

The Wrong Tool for the Job: Diabetes Public Health Programs and Practice Guidelines

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We surveyed state diabetes programs to determine whether they develop and disseminate diabetes guidelines. We found they largely disseminate clinical practice guidelines developed from subspecialty organizations, do not prioritize among the many recommendations contained in diabetes guidelines, and have not adapted guidelines to focus on population rather than individual health. An opportunity exists for state diabetes control programs to better align guidelines with public health goals. (*Am J Public Health*. 2011;101:1871–1873. doi: 10.2105/AJPH.2011.300148)

Clinical practice guidelines wield a strong influence over chronic disease care. Many health care organizations issue clinical practice guidelines, and the strength of evidence underlying the recommendations varies.¹ Some guidelines emanate from a strong basis in medical evidence, whereas others reflect expert opinion.^{2,3} Although many have criticized guidelines for lack of transparency and potential for conflicts of interest,^{4–6} they remain a cornerstone of chronic disease care. Most guidelines are intended to optimize the treatment of individual patients and largely do not address population health.⁷

Guidelines are particularly important to diabetes care because managing type 2 diabetes is a major challenge for health systems, practitioners, and patients.⁸ Because diabetes is a multisystem disease, relevant guidelines have many individual recommendations that differ in their relative effects on health and their cost-effectiveness.^{9,10} Because of diabetes' public

health importance, each US state and territory has a federally funded diabetes prevention and control program (DPCP) within its public health department intended to mitigate the public health burden of diabetes in the community. These programs are well positioned to guide prioritization of clinical services to maximize population health within existing resource constraints.

We explored public health DPCPs' perceptions about and use of diabetes practice guidelines. We were interested in learning (1) whether state DPCPs have adapted clinical practice guidelines to align with population-based public health goals, (2) how DPCPs perceive the public health value of specific guideline recommendations, and (3) whether DPCPs prioritize individual recommendations within practice guidelines over others.

METHODS

We conducted an independent survey of Centers for Disease Control and Prevention–funded state DPCPs. We solicited information from all 50 states and the 7 US territories and island jurisdictions operating DPCPs as of August 2009, drawn from a publicly available list.¹¹ We invited DPCP directors and program managers and designees to participate via an in-person announcement at their annual meeting and via e-mail, directing consenting individuals to the Web-based survey administered between August and October 2009. We sent 2 reminder e-mails to nonresponders, contacted them by telephone, and mailed them paper surveys.

The survey addressed (1) extent of guideline dissemination, (2) use of various organizations' guidelines, (3) resource availability to deliver guideline-concordant care, (4) prioritization and perceived cost-effectiveness of individual recommendations within guidelines, and (5) safety concerns about aggressive glycemic control. We present summary statistics for items for each outcome using a complete data-only approach.

RESULTS

Of 57 federally funded state and territory diabetes programs, 52 completed the survey (response rate 91%). Of the 52, 40 (77%) reported disseminating diabetes guidelines. Of these, 60% (24/40) reported directly adopting

other organizations' recommendations, most frequently citing the American Diabetes Association (23/24, 96%) and the American Association of Clinical Endocrinologists (13/24, 54%). The remainder of the programs that disseminate guidelines (14/40, 35%) reported using a committee process to adapt published guidelines (2/40 missing responses). We examined the resulting 14 state-issued guidelines; none mentions cost-effectiveness, and 1 mentions tailoring for vulnerable populations in the context of social barriers to adherence.

The majority (35/49, 71%) of DPCPs reported that their state lacked the capacity to deliver guideline-concordant care. Nevertheless, of the 49 programs, 29 (59%) reported that their guidelines do not respond to the state's lack of resources, and only 1 explicitly prioritized among domains of diabetes care within their guidelines. This program's guidelines prioritized glycemic control as most important, followed by blood pressure control, and then lipid control.

In terms of perceived public health importance among individual guideline recommendations, DPCPs ranked optimizing glycemic control as most important, followed by blood pressure, and then lipid control (Table 1). For perceived cost-effectiveness (Figure 1), respondents most often perceived glycemic control, blood pressure control, and lipid control as cost saving. All guideline recommendations were perceived as either cost saving or cost-effective.

Of 52 programs, 6 (12%) reported that they disseminated their interpretation of recent findings that tight glycemic control was associated with increased mortality in recent trials. Two suggested raising glycemic targets for special populations, and 1 de-emphasized tight glucose control.

DISCUSSION

The traditional roles of state health departments include improving population health at low cost, promoting public safety, and working with safety net health systems to promote health for the most vulnerable populations.¹² State DPCPs can play a critical role in furthering these objectives for diabetes. Although most DPCPs disseminate guidelines, these guidelines are focused on individual-level risk factor optimization rather than population health. The

Table 1—Perceived Public Health Importance of Diabetes Care Domains: Survey of Centers for Disease Control and Prevention–Funded State Diabetes Prevention and Control Programs, United States, 2009

Diabetes Care Domain	Rank (pooled)
Optimal glycemic control (HbA1c < 7%)	1
Optimal blood pressure control (BP < 130/80)	2
Optimal lipid management (LDL < 100)	3
Diabetes education from certified practitioner	5
Annual dilated retinal examinations	5
Annual foot inspection and monofilament examination	5

Note. BP = blood pressure; HbA1c = marker of glycemic control or a form of hemoglobin which is measured primarily to identify the average plasma glucose concentration over prolonged periods of time; LDL = low-density lipoprotein. Ranking: most important = 1; least important = 10. The sample size was n = 49.

sources for guidelines are most likely to be subspecialty organizations, such as medical subspecialty societies or single-disease associations, rather than public health or primary care entities.

Although most DPCPs reported that their states do not have the resources or capacity to deliver guideline-concordant care in all domains, most DPCPs do not prioritize among the many individual recommendations contained in diabetes clinical practice guidelines to enable planners and to maximize use of resources to improve population health. Finally, our finding that only 6 DPCPs have communicated possible risks associated with tight glycemic control is surprising, given that informing, educating,

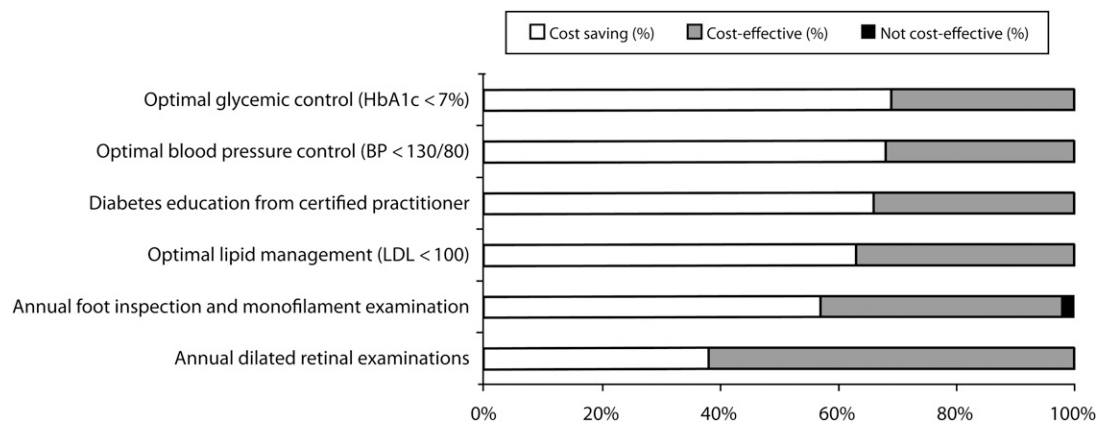
and empowering people about health issues is an essential public health function.¹³

The DPCP respondents perceived glycemic control to be of greater public health importance than is blood pressure or lipid control in diabetes. Optimal diabetes management indeed requires simultaneous control of blood glucose, blood pressure, blood lipid levels, tobacco cessation or avoidance, and access to other preventive services to prevent complications for people with diabetes.¹⁴ Although cost-effectiveness is only 1 metric to help determine prioritization and public health importance, abundant evidence exists that controlling blood pressure is the most cost-effective means to reduce morbidity and mortality in diabetes.¹⁵

Participants overestimated the cost-effectiveness of achieving recommended glycemic targets. In contrast to respondents' perceptions, glycemic control is not cost saving. Although it is known that glycemic control is important for preventing microvascular complications,^{16,17} it is far more costly per quality-adjusted life year than are blood pressure and lipid control^{18,19} and retinal screening.²⁰

Our study has numerous limitations. We did not conduct preparatory qualitative work to develop the questionnaire but instead relied on our own DPCP experience. We did not explicitly define the terms "cost-effective" and "cost saving," which may have led to imprecision in our assessment of DPCPs' perceptions of individual recommendations. We did not distinguish between type 1 and type 2 diabetes in the survey, although approximately 95% of cases in the United States reflect type 2 diabetes and, among the DPCP guidelines we evaluated, all related to type 2 diabetes. Finally, we acknowledge the recent controversy regarding optimal targets for blood pressure control^{21–23} and the lack of scientific consensus regarding the risks versus benefits of intensive glycemic control,^{24–26} although the risks of hypoglycemia in vulnerable subgroups is now well established.^{27,28}

State DPCPs play a vital role in advancing public health objectives related to diabetes in the United States. DPCPs often employ the model of influence^{29,30} in a context of multifaceted



Note. BP = blood pressure; HbA1c = marker of glycemic control or a form of hemoglobin which is measured primarily to identify the average plasma glucose concentration over prolonged periods of time; LDL = low-density lipoprotein. The sample size was n = 49.

FIGURE 1—Perceived cost-effectiveness of diabetes interventions: survey of Centers for Disease Control and Prevention–Funded state diabetes prevention and control programs, United States, 2009.

quality improvement efforts involving multiple systems, partners, and strategies to build capacity for high quality diabetes care. We believe that DPCPs have the potential to provide a unique perspective on how individual recommendations can affect population health and how allocation of health resources can foster achievement of public health goals in diabetes. With respect to diabetes guidelines, our findings suggest that DPCPs have an unmet need for guidance regarding the relative values of diabetes care recommendations on improving population health, particularly in the context of resource constraints, and our studies have identified a novel area for public health research, capacity building, and leadership.³¹ ■

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Contributors

U. Sarkar designed the study and wrote the initial draft of the article. A. López helped conduct the literature review; performed data collection, cleaning, and analysis; and prepared the methods section of the text as well as the table and figure. K. Black contributed to instrument development and designed and oversaw the data collection process. D. Schillinger designed the study, directed its implementation including quality assurance and control, and contributed intellectual content to the article.

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Human Participant Protection

The committee on human research at the University of California, San Francisco approved the study protocol.

References

- Burgers JS, Bailey JV, Klazinga NS, Van Der Bij AK, Grol R, Feder G. Inside guidelines: comparative analysis of recommendations and evidence in diabetes guidelines from 13 countries. *Diabetes Care*. 2002;25(11):1933–1939.
- Savoie I, Kazanjian A, Bassett K. Do clinical practice guidelines reflect research evidence? *J Health Serv Res Policy*. 2000;5(2):76–82.
- McAlister FA, van Diepen S, Padwal RS, Johnson JA, Majumdar SR. How evidence-based are the recommendations in evidence-based guidelines? *PLoS Med*. 2007;4(8):e250.
- Choudhry NK, Stelfox HT, Detsky AS. Relationships between authors of clinical practice guidelines and the pharmaceutical industry. *JAMA*. 2002;287(5):612–617.
- Psaty BM, Furberg CD. British guidelines on managing hypertension. Provide evidence, progress, and an occasional missed opportunity. *BMJ*. 1999;319(7210):589–590.
- Sniderman AD, Furberg CD. Why guideline-making requires reform. *JAMA*. 2009;301(4):429–431.
- Shaneyfelt TM, Centor RM. Reassessment of clinical practice guidelines: go gently into that good night. *JAMA*. 2009;301(8):868–869.
- Dall TM, Zhang Y, Chen YJ, Quick WW, Yang WG, Fogli J. The economic burden of diabetes. *Health Aff (Millwood)*. 2010;29(2):297–303.
- McAlister FA, Lawson FM, Teo KK, Armstrong PW. A systematic review of randomized trials of disease management programs in heart failure. *Am J Med*. 2001;110(5):378–384.
- Zhang P, Engelgau MM, Norris SL, Gregg EW, Narayan KM. Application of economic analysis to diabetes and diabetes care. *Ann Intern Med*. 2004;140(11):972–977.
- Centers for Disease Control and Prevention. State-Based Diabetes Prevention & Control Programs. Available at: <http://www.cdc.gov/Diabetes/states/index.htm#list>. Accessed May 4, 2011.
- Institute of Medicine of the National Academies. *The Future of the Public's Health in the 21st Century*. Washington, DC; 2002.
- American Public Health Association. 10 Essential Public Health Services. 1994. Washington, DC. Available at: <http://www.apha.org/programs/standards/performancestandardsprogram/resexentialservices.htm>. Accessed May 4, 2011.
- Nathan DM. Clinical practice. Initial management of glycemia in type 2 diabetes mellitus. *N Engl J Med*. 2002;347(17):1342–1349.
- UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes: UKPDS 38. *BMJ*. 1998;317(7160):703–713.
- UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet*. 1998;352(9131):837–853.
- The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med*. 1993;329(14):977–986.
- The CDC Diabetes Cost-Effectiveness Group. Cost-effectiveness of intensive glycemic control, intensified hypertension control, and serum cholesterol level reduction for type 2 diabetes. *JAMA*. 2002;287(19):2542–2551.
- Clarke PM, Gray AM, Briggs A, Stevens RJ, Matthews DR, Holman RR. Cost-utility analyses of intensive blood glucose and tight blood pressure control in type 2 diabetes (UKPDS 72). *Diabetologia*. 2005;48(5):868–877.
- Javitt JC, Aiello LP. Cost-effectiveness of detecting and treating diabetic retinopathy. *Ann Intern Med*. 1996;124(1 Pt 2):164–169.
- The Accord Study Group. Effects of intensive blood-pressure control in type 2 diabetes mellitus. *N Engl J Med*. 2010;362(17):1575–1585.
- Weir MR, Bakris GL. Optimal blood pressure for a patient with type 2 diabetes mellitus: insight from the ACCORD study. *Curr Hypertens Rep*. 2010;12(5):313–315.
- Nilsson PM. ACCORD and risk-factor control in type 2 diabetes. *N Engl J Med*. 2010;362(17):1628–1630.
- The Action to Control Cardiovascular Risk in Diabetes Study Group. Effects of intensive glucose lowering in type 2 diabetes. *N Engl J Med*. 2008;358(24):2545–2559.
- Cefalu WT. Glycemic targets and cardiovascular disease. *N Engl J Med*. 2008;358(24):2633–2635.
- Dluhy RG, McMahon GT. Intensive glycemic control in the ACCORD and ADVANCE trials. *N Engl J Med*. 2008;358(24):2630–2633.
- Brown AF, Mangione CM, Saliba D, Sarkisian CA, California Healthcare Foundation/American Geriatrics Society Panel on Improving Care for Elders With Diabetes. Guidelines for improving the care of the older person with diabetes mellitus. *J Am Geriatr Soc*. 2003;51(5 suppl):S265–S280.
- Sarkar U, Karter AJ, Liu JY, Moffet HH, Adler NE, Schillinger D. Hypoglycemia is more common among type 2 diabetes patients with limited health literacy: the Diabetes Study of Northern California (DISTANCE). *J Gen Intern Med*. 2010;25(9):962–968.
- Safran MA, Mukhtar Q, Murphy DL. Implementing program evaluation and accountability for population health: progress of a national diabetes control effort. *J Public Health Manag Pract*. 2003;9(1):58–65.
- Vinacor F, Jack L Jr. 25 years and counting: Centers for Disease Control and Prevention identifies opportunities and challenges for diabetes prevention and control. *Ann Intern Med*. 2004;140(11):943–944.
- Schmittiel J, Vijan S, Fireman B, Lafata JE, Oestreicher N, Selby JV. Predicted quality-adjusted life years as a composite measure of the clinical value of diabetes risk factor control. *Med Care*. 2007;45(4):315–321.