housing data capture physical characteristics (e.g., rooms, age, access to utilities) as well as housing costs, age, and value (U.S. Census Bureau, 2013) and the HUD Healthy Communities Index captures vacancy rates, housing costs, blood lead levels in children as an indicator of environmental hazards, and age of housing (San Diego Council of Governments, n.d.). Because some dimensions of housing reflect beneficiaries’ environment, an area-level measure could be appropriate. This measure would be based on a beneficiary’s residential address, which is collected by CMS, through EHRs, and by plans. However, following the principle to first use available existing data it possesses, the residential address in the Medicare record is preferred. Thus, in the short term, the committee recommends that CMS test area-level measures based on a beneficiary’s residential address in the Medicare record and contrast their performance. Because other elements of housing, in particular, physical characteristics, occur at the individual level, and these are likely to change over time, individual-level housing data could be collected through EHRs in the long term, but more research is needed on measurement and data collection methods.

Recommendation 6: The committee recommends that research be conducted on the effect of acculturation, sexual orientation and gender identity, and environmental measures of residential and community
context on health care outcomes of Medicare beneficiaries and on methods to accurately collect relevant data in the Medicare population.

Acculturation

Acculturation describes how much an individual adheres to the social norms, values, and practices of his or her own home country or ethnic group or to those of the United States (NASEM, 2016a). Acculturation is frequently assessed with language use. Additionally, because there is a strong interaction between acculturation and race and ethnicity, measures of acculturation frequently assess acculturation among specific subgroups (e.g., Hispanic immigrants) (HHS, 2014). For example, the Brief Acculturation Scale for Hispanics is a reliable, validated measure to assess acculturation among Hispanic Americans using four self-reported language use items (Mills et al., 2014). Duration in the United States is also used as a proxy for acculturation, because acculturation is expected to increase with the amount of time spent in the United States. Although there is evidence on the relationship between acculturation and health, evidence on the effect of acculturation and health care outcomes is not well established (Abraído-Lanza et al., 2006; IOM, 2014; NASEM, 2016a). Because more evidence is needed on the empirical association between acculturation and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available. However, because acculturation is often measured using preferred language, which is available to CMS in the short term, language data could capture elements of acculturation in addition to language itself.

Sexual Orientation and Gender Identity

Sexual orientation captures individuals who identify as lesbian, gay, bisexual, queer, questioning, or otherwise nonconforming, and is typically defined with respect to three dimensions: attraction, behavior, and identity (IOM, 2011). Gender identity typically refers to individuals who identify as gender minorities, including those who identify as transgender, intersex, or otherwise nonconforming (IOM, 2011). Although some measures and best practices for data collection exist and CMS has included data collection of sexual orientation and gender identity in its Equity Plan for Improving

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4 As described in the committee’s third report (NASEM, 2016b), normative gender categories (men and women) are strongly associated with health and health care outcomes, despite the fact the gender effects are difficult to separate from biological sex effects. Thus, normative gender is a strong candidate for inclusion in methods to account for social risk factors in Medicare quality measurement and payment programs. However, the committee notes that gender is already included as a risk factor in clinical risk adjustments in Medicare.
Quality in Medicare, there are currently no standards for measuring and collecting data on sexual orientation and gender identity (CMS Office of Minority Health, 2015). One limitation of existing measures of sexual orientation is that they frequently only capture one dimension of sexual orientation, and some individuals do not present consistently across the three dimensions (e.g., men who have sex with men but do not identify as gay) (IOM, 2011). Outside of CMS, some national health surveys, including the National Health and Nutrition Examination Survey (NHANES), National Health Interview Survey (NHIS), and Behavioral Risk Factor Surveillance System (BRFSS) do collect data on sexual orientation and gender identity. NHANES includes sexual behavior questions, while NHIS and BRFSS include items capturing sexual identity and gender identity (CDC, 2013, 2015, 2016). Providers and plans also do not typically collect sexual orientation and gender identity data. However, ONC added collection of sexual orientation and gender identity to its measure of recording demographics in its Stage 3 meaningful use regulations (CMS, 2015b). Importantly, this does not require providers to collect sexual orientation and gender identity data, but rather that their EHRs have the capacity to do so. Partly because of a lack of standardized measures, there is currently little evidence on the effect of sexual orientation and gender identity on health care outcomes (NASEM, 2016a,b). Because more evidence is needed on the empirical association between sexual orientation and gender identity and health care outcomes, CMS should revisit this indicator and its appropriate measurement when more evidence is available. In particular, for sexual orientation, CMS should take notice of which dimension or dimensions are most relevant for health care outcomes. At the same time, CMS should continue efforts to develop standardized measures and data collection strategies and to collect data.

Other Environmental Measures of Residential and Community Context

Other environmental measures of residential and community context capture elements of the physical or built environment such as housing, walkability, transportation options, and proximity to services (including health care and social services) as well as social environments such as safety and violence, social disorder or cohesion, economic and educational opportunities, and the presence of social organizations. Neighborhood environments can affect health through the distribution of health-relevant resources (e.g., access to recreational spaces, healthy foods, or health care services), by exposing residents to environmental hazards like air pollution, and by exposing residents to physical and social hazards such as discrimination and physical decay that negatively affect health through stress and other psychosocial processes (Diez Roux and Mair, 2010; IOM, 2003b). Thus,
there is a conceptual relationship between neighborhood environments and health care outcomes, but evidence is currently limited and environmental measures need to be tested further (NASEM, 2016a). Therefore, CMS should revisit such environmental measures and their appropriate measurement when more evidence is available.

**Recommendation 7:** The committee recommends that the Centers for Medicare & Medicaid Services collect information about relevant, relatively stable social risk factors, such as race and ethnicity, language, and at the time of enrollment.

Indicators for which data might best be captured through a revised enrollment form include race and ethnicity, language, and education. Should other methods, such as linking to data from the SSA or the Internal Revenue Service, prove too difficult or not produce accurate information on other indicators (e.g., income, race and ethnicity, and nativity), these could be considered for inclusion in the revised enrollment form.

Should research demonstrate an important explanatory effect of one or more of these indicators and a pilot test shows it is feasible, CMS could supplement the information collected at enrollment with a survey of current beneficiaries, whose information would not have been captured at the time of enrollment.

Table D3-2 summarizes the availability of data for social risk factor indicators that could be accounted for in Medicare payment programs.

**GENERAL CONCLUSIONS**

In addition to the specific guidance the committee proposed for collecting data for specific social risk factor indicators, the committee also identified several general conclusions for CMS in its overall approach to collecting data on social risk factors for use in Medicare quality measurement and payment.

Different data collection strategies for the same indicator may be warranted depending on the purpose or methods it is used for. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use. For example, risk adjusting health plan quality measures may require data from different sources compared to risk adjusting hospital quality measures, because, for example, social risk factors that affect the outcome or cost of a hospitalization likely differ from those that affect quality or total cost of care measures. Similarly, CMS may need data on social risk factors regardless of whether care is sought or not
when accounting for social risk factors in health plan or accountable care organization performance scores; whereas, for adjustment related to performance measures that are associated with a health care episode, it may make sense to have providers report. Thus, any indicator may require a multimodal approach to data collection. This may be particularly relevant for data collected through an EHR, because there is substantial variation in providers’ stage of EHR adoption, as well as in their capacities for health information exchange. However, this may also be true for other sources of data, where there are limitations to data from existing sources, where data would be collected in different settings (e.g., hospitals, clinical practices, in the home), and when data are collected by different types of individuals (e.g., clinicians and non-clinical staff). Moreover, the specific modes of data collection needed may change over time. Specifically for EHR data, needs for complementary modes may diminish with advances in EHR adoption and interoperability. An example of an existing multimodal approach is CMS’s strategy for collecting race and ethnicity data. Data from beneficiaries enrolled since the 1990s are collected via self-report, but for older beneficiaries for whom current categories collected through self-reported data are unavailable, CMS imputes race and ethnicity and also updates older data with newer self-reported data collected through surveys. Additionally, when CMS revised its race and ethnicity measures, it conducted a survey of certain Medicare beneficiaries to improve the accuracy of its data (Zaslavsky et al., 2012). In short, regardless of the source, research on how to accurately and reliably collect data across different modes and in different settings will be needed.

Conclusion 2: Different data collection strategies for the same social risk factor indicator may be warranted depending on the purpose or methods used to account for social risk factors in Medicare performance measurement and payment. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use.

Conclusion 3: Any specific social risk factor indicator may require a multi-modal approach to data collection.

Conclusion 4: Regardless of the source, research on how to accurately and reliably collect social risk factor data across different modes and in different settings will be needed.
TABLE D3-1 Potential Data Sources for Each Social Risk Factor Indicator, Their Advantages and Disadvantages, and the Committee’s Proposed Data Collection Strategy

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Existing or New Sources of CMS Data</th>
<th>Data Sources from Providers and Plans</th>
<th>Alternative Government Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual eligibility</td>
<td>Centers for Medicare &amp; Medicaid (CMS) has existing data</td>
<td>Most reliable; graded (full or partial)</td>
<td>Use existing CMS data</td>
</tr>
<tr>
<td>Nativity</td>
<td>No existing data; need further research to pilot for new Medicare intake survey</td>
<td>Could be accurately collected with little burden (see IOM, 2014, report for country of origin measure), but is not currently collected</td>
<td>The Social Security Administration (SSA) maintains administrative records with place of birth (city and state/foreign country)</td>
</tr>
<tr>
<td>Urbanicity/rurality</td>
<td>Based on residential address, which is in the Medicare record</td>
<td>Based on residential address, which is currently collected in Electronic Health Records (EHRs)</td>
<td>Area-level measures at census tract level from the American Community Survey (ACS)</td>
</tr>
</tbody>
</table>

1. Data sources exist that could be used in the short and long term
### Potential Data Sources for Each Social Risk Factor Indicator, Their Advantages and Disadvantages, and the Committee’s Proposed Data Collection Strategy

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Existing or New Sources of CMS Data</th>
<th>Data Sources from Providers and Plans</th>
<th>Alternative Government Data Sources</th>
<th>Other Considerations</th>
<th>Proposed Data Collection Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual eligibility</td>
<td>Existing data</td>
<td>Use existing CMS data</td>
<td>Government data sources</td>
<td>Country of origin is highly correlated with language for many groups, although exceptions exist (e.g., native-born Hispanic groups often speak Spanish at home)</td>
<td>Use available data on country of origin from the SSA</td>
</tr>
<tr>
<td>Nativity</td>
<td>No existing data; need further research to pilot for new Medicare intake survey</td>
<td>Could be accurately collected with little burden (see IOM, 2014, report for country of origin measure), but is not currently collected</td>
<td>Social Security Administration (SSA) maintains administrative records with place of birth (city and state/foreign country)</td>
<td>Using documentation status rather than country of origin is sensitive; a potential cost of using documentation status may be the burden of handling information on undocumented persons on CMS, providers, and plans</td>
<td>Use available area-level measure at census tract level from the ACS. Preference to use residential address in Medicare record, but with the caveat that there will be some slippage for adjustments to providers in destination areas for people who have more than one primary address (e.g., “snow birds”)</td>
</tr>
<tr>
<td>Urbanicity/rurality</td>
<td>Based on residential address, which is in the Medicare record</td>
<td>Based on residential address, which is currently collected in Electronic Health Records (EHRs)</td>
<td>Area-level measures at census tract level from the American Community Survey (ACS)</td>
<td>Use available area-level measure at census tract level from the ACS. Preference to use residential address in Medicare record, but with the caveat that there will be some slippage for adjustments to providers in destination areas for people who have more than one primary address (e.g., “snow birds”)</td>
<td>Use available area-level measure at census tract level from the ACS. Preference to use residential address in Medicare record, but with the caveat that there will be some slippage for adjustments to providers in destination areas for people who have more than one primary address (e.g., “snow birds”)</td>
</tr>
<tr>
<td>Social Risk Factor Indicator</td>
<td>Existing or New Sources of CMS Data</td>
<td>Data Sources from Providers and Plans</td>
<td>Alternative Government Data Sources</td>
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</tr>
<tr>
<td>Race and ethnicity</td>
<td>Included in Medicare record, but standardization/accuracy issues exist (better data for enrollees since 1990s)</td>
<td>Collection of race and ethnicity adhering to OMB standards included in Stage 2 EHR meaningful use regulation</td>
<td>Area-level measures available (see imputation methods used by Medicare in the Medicare column)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current methods exist to impute where direct self-report not available; methods also being continually refined</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td>Available with high specificity, but lower sensitivity</td>
<td>Collection of preferred language using Library of Congress language codes included in Stage 2 EHR meaningful use regulation</td>
<td>Area-level measure from ACS available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health plans have good data, and if standardized, could submit to CMS</td>
<td>Imputation methods available for some languages</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Other Considerations

<table>
<thead>
<tr>
<th></th>
<th>Proposed Data Collection Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct self-report is</td>
<td>Short term: Use available Medicare/SSA data (comprising individual-level self-report data and</td>
</tr>
<tr>
<td>the gold standard and</td>
<td>available imputation methods where self-reported race and ethnicity is lacking)</td>
</tr>
<tr>
<td>should be used for</td>
<td>Long term: Standardize methods across various self-report mechanisms (EHRs, administrative forms,</td>
</tr>
<tr>
<td>new enrollees/new race</td>
<td>Medicare sample surveys like Consumer Assessment of Healthcare Providers and Systems [CAHPS])</td>
</tr>
<tr>
<td>and ethnicity</td>
<td></td>
</tr>
<tr>
<td>collection, but methods exist where unavailable</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE D3-1  Continued

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Existing or New Sources of CMS Data</th>
<th>Data Sources from Providers and Plans</th>
<th>Alternative Government Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital/partnership status</td>
<td>Marital status is part of the Medicare record (collected and maintained because they are important for Social Security benefits)</td>
<td>Partnership data could be collected because it can change over time and has clinical utility, but would require standardized data collection</td>
<td>No other existing sources of partnership status</td>
</tr>
<tr>
<td>Income</td>
<td>No existing data; need further research on standardized data collection</td>
<td>Possible, but may be burdensome to collect</td>
<td>Individual-level data from the SSA (lifetime earnings, Medicare payroll tax, Supplemental Security Income [SSI]), Internal Revenue Service</td>
</tr>
<tr>
<td></td>
<td>Potential accuracy issues</td>
<td></td>
<td>The ACS area-level measure of median household income available as a proxy for individual-level income</td>
</tr>
<tr>
<td></td>
<td>May not be clinically useful because providers can address but not intervene. Whether costs are a barrier to care may be more salient than income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Included in CAHPS family of surveys for only a sample of beneficiaries</td>
<td>Some may currently include it, but it requires standardized measurement and data collection</td>
<td>Area-level measure as a proxy for individual-level education available from the ACS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clinically useful</td>
<td></td>
</tr>
</tbody>
</table>
### Other Considerations

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Proposed Data Collection Strategy</th>
</tr>
</thead>
</table>
| Data sources and data needs for marital status and partnership status may need to be considered separately | **Short term:** Use marital status data that Medicare already has  
**Long term:** Partnership could be collected through EHRs, but needs standardization. In particular, CMS could research about whether partnership adds precision and discrimination in addition to marital status and living alone |
| Need to consider potential demographic shifts in marriage and partnership (including same-sex marriage and never married, which may change the meanings of both partnership and marriage) and, correspondingly, changes in the relationship between marital/partnership status and health outcomes | |
| SSI is also available, but represents only part of total income for more affluent beneficiaries, but may be a large part for less advantaged beneficiaries (and therefore more useful as a measure of overall income for them) | **Short term:** Use area-level ACS measure as an imperfect proxy  
**Long term:** Assess possibility of linking to and using the SSA income data from uncapped Medicare payroll taxes or need research on measurement and data collection by CMS |
| Area-level income is an imperfect proxy for individual-level income, so even if it partly captures an individual-level effect, it can be problematic as an individual-level proxy |  
**Short-term:** Use ACS areal measure as a proxy  
**Long-term:** CMS could conduct research on data collection either by CMS or through EHRs |

*continued*
### TABLE D3-1  Continued

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Existing or New Sources of CMS Data</th>
<th>Data Sources from Providers and Plans</th>
<th>Alternative Government Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neighborhood deprivation index (based on place of residence)</td>
<td>Based on residential address, which is in the Medicare record</td>
<td>Based on residential address, which is currently collected through EHRs</td>
<td>Indicators are available from the ACS</td>
</tr>
</tbody>
</table>

3. Measures and data collection methods exist, but data sources have considerable limitations and more research is needed to accurately collect data in the long term

| Wealth | No existing data; needs further research on standardized data collection | Burdensome to ask Potential accuracy issues May not be clinically useful because providers can address but not intervene | State Medicaid asset threshold data could capture low income, but varies by state eligibility requirement and would be partly captured through dual eligibility status |
**Social Risk**

### Factor Indicator

- **Existing or New Sources of CMS Data**
  - Data Sources from Providers and Plans
  - Alternative Government Data Sources

**Neighborhood deprivation index** (based on place of residence)

- Based on residential address, which is in the Medicare record
- Currently collected through EHRs
- Indicators are available from the ACS

Could use a single indicator (such as median household income) for simplicity or a composite measure/index using multiple indicators if a composite has better measurement properties

Need to identify geographic areas that both meaningfully capture the neighborhood and also have sufficient variability regarding plan/provider performance (possibly census tracts for urban; counties for rural effect, but few rural studies)

Most existing neighborhood deprivation indices are designed to apply to and are tested for use in urban areas; conceptually, what constitutes “deprivation” in a rural setting may differ

Thus, traditional indicators included in neighborhood deprivation indices may not be applicable to rural areas

Other indicators may be better measures of neighborhood deprivation in rural areas

**Other Considerations**

#### Proposed Data Collection Strategy

- **Short term**: To assess the explanatory value of the composite measure compared to the single-indicator item, CMS should construct alternative measures and see how they perform when included in methods to account for social risk factors in quality measurement/payment

- **Long term**: Monitor the performance of the selected measure across rural and urban areas

To improve accuracy, CMS could conduct additional research to identify the appropriate geographic area to capture the “neighborhood” effect that applies to rural settings

CMS could also conduct research to identify salient constructs comprising “neighborhood deprivation” for rural areas and correspondingly, need to identify appropriate measures

**Subject to change over time**

- **Short term**: Some methodologies available in other surveys (e.g., Health and Retirement Study [HRS]), but no good measure for EHRs or collection by CMS

- **Long term**: More research is needed on whether wealth adds additional precision/discrimination above and beyond income to warrant inclusion of wealth as well

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*continued*
TABLE D3-1 Continued

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
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<th>Alternative Government Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living alone</td>
<td>Some limited data exists for beneficiaries in postacute settings</td>
<td>Could be collected because it can change over time, especially for older adults, and has clinical utility</td>
<td>Area data from ACS may be useful for certain geographic regions with particular density (may be more useful for plans than providers)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Measures on living arrangements are available (e.g., HRS, National Survey of Families and Households [NSFH])</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No existing data sources</td>
</tr>
<tr>
<td>Social support</td>
<td>No existing data</td>
<td>Could be collected because it can change over time, especially for older adults, and has clinical utility</td>
<td>Some measures exist in the literature that could be used</td>
</tr>
</tbody>
</table>

Some measures exist in the literature that could be used.
<table>
<thead>
<tr>
<th>Other Considerations</th>
<th>Proposed Data Collection Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>May change rapidly among Medicare beneficiaries; therefore, it may best be collected periodically in the clinical context</td>
<td>Long term: Develop measures and methods for collection through EHRs</td>
</tr>
</tbody>
</table>

May change rapidly among Medicare beneficiaries; therefore, it may best be collected periodically in the clinical context | Long term: Develop measures and methods for collection through EHRs |

continued
### TABLE D3-1 Continued

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Existing or New Sources of CMS Data</th>
<th>Data Sources from Providers and Plans</th>
<th>Alternative Government Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing stability and quality</td>
<td>No existing data</td>
<td>Could be collected because it can change over time and has clinical utility, but would require further research on standardized data collection</td>
<td>Area-level measures of housing quality (e.g., type, age, amenities and utilities available, cost/value, taxes) and mobility available through ACS. The Department of Housing and Urban Development collects data on housing quality, such as those included in its Healthy Communities Index (vacancy rates, age of housing, excessive housing cost burden, blood lead levels in children)</td>
</tr>
<tr>
<td>Acculturation</td>
<td>No existing data; need further research on standardized data collection</td>
<td>Could be accurately collected with little burden, but is not currently collected</td>
<td>No existing data sources</td>
</tr>
<tr>
<td></td>
<td>Language use could also be used as a proxy (see row on language)</td>
<td>Could have clinical utility</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix D

### Other Considerations

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Proposed Data Collection Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing stability and quality</td>
<td>Short term: CMS should test area-level measures and compare their performance. Preference to use residential address in Medicare record, but with the caveat that there will be some slippage for adjustments to providers in destination areas for beneficiaries with more than one primary address. Long term: Further research is needed on measurement to collect through EHRs.</td>
</tr>
<tr>
<td>Acculturation</td>
<td>Long term: Needs more research on the effect of acculturation on performance indicators used in value-based payment (VBP) (rather than health status generally or access). If there is evidence of an effect, language, which is often used to measure acculturation, could be considered as a proxy (see row on language). Duration in the United States (measured in years) could also be added to a new Medicare intake survey.</td>
</tr>
</tbody>
</table>

**Validated measures are available in the literature.**
TABLE D3-1  Continued

<table>
<thead>
<tr>
<th>Social Risk Factor Indicator</th>
<th>Existing or New Sources of CMS Data</th>
<th>Data Sources from Providers and Plans</th>
<th>Alternative Government Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual orientation/gender identity</td>
<td>No existing data, although there is general interest throughout HHS to collect data more broadly, and collecting more data and refining measures is included in the CMS Equity Plan (CMS Office of Minority Health, 2015)</td>
<td>In Stage 3, but standardized measures and data collection methods are needed</td>
<td>Sexual identity and gender identity are included in some national surveys (e.g., National Health Interview Survey [NHIS], National Health and Nutrition Examination Survey [NHANES], National Survey of Family Growth [NSFG])</td>
</tr>
<tr>
<td>Other environmental measures</td>
<td>No existing data</td>
<td>No existing data</td>
<td>Area-level measure, needs to be thought about much more as evidence develops; need to wait for more evidence of association with health care outcomes of interest and indicators used in VBP</td>
</tr>
<tr>
<td>Other Considerations</td>
<td>Proposed Data Collection Strategy</td>
<td></td>
<td></td>
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<tr>
<td>-------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual identity (rather than behavior or attraction) is the relevant construct to</td>
<td>Long term: Needs more research on the effect of sexual orientation and gender identity on health care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assess</td>
<td>outcomes of interest and standardized measurement. Could be revisited when more evidence is</td>
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</tr>
<tr>
<td></td>
<td>available, but standardized data collection is needed</td>
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<tr>
<td></td>
<td>Preference to collect through EHRs rather than the Medicare intake survey because of the sensitive</td>
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<tr>
<td></td>
<td>nature of the information</td>
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<tr>
<td></td>
<td>Mode of collection matters for accuracy and this question may be best assessed through a clinical</td>
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<tr>
<td></td>
<td>discussion between a patient and a provider</td>
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<tr>
<td>Examples of indicators include transportation availability and exposure to</td>
<td>Long term: Needs further research on the effect on health care outcomes of interest</td>
<td></td>
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<tr>
<td>environmental hazards</td>
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<tr>
<td></td>
<td>Could be revisited when more evidence is available, but standardized data collection is needed</td>
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</tbody>
</table>
### TABLE D3-2 Summary of Data Availability for Social Risk Factor Indicators

<table>
<thead>
<tr>
<th>SOCIAL RISK FACTOR</th>
<th>DATA AVAILABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td>1</td>
</tr>
<tr>
<td><strong>SEP</strong></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Dual eligibility</td>
<td></td>
</tr>
<tr>
<td>Wealth</td>
<td></td>
</tr>
<tr>
<td><strong>Race, Ethnicity, and Cultural Context</strong></td>
<td></td>
</tr>
<tr>
<td>Race and ethnicity</td>
<td></td>
</tr>
<tr>
<td>Language</td>
<td></td>
</tr>
<tr>
<td>Nativity</td>
<td></td>
</tr>
<tr>
<td>Acculturation</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Gender identity</td>
<td></td>
</tr>
<tr>
<td>Sexual orientation</td>
<td></td>
</tr>
<tr>
<td><strong>Social Relationships</strong></td>
<td></td>
</tr>
<tr>
<td>Marital/partnership status</td>
<td></td>
</tr>
<tr>
<td>Living alone</td>
<td></td>
</tr>
<tr>
<td>Social support</td>
<td></td>
</tr>
<tr>
<td><strong>Residential and Community Context</strong></td>
<td></td>
</tr>
<tr>
<td>Neighborhood deprivation</td>
<td></td>
</tr>
<tr>
<td>Urbanicity/rurality</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td></td>
</tr>
<tr>
<td>Other environmental measures</td>
<td></td>
</tr>
</tbody>
</table>

1. Available for use now
2. Available for use now for some outcomes, but research needed for improved, future use
3. Not sufficiently available now; research needed for improved, future use
4. Research needed to better understand relationship with health care outcomes and on how to best collect data
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Filice, C. E., and K. E. Joynt. 2016. Examining race and ethnicity information in Medicare administrative data. Medical Care [Epub ahead of print].


This appendix lists the committee’s conclusions and recommendations from its previous reports. The committee’s first report, Accounting for Social Risk Factors in Medicare Payment: Identifying Social Risk Factors (NASEM, 2016a), had no conclusions or recommendations, only findings.

REPORT 2: SYSTEMS PRACTICES FOR THE CARE OF SOCIALLY AT-RISK POPULATIONS¹

The committee concluded that six community-informed and patient-centered systems practices show promise for improving care for socially at-risk populations:

- **Commitment to health equity**: Value and promote health equity and hold yourself accountable.
- **Data and measurement**: Understand your population’s health, risk factors, and patterns of care.
- **Comprehensive needs assessment**: Identify, anticipate, and respond to clinical and social needs.
- **Collaborative partnerships**: Collaborate within and across provider teams and service sectors to deliver care.
- **Care continuity**: Plan care and care transitions to prepare for patients’ changing clinical and social needs.

¹ NASEM, 2016d.
• Engaging patients in their care: Design individualized care to promote the health of individuals in the community setting

REPORT 3:
ACCOUNTING FOR SOCIAL RISK FACTORS IN MEDICARE PAYMENT:
CRITERIA, FACTORS, AND METHODS

Conclusion 1: Three overarching considerations encompassing five criteria could be used to determine whether a social risk factor should be accounted for in performance indicators used in Medicare value-based payment programs. They are as follows:

A. The social risk factor is related to the outcome.
   1. The social risk factor has a conceptual relationship with the outcome of interest.
   2. The social risk factor has an empirical association with the outcome of interest.

B. The social risk factor precedes care delivery and is not a consequence of the quality of care.
   3. The social risk factor is present at the start of care.
   4. The social risk factor is not modifiable through provider actions.

C. The social risk factor is not something the provider can manipulate.
   5. The social risk factor is resistant to manipulation or gaming.

Conclusion 2: There are measurable social risk factors that could be accounted for in Medicare value-based payment programs in the short term. Indicators include

• Income, education, and dual eligibility;
• Race, ethnicity, language, and nativity;
• Marital/partnership status and living alone; and
• Neighborhood deprivation, urbanicity, and housing.

Conclusion 3: There are some indicators of social risk factors that capture the basic underlying constructs and currently present practical challenges, but they are worth attention for potential inclusion in accounting methods in Medicare value-based payment programs in the longer term. These include

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2 NASEM, 2016b.
• Wealth,
• Acculturation,
• Gender identity and sexual orientation,
• Emotional and instrumental social support, and
• Environmental measures of residential and community context.

Conclusion 4: It is possible to improve on the status quo with regard to the effect of value-based payment on patients with social risk factors. However, it is also important to minimize potential harms to these patients and to monitor the effect of any specific approach to accounting for social risk factors to ensure the absence of any unanticipated adverse effects on health disparities.

Conclusion 5: Characteristics of a public reporting and payment system that could accomplish the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly include

• Transparency and accountability for overall performance and performance with respect to socially at-risk members of the population;
• Accurate performance measurement—with high reliability and without bias (systematic error) related to differences in populations served;
• Incentives for improvement overall and for socially at-risk groups, both within reporting units (i.e., the provider setting that is being evaluated—hospitals, health plans, etc.) and between reporting units.

Conclusion 6: To achieve goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly, a combination of reporting and accounting in both measures and payment are needed.

Conclusion 7: Strategies to account for social risk factors for measures of cost and efficiency may differ from strategies for quality measurement, because observed lower resource use may reflect unmet need rather than the absence of waste, and thus lower cost is not always better, while higher quality is always better.

Conclusion 8: Any specific approach to accounting for social risk factors in Medicare quality and payment programs requires continuous
monitoring with respect to the goals of reducing disparities in access, quality, and outcomes; quality improvement and efficient care delivery for all patients; fair and accurate public reporting; and compensating providers fairly.

REPORT 4: 
ACCOUNTING FOR SOCIAL RISK FACTORS 
IN MEDICARE PAYMENT: DATA

Recommendation 1: The committee recommends the Centers for Medicare & Medicaid Services (CMS) use five guiding principles when choosing data sources for specific indicators of social risk to be used in Medicare performance measurement and payment. These guiding principles are as follows:

- CMS should first use data it already has.
- CMS should second look for opportunities to use existing data collected by other government agencies (including elsewhere in the Department of Health and Human Services).
- To the extent that a social risk factor is relatively stable, CMS should examine the feasibility of collecting additional data at the time of enrollment in Medicare.
- Where social risk factors change over time and have clinical utility, requiring data collection through electronic health records or other types of provider reporting may be the best approach.
- For social risk factors that reflect a person’s context or environment, existing data sources that can be used to develop area-level measures should be considered.

Recommendation 2: The committee recommends that the Centers for Medicare & Medicaid Services use existing data on dual eligibility, nativity, and urbanicity/rurality in Medicare performance measurement and payment.

Recommendation 3: Data for individual measures of race and ethnicity, language, and marital/partnership status and for area-level measures of income, education, and neighborhood deprivation are currently available and the committee recommends that the Centers for Medicare & Medicaid Services (CMS) use them for performance measurement and payment applications in the short term. However, owing to limitations

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3 NASEM, 2016c.
in these data, CMS should research ways to improve accuracy and collection of individual-level measures of race and ethnicity, language, marital/partnership status, income, and education, as well as an area-level measure of neighborhood deprivation for use in the future.

Recommendation 4: Individual measures of wealth, living alone, and social support exist, but they are sufficiently limited to preclude use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. Therefore, the committee recommends that CMS research ways to accurately collect data on these indicators.

Recommendation 5: Area-level measures exist for housing, but they have limitations for use by the Centers for Medicare & Medicaid Services (CMS) in Medicare performance measurement and payment at this time. The committee recommends that CMS research ways to accurately collect housing data, whether at an individual level or an area level.

Recommendation 6: The committee recommends that research be conducted on the effect of acculturation, sexual orientation and gender identity, and environmental measures of residential and community context on health care outcomes of Medicare beneficiaries and on methods to accurately collect relevant data in the Medicare population.

Recommendation 7: The committee recommends that the Centers for Medicare & Medicaid Services collect information about relevant, relatively stable social risk factors, such as race and ethnicity, language, and at the time of enrollment.

Conclusion 1: If there are substantial barriers to collecting social risk factor data (such as high cost) and/or if early pilot testing or modeling in a multivariable model suggests only marginal gains from including any given indicator in any method of accounting for social risk factors in Medicare performance measurement and payment, inclusion of that social risk factor may not be warranted.

Conclusion 2: Different data collection strategies for the same social risk factor indicator may be warranted depending on the purpose or methods used to account for social risk factors in Medicare performance measurement and payment. Additionally, the advantages and disadvantages of any specific source should be considered in reference to the intended use.
Conclusion 3: Any specific social risk factor indicator may require a multi-modal approach to data collection.

Conclusion 4: Regardless of the source, research on how to accurately and reliably collect social risk factor data across different modes and in different settings will be needed.

REFERENCES


Committee Biosketches

Donald M. Steinwachs, Ph.D. (Chair), is a professor emeritus in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. He is active in the Center for Health Services and Outcomes Research, previously named the Health Services Research and Development Center, where he served as director for many years. His research spans the design and application of health information systems for evaluation and management, development of classification systems and modeling tools, and research on the impact of organization, financing, and quality of care on outcomes for persons with chronic diseases. Dr. Steinwachs was a co-developer of the widely-used Adjusted Clinical Groups (ACG) case-mix adjustment and co-developer of the Johns Hopkins Hospital at Home (HaH). He developed methods for measuring provider continuity, needs and unmet needs for care, and measures of the timeliness of care. He was president of the Association for Health Services Research (now AcademyHealth) and received the 2013 Distinguished Research Award from AcademyHealth. He currently serves on the National Research Advisory Council of the Department of Veterans Affairs. He served on numerous committees of the National Academies of Sciences, Engineering, and Medicine, including the Board on Health Care Services and the Institute of Medicine Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care. He holds a Ph.D. from Johns Hopkins University and is an elected member of the National Academy of Medicine.

John Z. Ayanian, M.D., M.P.P., is director of the Institute for Healthcare Policy and Innovation, the Alice Hamilton Professor of Medicine.
at the School of Medicine, professor of health management and policy at the School of Public Health, and professor of public policy at the Ford School of Public Policy, all at the University of Michigan. From 2014 to 2016 he also served as associate editor of the *New England Journal of Medicine*. Dr. Ayanian has focused his career on health policy and health services research related to access to care, quality of care, and health care disparities, and has served in key health policy advisory roles to state and federal government. Prior to joining the University of Michigan, Dr. Ayanian was a professor at the Harvard Medical School and at the Harvard School of Public Health, and a practicing primary care physician at Brigham and Women’s Hospital in Boston. At Harvard, Dr. Ayanian also directed the Health Disparities Research Program of Harvard Catalyst, Harvard’s Clinical and Translational Sciences Center; the Outcomes Research Program of the Dana-Farber/Harvard Cancer Center; and the Harvard Medical School Fellowship in General Medicine and Primary Care. In addition to his medical degree from Harvard Medical School, he holds an M.P.P. from Harvard’s John F. Kennedy School of Government. He is an elected member of the National Academy of Medicine.

**Charles Baumgart, M.D.,**¹ is senior medical director at xG Health Solutions, an organization that was spun out of Geisinger Health System, designed to partner with health care organizations nationally to bring Geisinger population health management expertise to local health care improvement efforts. He has worked with numerous health care systems, both academic and community-based, as well as with managed care organizations. He has most recently been the xG Health clinical/physician lead for support of a New York Delivery System Reform Incentive Payment program site, the Suffolk County Care Collaborative (Stony Brook University Hospital). Before joining xG Health Solutions, Dr. Baumgart was the Geisinger Health Plan senior medical director for government programs. His responsibilities included the development of the clinical management program for a new Managed Medicaid program in northeast Pennsylvania, leveraging Geisinger’s existing Advanced Medical Home model. In his role, he worked with all aspects of population and quality management, including support of medical home development, analytics, and provider pay-for-performance programs. Dr. Baumgart previously served as a senior medical director and then the vice president and chief medical officer for Presbyterian Health Plan in Albuquerque, New Mexico. Dr. Baumgart graduated with an M.D. from the University of Iowa. Dr. Baumgart is board certified in internal medicine and quality assurance and utilization review. He has participated in the advanced training program in health care delivery improvement with

¹ Resigned in July 2016.
Intermountain Healthcare, is a certified managed care executive through America’s Health Insurance Plans, and served as a senior examiner with the Malcolm Baldrige National Quality Award Program.

Melinda Buntin, Ph.D., is professor and the chair of the Department of Health Policy at Vanderbilt University’s School of Medicine. She previously served as deputy assistant director for health at the Congressional Budget Office (CBO), where she was responsible for managing and directing studies of health care and health care financing issues in the Health, Retirement, and Long-term Analysis Division. Prior to joining CBO, Dr. Buntin worked at the Office of the National Coordinator for Health Information Technology, where she established and directed the economic analysis, evaluation, and modeling group, while on leave from RAND Corporation. At RAND, Dr. Buntin served as deputy director of RAND Health’s Economics, Financing, and Organization Program, director of Public Sector Initiatives for RAND Health, and co-director of the Bing Center for Health Economics. Her research at RAND focused on insurance benefit design, health insurance markets, provider payment, and the care use and needs of the elderly. She has a Ph.D. in health policy with a concentration in economics from Harvard University. Dr. Buntin is a member of the National Academies of Sciences, Engineering, and Medicine’s Board on Health Care Services.

Ana V. Diez Roux, M.D., Ph.D., M.P.H., is Distinguished University Professor of Epidemiology and dean of the Drexel University Dornsife School of Public Health. Before joining Drexel University, she served on the faculties of Columbia University and the University of Michigan, where she was chair of the Department of Epidemiology and director of the Center for Social Epidemiology and Population Health at the University of Michigan School of Public Health. Dr. Diez Roux is internationally known for her research on the social determinants of population health and the study of how neighborhoods affect health. She has been a member of the MacArthur Network on Socioeconomic Factors and Health and was co-director of the Network on Inequality, Complexity and Health. Dr. Diez Roux received an M.D. from the University of Buenos Aires and a master’s degree in public health and doctorate in health policy and management from the Johns Hopkins Bloomberg School of Public Health. She is an elected member of the National Academy of Medicine and has served on numerous committees of the National Research Council and the Institute of Medicine, most recently on the Committee on Recommended Social and Behavioral Domains and Measures for Electronic Health Records.

Marc N. Elliott, Ph.D., is a senior principal researcher and holds the Distinguished Chair in Statistics at the RAND Corporation. His areas of interest
include health disparities, Medicare, vulnerable populations, experiences with health care, profiling of health care institutions, survey sampling, experimental design, causal inference, and case-mix adjustment. He has developed Bayesian methods of estimating race/ethnicity and associated disparities using surname and address information. Dr. Elliott led an Office of Minority Health project, developing novel, cost-effective sampling and analytic methods to improve national health estimates for small racial/ethnic subgroups. Since 2006, he has led the Centers for Medicare & Medicaid Services Medicare CAHPS (Consumer Assessment of Health Providers and Systems) Analysis project. Since 1996, he has been RAND’s lead statistician on the Agency for Healthcare Research and Quality (AHRQ) CAHPS I–III projects and currently co-leads the AHRQ CAHPS IV project. Dr. Elliott was recognized by Thomas Reuters as being one of the Top 1 percent of Cited Scientists 2002–2012. Dr. Elliott is a fellow of the American Statistical Association. He earned his Ph.D. in statistics from Rice University.

José J. Escarce, M.D., Ph.D., is a professor of medicine in the David Geffen School of Medicine at the University of California, Los Angeles (UCLA), and a professor of health policy and management in the UCLA Fielding School of Public Health. His research interests and expertise include health economics, managed care, physician behavior, racial/ethnic and socioeconomic disparities in health care, technological change in medicine, and access, costs, and quality of care. Dr. Escarce is currently working on projects that address sociodemographic barriers to access, vertical integration between acute and postacute care, bundled payments, and the effects of financial and non-financial incentives on costs and quality in provider groups and health systems. He holds an M.D. from the University of Pennsylvania School of Medicine and a Ph.D. from the Wharton School. Dr. Escarce is an elected member of the National Academy of Medicine and was a member of the Institute of Medicine Committee on Understanding and Eliminating Racial and Ethnic Disparities in Health Care and of the National Academies of Sciences, Engineering, and Medicine’s Board on Population Health and Public Health Practice.

Robert Ferrer, M.D., M.P.H., is John M. Smith, Jr. Professor and vice chair for research in the Department of Family and Community Medicine at the University of Texas Health Science Center at San Antonio (UTHSCSA). Dr. Ferrer is a practicing family physician with research interests at the interface of primary care and public health, including primary care transformation and quality improvement, social determinants of health, and applications of complexity science to health and health care. Currently, he also serves as director of community engagement for UTHSCSA’s Clinical Translational Science Award. Dr. Ferrer is active in community health
initiatives, having served as chair of the leadership team for San Antonio’s Communities Putting Prevention to Work grant from the Centers for Disease Control and Prevention and is now vice-chair of the Bexar County Health Collaborative. He has also been a member of the Expert Panel for the Agency for Healthcare Research and Quality Innovations Exchange.

Dr. Ferrer holds an M.D. from Hahnemann University School of Medicine and an M.P.H. from the University of Washington.

Darrell J. Gaskin, Ph.D., is William C. and Nancy F. Richardson Professor of Health Policy and director of the Johns Hopkins Center for Health Disparities Solutions, Johns Hopkins Bloomberg School of Public Health. His research aims to improve access to care for poor, minority, and other vulnerable populations and to eliminate racial/ethnic and socioeconomic disparities in health care. His current research explores the relationship between “place” and health care disparities and examines racial/ethnic and socioeconomic disparities in hospital care. He is vice chair of the Board of Directors of AcademyHealth and a member of the Center for Health Policy Development Board and the board of directors for the National Academy of State Health Policy. He has served as a member of the Congressional Black Caucus Commission on the Budget Deficit, Economic Crisis, and Wealth Creation and of the Board of Directors of the Maryland Health Insurance Plan, the state’s high-risk pool, and was vice chair of the Board of Directors of the Maryland Health Benefits Exchange Commission. He has also served as a member of several Institute of Medicine committees, including the Committee on Valuing Community-Based, Non-Clinical Prevention Policies and Wellness Strategies and the Committee on the Future of Emergency Care in the United States Health System. He received an M.S. from the Massachusetts Institute of Technology and a Ph.D. from the Johns Hopkins Bloomberg School of Public Health.

Mark D. Hayward, Ph.D., is Centennial Commission Professor in the Liberal Arts and professor of sociology at The University of Texas at Austin. From 2005 to 2015, he was director of the university’s Population Research Center. His primary research addresses how life course exposures and events influence the morbidity and mortality experiences of the adult population. Recent studies have clarified how early life conditions and especially educational experience influence socioeconomic, race, and gender disparities in adult morbidity and mortality; the demography of race/ethnic and gender disparities in healthy life expectancy; social inequality in the biomarkers of aging; and the health consequences of marriage, divorce, and widowhood. He recently served as the president of the Southern Demographic Association and chair of the Aging and Life Course section of the American Sociological Association. He has served on the boards of
the Population Association of America and the Society of Biodemography and Social Biology, and he was a member and then chair of the Inter-University Consortium for Political and Social Research Council. Currently, he is a member of the National Advisory Committee for the Robert Wood Johnson Foundation’s Health and Society Scholars Program. He served on the National Research Council (NRC) Committee on Population and the NRC Panel on New Directions in Social Demography, Social Epidemiology, and the Sociology of Aging. Dr. Hayward received his Ph.D. in sociology from Indiana University.

James S. Jackson, Ph.D., is the past director of the Institute for Social Research and the Daniel Katz Distinguished University Professor of Psychology at the University of Michigan. He has previously held positions as chair of the Social Psychology Training Program and director of the Research Center for Group Dynamics, the Program for Research on Black Americans, and the Center for Afroamerican and African Studies, all at the University of Michigan. His research focuses on issues of racial and ethnic influences on life course development, attitude change, reciprocity, social support, and coping and health among African Americans. His research efforts include carrying out a number of national and international surveys of black populations. Dr. Jackson is a fellow of the American Academy of Arts and Sciences and the American Academy of Political and Social Science, and was appointed to the National Science Board of the United States by President Obama in 2014. He has served on several committees of the National Academies of Sciences, Engineering, and Medicine, including currently on the Board on the Health of Select Populations, Board on Behavioral, Cognitive, and Sensory Sciences, Standing Committee on Integrating New Behavioral Health Measures into the Substance Abuse and Mental Health Services Administration’s Data Collection Programs (as chair), and Roundtable on the Application of Social and Behavioral Science Research of the Division of Behavioral and Social Sciences and Education. Dr. Jackson holds a Ph.D. in social psychology from Wayne State University and is an elected member of the National Academy of Medicine.

Daniel Polsky, Ph.D., is the executive director of the Leonard Davis Institute of Health Economics, Professor of Medicine in the Perelman School of Medicine, and the Robert D. Eilers Professor of Health Care Management in the Wharton School at the University of Pennsylvania. His research areas include access to health care, provider payment, disparities, and economic evaluation of medical and behavioral health interventions. He serves on the Congressional Budget Office’s Panel of Health Advisers and the National Academies of Sciences, Engineering, and Medicine’s Board on Population Health and Public Health Practice. He was the senior economist on health
issues at the President’s Council of Economic Advisers in 2007-2008. He received a Ph.D. in Economics from the University of Pennsylvania and a master of public policy from the University of Michigan.

Meredith Rosenthal, Ph.D., is professor of health economics and policy and the associate dean of diversity at the Harvard T.H. Chan School of Public Health. She is a member of the Massachusetts Public Health Council and an elected board chair of the Massachusetts Health Quality Partners. Dr. Rosenthal’s research focuses primarily on policies that will help slow the growth in health care spending. These efforts include changes in payment incentives, benefit design, and the provision of information and behavioral “nudges” to both patients and providers. Her research has influenced the design of provider payment systems in both the public and private sectors. She has advised federal and state policy makers in health care payment policy and implementation, and has also testified in congressional hearings on pay-for-performance and in legislative hearings in California and Massachusetts concerning health care provider payment and benefit design policies. Dr. Rosenthal earned her Ph.D. in health policy (economics track) at Harvard. She is an elected member of the National Academy of Medicine.

Anthony Shih, M.D., M.P.H., is executive vice president of The New York Academy of Medicine (NYAM). Established in 1847, NYAM advances solutions that promote the health and well-being of people in cities worldwide. Dr. Shih’s expertise is in health care policy, urban health, health system performance measurement, health care quality improvement, and health care philanthropy. Prior to joining NYAM, Dr. Shih served as The Commonwealth Fund’s executive vice president for programs, overseeing all of the fund’s program and research activities, which were focused on improving the U.S. health care system. Previously, Dr. Shih held several senior management roles, including chief quality officer and vice president of strategy at IPRO, a leading independent, not-for-profit health care quality improvement organization. At IPRO, he developed and managed large-scale quality assessment and improvement projects for Medicare and Medicaid populations, as well as led IPRO’s Health Care Transparency Group. Earlier in his career, Dr. Shih was assistant medical director for a community-based mental health organization serving immigrant and refugee populations in Oakland, California. Board-certified in preventive medicine, Dr. Shih received his M.D. from the New York University School of Medicine and his M.P.H. from the Columbia University Mailman School of Public Health.
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