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Primary Care Behavioral Interventions to Prevent or Reduce Illicit Drug and Nonmedical Pharmaceutical Use in Children and Adolescents: A Systematic Evidence Review for the U.S. Preventive Services Task Force

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Structured Abstract

Background: Drug use in youth is associated with multiple negative health and social consequences. Even infrequent use increases one's risk of serious adverse events due to an increase in risk-taking behaviors while intoxicated or impaired. Primary care could play a role in helping to prevent and reduce drug use in children and adolescents.

Purpose: To systematically review the evidence on the benefits and harms of primary care–relevant interventions designed to reduce illicit drug use or the nonmedical use of prescription drugs in children and adolescents.

Methods: We searched PubMed, PsycINFO, and the Cochrane Collaboration Registry of Controlled Trials to identify relevant literature published between January 1992 and June 4, 2013 and MEDLINE through August 31, 2013. We also examined the references from other relevant reviews and included studies. Two investigators independently reviewed all titles/abstracts and full-text articles against a set of predetermined inclusion and quality criteria. One reviewer abstracted data into a standard evidence table and a second reviewer checked the data for completeness and accuracy. We qualitatively synthesized the results for the three Key Questions and grouped the included studies by intervention type (primary care–based vs. primary care–relevant computer-based interventions conducted outside of primary care).

Results: We included six studies reported in seven publications. Four of the six trials examined the effect of the intervention on a health outcome. One study found no effects of either a therapist-led or computer-based brief intervention on marijuana use consequences or driving under the influence of marijuana. Only one of the three computer-based interventions that reported depression outcomes found greater improvement in the intervention group compared with the control group at 6 months only. All six trials reported a drug use outcome. Four of the five studies assessing self-reported marijuana use found statistically significant differences in favor of the intervention group compared with the control group. All three computer-based trials also reported differences in nonmedical prescription drug use occasions. Individual studies reported additional substance use outcomes with mixed results.

Conclusions: There is inadequate evidence on the benefits of primary care–relevant behavioral interventions in reducing self-reported illicit and pharmaceutical drug use in adolescents.

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Chapter 1. Introduction

Scope and Purpose

In 2008, the U.S. Preventive Services Task Force (USPSTF) concluded that there was insufficient evidence to recommend for or against screening adolescents, adults, and pregnant women for illicit drug use. This recommendation was based on a staged evidence review[1] of the literature published between 1994 and April 2006 and a 2008 supplemental assessment of screening instruments done on behalf of the USPSTF.[2] The staged review only included research related to screening or treatment for marijuana, cocaine, or opioids and included evidence for children and adolescents, adults, and pregnant women. In contrast, the current systematic review focuses specifically on: 1) behavioral interventions that are considered feasible for primary care; 2) the primary prevention and reduction of all illicit drugs, including the nonmedical use of prescription drugs; and 3) children and adolescents age 18 years and younger only who do not meet criteria for substance abuse or dependence. The objective of this review is to systematically review evidence for the benefits and harms of primary care–relevant behavioral interventions designed to reduce illicit drug use or the nonmedical use of prescription drugs in children and adolescents.

Condition Definition

Substance use typically refers to substances that affect mental processes (e.g., cognition, affect) when ingested, inhaled, injected, or taken through other administration routes. These substances have psychoactive properties and can include licit and illicit substances, such as alcohol; tobacco; marijuana; prescription drugs, including opioids and morphine derivatives; depressants; and stimulants. In this review, we focus on illicit drug use and the nonmedical use of prescription and over-the-counter drugs. We did not review the evidence related to alcohol, tobacco, and nonpsychoactive drugs (e.g., anabolic steroids or laxatives). Nonmedical use (also known as "extramedical use") refers to using a prescription or over-the-counter drug in ways other than prescribed (i.e., more frequently or for a longer duration) or by people other than the prescribed individual. Individuals generally use these substances to "get high" or for other unapproved indications.

An individual's substance use can range from abstinence to dependency or addiction (**Table 1**). In this review, we are specifically interested in interventions that aim to prevent (i.e., primary prevention prior to any use) or reduce drug use in children and adolescents who have experimented with drug use, have limited drug use, or have problematic/harmful drug use. We did not review the evidence on interventions designed to reduce drug use in children and adolescents who are diagnosed with substance abuse or substance dependence according to the Diagnostic and Statistical Manual of Mental Disorders (4th edition) or similar criteria.[3] The distinction between problematic use and abuse is somewhat ambiguous clinically. Problematic use is often associated with use of the substance in high-risk situations, such as driving a car, or is associated with problems such as a school suspension. Diagnosed abuse, on the other hand, reflects recurrent problems associated with use that interferes with functioning.

Prevalence

There are three main U.S. surveillance surveys that track trends in the prevalence of alcohol, tobacco, and other drug use in children and adolescents: 1) the annual National Survey of Drug Use and Health in children age 12 years and older, 2) the annual Monitoring the Future Study of students in grades 8, 10, and 12, and 3) the biannual Youth Risk Behavior Survey of students in grades 9 through 12. Substance use is typically reported as lifetime (or ever) use, use during the past year, use during the previous 30 days (often referred to as "current" use), daily use, or use over some other defined period of time (e.g., 14 or 90 days). Rates of current substance use over the past 5 years are similar in all three surveillance systems.[4]

According to the 2012 National Survey of Drug Use and Health, 9.5 percent of adolescents ages 12 to 17 years reported current (past month) illicit drug use—a rate that has remained steady since 2009.[4] Marijuana and prescription psychotherapeutics (including pain relievers) are the most commonly used drugs among children and adolescents (**Table 2**). Nearly 7.2 percent of 12- to 17-year-olds reported current use of marijuana and an estimated 5.0 percent used marijuana for the first time within the past year.[4] Consequences of prescription drugs used for nonmedical purposes are a quickly growing epidemic in the United States. These drugs include opioid pain relievers, central nervous system depressants, and stimulants and are the number one cause of unintentional drug overdose.[5] In 2012, 2.8 percent of 12- to 17-year-olds reported using a prescription drug for nonmedical reasons; 2.2 percent of those individuals reported this to be opioid pain relievers.[4]

To put the rates of drug use in context with the use of other substances, in 2012 the rate of current alcohol use in youths ages 12 to 17 years was 12.9 percent and current cigarette use in this group was 6.6 percent. Illicit drug use was approximately 15 times higher in young persons who smoked cigarettes and drank alcohol during the past month (61.1%) than in those who neither smoked cigarettes nor drank alcohol during the past month (4.0%).[4]

Drug-use patterns differ between sex and race or ethnic groups. Males, for example, are more likely than females to have ever used or be current users of all types of drugs, except for ever use of inhalants.[4,6,7] Black and Hispanic students, on the other hand, have a higher rate of having ever used marijuana than white students, with lifetime prevalence reported at 43.0, 42.1, and 37.9 percent, respectively. Cocaine, inhalant, heroin, and methamphetamine use was higher in Hispanic students than white and black students. The use of prescription drugs for nonmedical purposes, on the other hand, was higher in white (22.9%) students than black (14.7%) or Hispanic (19.4%) students. More white (9.3%) and Hispanic (9.1%) students report current use of hallucinogens than black (3.3%) students.[7] There are also slight differences in illicit drug use by the type of county individuals reside in (i.e., urban or rural). Drug use is more common in urban and large metropolitan settings than any other areas.[4]

In 2012, approximately 7,900 individuals age 12 years and older initiated drugs every day, representing an estimated 2.9 million new users per year. Most first-time illicit drug users (55.1%) were younger than age 18 years. The average age at drug use initiation in 2012 was 17 years in 12- to 49-year-olds. In 2012, the majority (65.6%) of those who used illicit drugs for the first time during the past 12 months used marijuana as their first drug. The nonmedical use of

psychotherapeutics was reported by 26.0 percent of new initiates as their first drug used (includes 17.0% with pain relievers, 4.1% with tranquilizers, 3.6% with stimulants, and 1.3% with sedatives). Inhalants were reported as the first drug used by 6.3 percent of new users, and hallucinogens by 2.0 percent of new initiates in 2012.[4]

The rate of illicit drug dependence or abuse in young persons ages 12 to 17 years in 2012 was 4.0 percent, which is a 1.6 percent decline from 2002, when 5.6 percent of 12- to 17-year-olds were diagnosed with substance dependence or abuse. The rate of substance dependence and abuse (alcohol and drugs) was the same for males and females in 2012 (6.1%). Individuals who initiate marijuana use at younger ages (i.e., age 14 years or younger) are more likely to develop drug dependence or abuse as adults than those who initiate marijuana use after age 18 years.[8]

Burden

Drug use is associated with multiple negative health, social, and economic consequences. In 2010, for example, 64 percent of all deaths in young persons ages 1 to 24 years in the United States resulted from three causes: unintentional injuries, including motor vehicle accidents (38%); homicide (13%); and suicide (12%).[9] The use of alcohol and other drugs is the primary health risk behavior that contributes to these leading causes of morbidity and mortality in adolescents and young adults.[7] While experimentation with alcohol or marijuana are often incorrectly regarded as developmentally normative behaviors in adolescents, even infrequent use increases an individual's risk of serious adverse events due to an increase in risk-taking behaviors while intoxicated or impaired. Risky behaviors often do not occur in isolation. Indeed, alcohol, tobacco, and other drug use are commonly associated with other risky behaviors, such as driving under the influence, early and unsafe sexual activity, and interpersonal violence.

In 2009, the Drug Abuse Warning Network estimated that approximately 55,306 emergency department (ED) visits by adolescents ages 12 to 17 years involved illicit drugs (alone or in combination with alcohol and/or prescription drugs).[10] Marijuana (182.2 visits per 100,000 individuals), cocaine (21.4 visits), ecstasy (17.5 visits) and stimulants (15.0 visits) were the most commonly reported illicit drugs that led to an ED visit by children and adolescents. The nonmedical use of prescription drugs was involved in over 66,000 ED visits by children and adolescents, with pain relievers (e.g., opioids) being the most commonly reported substance.

National tracking systems of fatal poisonings capture deaths due to drug use. These systems report that the majority of poisoning deaths are due to illicit and licit drugs (nine out of 10 poisoning deaths for all ages are caused by drugs). From 1999 to 2008, the drug poisoning death rate for the U.S. population ages 15 to 24 years increased from 3.2 per 100,000 to 8.2 per 100,000.[11] Unintentional poisoning deaths (due to drugs and other substances) increased by 91 percent from 2000 to 2009 for those ages 15 to 19 years and by 36 percent for those ages 10 to 14 years.[12]

Drug use can also have deleterious effects on educational achievement and attainment. Cross-sectional and longitudinal studies show that students who dropped out of school or were at risk for dropping out of school had higher rates of marijuana use than students who remained in

school or graduated. Studies that examined the relationship between other nonmarijuana drug use and dropping out of school report mixed results, with some showing that drug use and dropping out of high school are related, while others indicate that the association varies by race/ethnicity and is confounded by other factors.[13]

Risk and Protective Factors

Research has identified multiple risk and protective factors that influence adolescent substance use. Risk factors include substance use by family members (specifically parents and siblings), poor parental supervision and household disruption, low academic performance or aspirations, decreased participation in school activities, poor relationships with teachers, untreated attention deficit hyperactivity disorder, and perceived peer acceptance of substance use and actual use among peers. Protective factors include parents who set clear rules and enforce them, parents who regularly talk with their children about the dangers of substance use, having a parent in recovery, having a positive school climate and a positive sense of community, involvement in religious or other community programs, and having adequate opportunities in the community for prosocial involvement.[14-17]

While not everyone who uses tobacco or alcohol will progress to illicit drug use, tobacco or alcohol use often precedes marijuana and other illicit drug use and the use of one substance can be a marker for the use of others.[18] A recent study found that alcohol use is the first step toward using tobacco and illicit drugs.[19] Marijuana use in adolescents has been linked to illicit drug abuse and dependency and using more types of illicit drugs.[20]

Behavioral Interventions in Primary Care

Preventing and reducing drug use in adolescents is a national priority. Healthy People 2020 substance abuse objectives include increasing the proportion of high school seniors who have never used illicit drugs, decreasing the proportion of young persons who use marijuana for the first time, and decreasing the proportion of adolescents who report using marijuana and nonmedical use of prescription drugs or inhalants.[21]

To reduce the health burden associated with substance use and substance use disorders, the Substance Abuse and Mental Health Services Administration (SAMHSA) recommends that universal screening for substance use, brief intervention, and/or referral to treatment (the SBIRT model) become a part of routine health care.[22] SBIRT is an early intervention approach that targets individuals with nondependent substance use and provides strategies for intervention before the need for more extensive or specialized treatment. Brief interventions, in particular, are well-suited for use in primary care. This approach is a precursor to interventions that focus on specialized treatment of individuals with more severe substance use or those who have met the criteria for a diagnosis of a substance use disorder (i.e., abuse or dependence). Therefore, brief or early intervention is a proactive approach that is initiated by the health care provider rather than the patient.

Among children and adolescents, the term "brief intervention" includes a broad range of clinical activities intended to prevent, delay, or reduce substance use in individuals with varying experience with substances. These activities include positive feedback to nonusers as primary prevention; brief advice as a form of secondary prevention for those at low risk for abuse; or an intervention using motivational techniques directed at reducing use, associated high-risk behaviors, and/or getting a patient to accept a referral to treatment if they are at high risk for or abusing drugs. The SBIRT model for children and adolescents is slightly different than the model applied for adults, in which the focus is on brief, motivational interventions for those identified "at risk" for abuse or dependence. Because any substance use can negatively affect the health of children and adolescents, brief interventions are designed to provide positive reinforcement, brief advice, or brief motivational interventions for youth at all stages of use. According to SAMHSA, a brief intervention usually involves one to five sessions of 5 minutes to 1 hour in duration. These interventions can be delivered via face-to-face sessions, written self-help materials, a computer intervention, or telephone counseling.

The American Academy of Pediatrics has developed specific guidelines through Bright Futures for screening for and counseling about alcohol and illicit substance use. This group specifically recommends that pediatricians provide substance abuse (i.e., alcohol, tobacco, and drug) education and screening to adolescents during routine clinical care, incorporating the SBIRT guidelines designed by SAMHSA.[14,23] Furthermore, it advises that brief counseling and in-office followup may be sufficient if patients report substance use without associated problems and there have been no adverse consequences of substance use. More intense intervention and referral for treatment are indicated, however, when children or adolescents are identified as having experienced adverse events related to their substance use (e.g., injuries associated with acute intoxication, trouble with the law, truancy, decline in school performance, or deterioration in physical or mental health), are regularly using drugs (including the use of more drugs and on a more frequent basis), or are using drugs to "feel normal."[24]

Current Clinical Practice in the United States

Few primary care physicians or their adolescent patients report specifically discussing substance use or drug use. Less than 50 percent of pediatricians report screening their adolescent patients for substance use or abuse in their general pediatric visits.[25] In one survey of adolescent patients, only 35 percent reported discussing substance use with their physicians, although 65 percent wanted to talk about substance use.[26] Difficulties with discussing the issues (e.g., parent present in the examination room), insufficient time, level of physician preparedness, and belief that treatment is not effective are reported as common barriers for not discussing substance use with children and adolescents.[27,28]

Previous USPSTF Recommendation

In 2008, the USPSTF concluded that the current evidence was insufficient to assess the balance of benefits and harms of screening adolescents, adults, and pregnant women for illicit drug use (I statement).

Chapter 2. Methods

Key Questions and Analytic Framework

With input from the USPSTF, we developed an Analytic Framework (**Figure 1**) and three Key Questions (KQs) using the USPSTF's methods[29] to guide the literature search, data abstraction, and data synthesis for this topic. The proposed Analytic Framework and KQs were posted on the USPSTF's Web site for public comment for 4 weeks. We revised the Analytic Framework and KQs based on public comment, with final approval by the USPSTF. We examined the following KQs:

1. Do primary care behavioral counseling interventions for drug use, with or without referral, improve mortality, morbidity, and other health, social, and legal outcomes in children and adolescents?
   a. Do outcomes differ in subgroups (e.g., as defined by age, risk level, sex, race, ethnicity, or types of substances used)?
   b. What are elements of efficacious interventions?
   c. What criteria are used to identify children and adolescents for primary care drug use interventions?
2. Do primary care behavioral counseling interventions for drug use, with or without referral, prevent drug use initiation in children and adolescents who do not currently use drugs or reduce drug use in children and adolescents who currently use drugs?
   a. Do outcomes differ in subgroups (e.g., as defined by age, risk level, sex, race, ethnicity, or types of substances used)?
   b. What are elements of efficacious interventions?
   c. What criteria are used to identify children and adolescents for primary care drug use interventions?
3. What are the adverse events of primary care behavioral counseling drug use interventions?

Data Sources and Searches

In addition to reviewing the two trials specific to children and adolescents that were captured in the 2008 review,[1] we searched MEDLINE, PubMed, PsycINFO, and the Cochrane Collaboration Registry of Controlled Trials for relevant publications through June 4, 2013 and MEDLINE through August 31, 2013 (**Appendix A**). Our searches were restricted to English-language publications published since January 1992. We chose this start date based on a 12-year decline in annual prevalence of adolescent illicit drug use from 1980 through 1992, with a sharp increase in 1993.[6] This shift is referred to as the "relapse phase" in the drug epidemic. We also examined the reference lists of six relevant published reviews or meta-analyses[30-35] and all of our included studies to identify other studies for inclusion. We also conducted grey literature searches of government agencies (e.g., AHRQ, SAMHSA), professional organizations (e.g., American Academy of Pediatrics), and other organizations (e.g., University of Washington Alcohol and Drug Abuse Institute) that sponsor or publish relevant research for synthesized evidence published outside of peer-reviewed journals. In addition, we searched for potentially relevant

ongoing or recently completed studies in children and adolescents through ClinicalTrials.gov (http://www.clinicaltrials.gov/), Current Controlled Trials (http://www.controlled-trials.com), Australian New Zealand Clinical Trials Registry (http://www.anzctr.org.au), and the World Health Organization's International Clinical Trials Registry Platform (http://www.who.int/ictrp.en). We supplemented our searches with suggestions from experts and articles identified through news and table-of-contents alerts from sources such as ScienceDirect (Elsevier, Maryland Heights, MO), HighWire Press (Stanford University Libraries, Palo Alto, CA), and *Pediatrics*.

We managed our literature search results using version 12.0 of Reference Manager® (Thompson Reuters, New York, NY), a bibliographic management software database.

Study Selection

Two investigators independently evaluated 2,253 abstracts for potential inclusion against prespecified eligibility criteria. Of these, we dually reviewed 144 full-text articles for possible inclusion in this review (**Appendix A Figure 1**). Full-text articles that were excluded are listed in **Appendix B**, including the specific reason for exclusion. We resolved reviewer discrepancies through discussion or consultation with the larger project team. Detailed inclusion and exclusion criteria are provided in **Appendix A Table 1** and are discussed below.

We included randomized, controlled trials (RCTs) or controlled (nonrandomized) clinical trials designed to prevent or reduce drug use in children and adolescents (no lower age restriction to 18 years) published in English in or after 1992. We excluded studies conducted in treatment-seeking children or adolescents or those that were mandated or directly referred to substance abuse or dependence treatment via the juvenile justice system, social services, parents, or a similar referral system. We also excluded trials in which more than half of the sample was diagnosed with substance abuse or dependence or a drug use disorder. Included interventions targeted children or adolescents or their parents and were delivered individually or in small groups. We examined trials conducted in primary care or that were potentially feasible to conduct in primary care, with or without referral to specialty treatment services. This included interventions delivered exclusively through electronic media (e.g., Web-based, CD-ROMs) that were not linked to health care. We describe these trials collectively as "primary care–relevant." We excluded trials evaluating the effects of detoxification or medically managed withdrawal, inpatient or residential treatment, and broad public health or policy interventions. Trials had to take place in a primary care setting or ED. Other settings were included, however, if the study was linked to primary care or health care (e.g., recruitment in clinics), such as research clinics/offices, community centers, or participants' homes. We excluded interventions that took place in substance abuse treatment centers, schools, worksites, and other institutions, such as juvenile detention centers, as they were seen as not generalizable to primary care. Studies had to take place in "very high" developed countries as defined by the 2011 Human Development Index of the United Nations Development Programme. Included trials had control arms that offered minimal or no intervention or an attention-control arm. Trials were only eligible if they reported a health, social, legal, or drug use outcome or a harm of the intervention at least 6 months after the baseline assessment. Given the volatile nature of behaviors in youth, outcomes reported at less

than 6 months may not be truly reflective of intervention effects.

Quality Assessment and Data Abstraction

We used predefined criteria developed by the USPSTF to assess the quality of all trials meeting our inclusion criteria.[29] Two investigators independently assessed the quality, resulting in a rating of "good," "fair," or "poor" (see **Appendix A Table 2** for quality criteria). We examined potential risks of bias, including randomization procedures and measurement procedures (including blinding and consistency between groups); comparability of the groups at baseline; overall and group-specific attrition; intervention fidelity and participant adherence; and the appropriateness of the statistical procedures, including methods for handling missing data. In general, a good-quality study employed valid randomization methods, including concealing treatment allocation, included comparable groups at baseline or appropriately adjusted for potential confounders in the analysis, had followup data on 90 percent or more of participants, and used reliable measures of drug use. Trials were rated as "poor" if attrition was greater than 40 percent; attrition in the intervention and control groups differed by more than 20 percentage points; or there were other important flaws, such as noncomparable groups at baseline. Studies that reported 10 to 20 percent differential attrition were categorized as fair. We excluded poor-quality studies from this review. We resolved differences in quality rating through discussion.

After quality rating, we abstracted data from all included studies into a standard evidence table. One reviewer abstracted data from all good- and fair-quality studies and a second reviewer checked the abstracted data for accuracy. We collected the following information for each study, where available: study characteristics (e.g., setting), recruitment methods, and eligibility criteria; study population, including the number of participants included/randomized and demographic characteristics; intervention and control descriptions; followup rates; and outcomes.

Data Synthesis and Analysis

We summarized all included studies in narrative form and summary tables that detail the important features of the study populations, design, intervention, outcomes, and results. We reported the risk ratio and between-group differences that were reported by the included studies, where available. We identified too few trials and too much variability in a number of factors to conduct any pooled analysis. Instead, we conducted a qualitative analysis for all KQs and stratified the results into two groups based on the type of intervention: 1) primary care–based and 2) computer-based. Primary care–based studies recruited directly from or were conducted in primary care clinics. Computer-based interventions only used electronic modes of intervention delivery (e.g., Web-based or CD-ROM) and were not conducted in primary care. We discuss the outcomes for the two groups separately. Within each group, we qualitatively explored patterns of association between group differences and the following factors: the type of intervention, the mode and duration of the intervention, and the substance or substances targeted.

Expert Review and Public Comment

A draft of the Analytic Framework, KQs, and inclusion/exclusion criteria was posted on the USPSTF's Web site for public comment from January 15 to February 11, 2013. We received comments from 14 individuals, including eight individuals providing comments on behalf of their organization. All comments were reviewed and addressed as appropriate. A final research plan was posted on the USPSTF's Web site on May 9, 2013. The full draft report was reviewed by experts and Federal partners from May 31 through June 14, 2013. We compiled and addressed (where appropriate) the comments received from invited reviewers. Additionally, a draft of the full report was posted on the USPSTF's Web site from October 1 through October 28, 2013. A few comments were received during this public comment period; there were no major changes made. All minor, editorial suggestions were addressed as appropriate.

USPSTF Involvement

We worked with four USPSTF liaisons at key points throughout this review, particularly when developing the Analytic Framework, KQs, and scope of the review. The USPSTF liaisons approved the final Analytic Framework, KQs, and inclusion/exclusion criteria after revisions reflecting the public comment period. AHRQ funded this review under a contract to support the work of the USPSTF. An AHRQ Medical Officer provided project oversight, reviewed the draft report, and assisted in the external review of the report.

Chapter 3. Results

Literature Search

We identified six trials meeting our eligibility criteria that examined the effects of primary care–relevant interventions designed to prevent or reduce drug use in children and adolescents. These trials were reported in seven publications.[36-42] Of the 143 full-text articles that were reviewed, the most common reasons for exclusion included the setting (i.e., not linked to or feasible for primary care; k=45), population (i.e., age 18 years or older, treatment seeking, or diagnosed with substance abuse or dependence; k=26), and not reporting any relevant outcomes (k=19) (**Appendix A Figure 1**).

We considered all of the included trials to be primary care–relevant because they were conducted in primary care or were judged to be feasible for primary care. Three of the studies were conducted in or recruited directly from primary care (i.e., "primary care–based"),[38,39,42] while the other three studies all tested the same computer-based intervention that was considered potentially feasible for primary care.[36,40,41] Only one of the studies exclusively targeted drug use behaviors (alcohol use was a secondary outcome).[42] Among the others, three of the six studies targeted alcohol, tobacco, and drug use behaviors. The remaining two studies targeted alcohol and drug use behaviors only. None of the studies addressed long-term behavioral or health outcomes beyond 2 years. **Table 3** and **Table 4** present study and intervention characteristics of all of the included studies.

Key Question 1. Do Primary Care Behavioral Counseling Interventions for Drug Use, With or Without Referral, Improve Mortality, Morbidity, and Other Health, Social, and Legal Outcomes in Children and Adolescents?

Key Question 2. Do Primary Care Behavioral Counseling Interventions, With or Without Referral, Prevent Drug Use Initiation in Children and Adolescents Who Do Not Currently Use Drugs or Reduce Drug Use in Children and Adolescents Who Currently Use Drugs?

Study Characteristics

Primary Care–Based Interventions

Three studies testing four active treatment arms were conducted in or recruited from primary care; they varied greatly in terms of their study population, intervention, outcomes, and quality

(**Tables 3 and 4**).[38,39,42] A fair-quality study conducted by Harris and colleagues published in 2012 was a quasiexperimental design conducted in two sites—the United States and Czech Republic.[38] The study's primary aim was to evaluate the immediate (3-month) and long-term (12-month) effects of a primary care computer-facilitated screening and brief advice system on adolescent alcohol and marijuana use. Within the United States, the study was conducted at nine primary care offices in three New England states (n=2,106). In the Czech Republic, the study included 10 pediatric generalist offices in Prague (n=589). Each site implemented an identical protocol. The study included patients ages 12 to 18 years partaking in routine primary care. At baseline, 12.8 and 14.0 percent of adolescents in the United States and Czech Republic cohorts, respectively, reported any past marijuana use. Baseline reports of ever having used alcohol were higher in the Czech Republic cohort (59.7%) than the U.S. cohort (28.5%). The intervention began with a computer-based, self-administered screening tool that asked adolescents about their lifetime and past-12-month use of substances (i.e., alcohol, marijuana, and "anything else to get high") followed by the CRAFFT (Car, Relax, Alone, Forget, Friends, Trouble) screening questions.[43] Participants were shown their individual CRAFFT score and risk level (low, medium, or high) after completing the screening questionnaire. Participants were then invited to read 10 pages of scientific information and true-life stories about substance use on the computer screen. Adolescents spent 5 minutes on average with the screening and educational computer program. Based on the adolescent's screening results, the provider was given a report that displayed their patient's risk level and six to 10 talking points designed to prompt a 2- to 3-minute brief advice discussion. This advice was tailored to advise the patient to "not start" or "stop" using substances, based on the adolescent's responses to the screening questionnaire. Providers at both sites underwent training to standardize the intervention. Control participants received treatment as usual. Substance use was assessed using a modified timeline follow-back interview that recorded frequency of use of multiple substances. The timeline follow-back interview has been found to have good convergent validity for marijuana use with other measures, including collateral reports from siblings and parents and urine testing,[44] and is a reliable method of quantifying alcohol and marijuana use in adolescents in primary care.[45] Because the frequency-of-use variables were highly skewed, a dichotomized use/no use variable was constructed in which any past-12-month use at the 12-month followup was the primary outcome. Rates of initiation and cessation in baseline nonusers and users, respectively, were also calculated. This study only analyzed marijuana use because of the low prevalence of use of all other drugs (≤2%). Analyses were stratified by country because the two cohorts had different demographic characteristics. The asynchronous design was this study's major threat to validity, as it precluded allocation concealment and blinding of assessors. There was also fairly high attrition among participants in the United States, with 72.4 percent of adolescents providing 12-month data (compared with a 90.4% response rate in the Czech Republic). The validity of the results were strengthened, however, by the relatively large sample sizes (United States: n=2,106; Czech Republic: n=589) and statistical methods, including controlling for demographics, peer/family substance use, visit/provider characteristics, and the multisite sampling design in logistic regression models with generalized estimating equations.

A very small fair-quality RCT conducted by Rhee and colleagues published in 2008 and based in the United States specifically recruited adolescents and young adults ages 14 to 20 years with a current diagnosis of asthma (n=41).[39] This study targeted adolescents with asthma based on data showing that they have higher rates of current smoking and marijuana and inhalant use than

adolescents without asthma—all behaviors which put them at high risk of asthma-related morbidity and mortality. Baseline risk of illicit drug use, alcohol use, and smoking are presented in **Table 5** and **Table 6**. Use of illicit drugs and alcohol appeared to be generally low in participants; however, they were smoking, on average, 6.5 cigarettes per day for the past 30 days. Participants were recruited from rural outpatient clinics and one high school. While the intervention's setting was not reported, we assume it took place in a research center/clinic. The intervention was based on a computer-assisted decisionmaking program that included a brief, 10-minute counseling session conducted by a researcher (a family nurse practitioner) who educated participants about the harmful effects of tobacco, alcohol, and drug use in the context of asthma. The interventionist was able to tailor counseling to the participants' prescribed asthma medications. Additionally, each participant completed two 1-hour computer-based (CD-ROM) educational modules. Module 1 was an interactive decisionmaking module that depicted 17 different decisional situations, including smoking, alcohol, and "street" drug use. Module 2 was a noninteractive risk behavior module including information about smoking and alcohol only. Intervention boosters consisting of repeating the decisionmaking CD-ROM module and a workbook and a new interactive CD-ROM on substance use decisions were mailed at 2 and 4 months, respectively. Participants in the control group were given a sham CD-ROM program ("featuring study skills") that ran for a comparable duration as the intervention modules. Intervention fidelity and participant adherence were also not reported. The Periodic Assessment of Drug Use was administered at baseline and 2-, 4-, and 6-month followup to assess the frequency and amount of smoking, alcohol, and illicit drug use.[46] Illicit drug use risk was constructed by combining the average frequencies of seven types of illicit drugs during the past year, including marijuana; lysergic acid diethylamide (LSD) or other hallucinogens; cocaine/crack; glue or inhalants; tranquilizers; "uppers," such as speed; or "downers," such as sedatives or sleeping pills.[47] The validity, reliability, and responsiveness to change of this surveillance instrument are unknown.[48] After 6 months of followup, 85.4 percent of the sample was retained. In terms of risk-of-bias, it was unclear if allocation to condition was concealed or if outcome assessors were blinded, although several participants completed followup measures online.

The third fair-quality study, conducted by Walton and colleagues and published in 2013, evaluated the effectiveness of two different brief interventions designed to reduce marijuana use and its consequences in adolescents ages 12 to 18 years.[42] All patients visiting one of seven Federally Qualified Community Health Clinics were screened for marijuana use (n=1,146) and subsequently randomly assigned to one of the intervention arms or control if they reported any past-year marijuana use (n=328). Both intervention arms implemented a brief intervention: one was therapist-led (n=118) and the other was computer-based (n=100). The interventions incorporated motivational interviewing and included tailored, parallel content. The therapist-led intervention was facilitated by a research therapist trained in motivational interviewing. The computer-based intervention was a stand-alone interactive program that participants completed on a computer tablet at the clinic. Control group participants (n=110) received a brochure containing information on the harms of marijuana use and resources about substance abuse treatment and other leisure activities. Both interventions took approximately 35 to 40 minutes to administer (therapist-led: mean, 41 minutes; computer-based: mean, 34 minutes).[49] About two thirds of the sample was female, more than 60 percent was African American, and the average age was 16 years. At baseline, 100 percent reported past-year marijuana use (required to be

eligible). More than 90 percent reported having experienced some negative consequence related to their marijuana use and 21 percent reported driving while under the influence of marijuana in the past 3 months. Twenty percent of participants reported other drug use besides marijuana and about half reported alcohol use in the past 3 months. Past-3-month frequency of marijuana and other drug use (i.e., inhalants, cocaine, heroin, other hallucinogens, and the nonmedical use of painkillers/opioids, stimulants, and sedatives) was measured using items adapted from the Add Health survey.[50] Response choices were on a 7-point scale and ranged from 0 = never to 6 = every day or almost every day (see **Table 5** for a full description of the scale). In addition, more than 80 percent of the sample provided a urine drug screen at each time point to determine concordance with the marijuana use self-report measures. Concordance was generally high at baseline (100%), 3 months (96.1%), 6 months (96.8%), and 12 months (98.5%). Given the low rates of discordance and fairly equal distribution of discordance across groups, reported outcomes were based on self-report. Marijuana-related consequences in the past 3 months included 28 items that addressed issues such as interpersonal consequences (e.g., "got in a fight") and symptoms of a substance use disorder (e.g., "kept smoking when you promised yourself not to"). The scale was based on the Rutgers Alcohol Problem index (23 items, 5-point scale) and Severity of Dependence Scale (5 items, 4-point scale), with a range from 0 to 107. A single item on a 5-point scale assessed the frequency of driving under the influence of marijuana in the past 3 months. This study had minimal threats to internal validity; the one concern was somewhat high attrition. At 12 months, 84 percent of the sample provided followup data, with 88, 77, and 86 percent retention in the therapist-led, computer-based, and control groups, respectively.

Computer-Based Interventions

We included three RCTs that evaluated the effectiveness of the same computer-based prevention program for reducing substance use in adolescent girls, reported in four publications.[36,37,40,41] The same group of authors conducted all three studies (**Tables 3 and 4**). The primary differences between the studies were the sample characteristics.

All three studies implemented the same computer-based (i.e., Internet or CD-ROM) intervention designed for mother–daughter dyads. The intervention was based on family interaction theory and intervention objectives for the mothers were to improve communication with their daughters, monitor their daughters' behaviors and activities, build their daughters' self-image and self-esteem, establish rules and consequences for substance use, and create family rituals. For the daughters, the program focused on building skills for managing stress, conflict, and mood; refusing peer pressure; and improving body esteem and self-efficacy. Mother–daughter dyads were asked to work together to complete nine 45-minute (once per week over 9 weeks) interactive sessions in their homes. Participants could not advance to the next program session unless the mother and daughter each answered questions correctly during the prior session. Additionally, only the dyads that had completed all nine program sessions could complete followup measures. Thus, the proportion of dyads that provided followup data reflects participants who had high compliance with the intervention. Two of the studies also included one[36,37] or two[41] 45-minute annual booster sessions that were assumed to also be computer-based and similar in content, although this was not reported. Control group participants received no intervention.

The samples within each study varied in size and demographic factors. The smaller 2009 "pilot" study conducted by Schinke et al,[40] for example, randomized 591 pairs of adolescent girls ages 11 to 13 years and their mothers from three northeastern U.S. states. These pairs were recruited through advertisements posted in local newspapers, online, in subway trains and buses, and broadcast on the radio. Nearly three quarters of the girls were of nonwhite race (48.9% African American and 24.7% Latina). The larger (n=916) 2009 study by the same authors also included pairs of adolescent girls ages 11 to 13 years and their mothers recruited similarly from the same three U.S. states.[41] Similarly, just over three quarters of the girls were of nonwhite race (40.6% African American, 23.1% Latina, 10.8% Asian, and 1.7% other). These two studies utilized two distinct samples within the same time frame.[51] In comparison, the study lead by Fang et al exclusively recruited and randomized 108 Asian American girls ages 11 to 14 years and their mothers within 19 U.S. states.[36,37] Approximately one fifth of the girls and over half of the mothers were born outside of the United States.

All three studies used the American Drug and Alcohol Survey self-report instrument to measure girls' substance use at baseline and followup (**Tables 5 and 6**).[52] This instrument has been shown to have an internal consistency of 0.72 to 0.94,[41, 40] although no data on its validity or sensitivity to change has been published. All measures were administered online. In terms of substance use, all three studies measured the number of "use occasions" in the past 30 days in which girls had used marijuana, prescription drugs for nonmedical purposes, alcohol, and cigarettes. One study also reported past-30-day use occasions of inhalants.[41] A use occasion score of 1.0 indicates a single use occasion of the respective substance in the past 30 days. At baseline, the number of use occasions for all substances was less than 1, indicating very low use, except for one study[41] that reported 1.16 mean use occasions of alcohol and 1.03 mean use occasions of cigarettes at baseline (**Table 6**). These studies did not report the prevalence of use in participants.

Two of the studies were rated good quality[36,41] and the other was rated fair quality.[40] While all three studies had more than 90 percent sample retention at 6 to 12 months, the one study rated as fair had more than 15 percentage points differential attrition between groups (i.e., retention in the intervention group at 12 months was 81.3%, whereas it was 96.5% in the control group).[40] Two studies reported statistically significant differences in demographic characteristics or substance use behaviors between the groups at baseline, but both controlled for these differences in the analysis.

Summary of Results

Four of six trials reported some type of health outcome and findings were modest, mixed, or otherwise limited. One fair-quality, primary care–based study found no effects of either a therapist-led or computer-based brief intervention on self-reported marijuana-related consequences or driving under the influence of marijuana compared with the control group at 6 or 12 months. Each of the three trials of the computer-based intervention reported depression outcomes, and only one found greater improvement in the intervention group compared with the control group at 6 months only. All six trials reported some type of substance use outcome. Four of the five studies reporting marijuana use found statistically significant differences in favor of the intervention group compared with the control group. The three computer-based trials also

reported differences in nonmedical prescription drug use occasions. Individual studies reported additional substance use outcomes with mixed results. No studies reported on harms of the interventions.

Detailed Results

Morbidity, Mortality, and Other Health, Social, and Legal Outcomes (KQ 1)

One primary care–based study[42] and all three computer-based studies[36,37,40,41] reported health outcomes from behavioral interventions to decrease substance use. In the primary care–based study by Walton and colleagues, the number of marijuana-related consequences significantly decreased in participants receiving the computer-based intervention at 3 and 6 months, while participants in the therapist-led group showed statistically significant decreases at 6 and 12 months; there were no significant decreases seen in the control group.[42] No statistically significant group-by-time interactions were seen at 6 or 12 months for either the computer-based or therapist-led groups compared with the control group (**Table 7**).

All three computer-based studies compared differences in levels of depressed mood between the intervention and control groups at baseline and followup (**Table 8**).[36,37,40,41] In one study, the intervention group reported less depressed mood than the control group at 6 months (p=0.045). This finding, however, did not hold true over 2 years.[36,37] The other two studies did not find statistically significant differences between groups. No studies reported other health, social, or legal outcomes that might relate to drug use in children and adolescents, such as drug-related injuries or accidents, other risky behaviors (e.g., unprotected sex), educational attainment, or impaired driving.

Behavioral Outcomes (KQ 2)

Table 5 presents the results of each study according to the specific drug use outcome. The specific outcome measure varied across the studies. Four of the six studies found statistically significant differences in marijuana use at 12 to 24 months favoring the intervention group over the control group.[36-38,40,41] In the cohort of U.S. adolescents in the study conducted by Harris and colleagues, there were lower rates of any marijuana use and marijuana initiation in intervention participants compared with control participants and higher rates of cessation at 12 months. These differences, however, were not statistically significant (**Table 5**). In contrast, in the Czech Republic cohort, 17.0 percent of participants in the intervention group reported past-12-month use of marijuana compared with 28.7 percent of control participants (risk ratio [RR], 0.47 [95% confidence interval [CI], 0.32 to 0.71]; p<0.05) at 12 months, after adjusting for multisite sampling; baseline past-12-month use; age; sex; parent education level; type of health care visit; perceived parent, sibling, and peer substance use; provider sex; and connectedness to provider.[38] Similarly, statistically significantly fewer adolescents in the intervention group reported initiating marijuana use during the past 12 months compared with those in the control group who initiated marijuana use (9.7% vs. 20.5%; RR, 0.47 [95% CI, 0.29 to 0.76]; p<0.05). Likewise, more participants in the intervention group reported quitting marijuana use (39.5% vs. 19.4% in the intervention vs. control groups, respectively; RR, 2.53 [95% CI, 1.06 to 6.05]; p<0.05). The study by Rhee did not find that the intervention had a statistically significant effect on the mean

illicit drug use risk score in adolescents with asthma at 6 months.[39] In the Walton study, all three conditions showed significant decreases in the frequency of marijuana use over time; however, group-by-time interactions were not significant for marijuana use frequency for either the therapist-led or computer-based interventions. Regarding the frequency of other drug use, there was a significant effect of the computer-based intervention at 6 months, but not 12 months; there was no effect of the therapist-led intervention on other drug use at any time point.[42]

All three computer-based studies found statistically significant group-by-time effects in favor of the intervention in the number of marijuana use occasions in the past 30 days. As shown in **Table 5**, while marijuana use tended to increase in both the intervention and control groups over time, there was a statistically significant time-by-condition effect at 12[40] and 24 months.[37,41] Use occasions remained generally low for marijuana and inhalant use (i.e., <1.0 occasion per month) in both groups; however, instances of prescription drug use for nonmedical purposes increased at 12 months (1.6 use occasions) and 24 months (3.6 use occasions) in the control group in the study of Asian American girls.[36,37]

The three computer-based studies all reported statistically significant changes from baseline to 1- and 2-year followups favoring the intervention group over the control group in reduced nonmedical use of prescription drugs.[37,40,41] Use occasions of prescription drugs were generally higher than marijuana for all three samples, although use was still generally low (range, 0.09 to 0.64 at baseline across groups). In all three studies, use occasions of prescription drugs decreased in the intervention group over time, whereas use increased in the control group. One of the studies[41] also found that the intervention group reported fewer occasions of inhalant use than the control group ($p<0.024$).

Results related to alcohol use were generally consistent with the marijuana use outcomes (**Table 6**). All three computer-based studies found that girls receiving the intervention reported significantly fewer instances of using alcohol compared with girls in the control group.[37,40,41] The study conducted by Harris and colleagues reported statistically significantly less alcohol use and initiation in adolescents in the intervention group compared with the control group in the U.S. cohort, and no significant differences among the adolescents in the Czech Republic. Interestingly, rates of any alcohol use in the Czech Republic were more than double the rates in the United States (59.6% vs. 28.5%).[38] The recent study by Walton and colleagues[42] found no effect of either intervention on past-3-month alcohol use frequency at any time point, and the study by Rhee also found no group differences for alcohol use outcomes after the intervention.[39] None of the four studies that reported cigarette use found a statically significant positive effect of the intervention.

Subgroup Differences (KQs 1a, 2a)

No data were found to explore whether some subpopulations benefited more from drug use interventions than others. Three of the four studies that found positive effects for marijuana use only included younger girls (ages 11 to 14 years); one of these studies only included Asian American girls and the other two included racially diverse samples. None of the studies explored the effects of the intervention based on the participants' ages, risk level, or types or frequencies of substances used.

Elements of Efficacious Interventions (KQs 1b, 2b)

We qualitatively examined a number of specific intervention characteristics (e.g., computer-assisted interventions, hours of contact, role of primary care provider, individual targeted) and study design issues (e.g., measurement of drug use) to see if they were associated with effect size. All four studies that found positive effects for marijuana use included a computer-based intervention component; three of the four studies tested the same nine-session computer-based program that was completed by mother–daughter dyads. The other study utilized a computer-based screening and educational module followed by brief provider advice during one primary care visit. Given the small number and heterogeneity of included interventions, however, we do not believe there is a clear pattern that explains why some trials had beneficial effects and others did not.

Screening Criteria (KQs 1c, 2c)

Only one study screened participants for their history of drug use prior to enrolling them in the study. In this study, only adolescents who reported any past-year marijuana use were included. Adolescents who reported never using marijuana were enrolled in a prevention study. The three computer-based studies relied on volunteer samples recruited from the community and set no criteria for current or past drug use for eligibility to enroll in the trial.

Key Question 3. What Are the Adverse Events of Primary Care–Relevant Behavioral Counseling Drug Use Interventions?

We identified no studies that reported adverse events related to interventions to reduce illicit drug use or nonmedical use of prescription drugs in children and adolescents.

Chapter 4. Discussion

Summary of Evidence

We conducted this systematic review to assist the USPSTF in updating its 2008 recommendation on screening and interventions for drug misuse in children and adolescents. Our review included six primary care–relevant studies examining the benefits of interventions designed to reduce substance use, including the use of illicit drugs or the nonmedical use of prescriptions drugs in children and adolescents who are not seeking or identified as needing treatment. While three of these studies were conducted in or recruited directly from primary care, they varied in the populations they included. One study was conducted in primary care pediatric patients in the United States and Czech Republic, one study was conducted in adolescents with a diagnosis of asthma, and one study was conducted in adolescents recruited from primary care who reported past-year marijuana use. The three remaining studies were all performed by the same set of authors and tested the same computer-based intervention in mother–daughter pairs recruited through newspaper and other media advertisements. Only one of the studies focused on marijuana use specifically. The remaining studies targeted substance use more broadly—focusing on reducing alcohol, drug, and, in some cases, tobacco use. The six included studies were generally of fair methodological quality, with various threats to internal validity.

Table 9 presents an overall summary of the evidence. The included studies presented minimal evaluation of health, social, and legal outcomes. One study found no differences in the frequency of marijuana use–related consequences or driving while under the influence of marijuana; none of the computer-based studies found less depressed mood in the intervention group compared with the control group at 12 or 24 months. None of the other studies reported on other health, social, or legal outcomes, such as drug-related injuries or accidents, other risky behaviors, or educational attainment. It is not surprising that these studies omitted these outcomes, given that the interventions focused on samples of children and adolescents who reported low levels of drug use in general. Such problems might be more prevalent in a population of adolescents with more problematic use, including drug abuse or dependence.

Four of the five studies that measured marijuana use before and after the intervention found greater benefit in the intervention group than the control group. The three computer-based studies reported marijuana outcomes as drug "use occasions" during the past 30 days, an uncommon summary measure that is difficult to interpret clinically. At 12 months, the range of use occasions was 0 to 0.10 in the intervention groups and 0.11 to 0.20 in the control groups, where a score of 1.0 indicates a single use occasion during the past 30 days. These three studies also found that use occasions of prescription drugs decreased in the intervention group over time, whereas use increased in the control group. One of the studies also found favorable outcomes in occasions of inhalant use. None of the studies reported adverse events related to the intervention.

Screening for Drug Misuse

Only two of the included studies employed a screening tool to determine whether or not

adolescents were at risk of substance misuse and were candidates for the intervention.[38,42] In the Walton study, adolescents were only eligible for the intervention if they reported using marijuana at all in the past year based on one screening question. In another study,[38] the intervention began with participants completing a computer-based self-administered screening questionnaire that asked about lifetime and past-12-month substance use followed by the CRAFFT screening instrument. If youth reported no previous substance use, they were directed to the question about riding in a car with someone under the influence. The CRAFFT results were used as the basis for the individually-tailored brief advice from the provider.

The CRAFFT instrument was developed specifically for adolescents.[43] The content and structure are provided in **Figure 2**. It is a six-item screening instrument that covers alcohol and other substance misuse. It is currently recommended for use by the American Academy of Pediatrics to screen for misuse of alcohol and other drugs.[23,53] It is a brief screen, taking only 1 to 2 minutes to administer, and can be administered as an interview, self-report, or computerized (the latter two methods being preferred by adolescents).[54] Each "yes" response in Part B scores 1 point. A total score of 2 or higher is considered a positive screen, indicating the need for further assessment. The higher the CRAFFT score, the higher the probability of a diagnosis of substance abuse or dependence.[43,55]

A systematic review of the psychometric properties of the CRAFFT instrument conducted by Dhalla et al presents a comprehensive summary of its validity and reliability in adolescents and young adults.[56] Across the 12 studies included in this review, CRAFFT was found to be applicable to the range of alcohol and other drug misuse problems in adolescence, from emerging problem use to abuse and dependence. The optimal cutoffs ranged from 1 or greater or 4 or greater, depending on the patient population and setting. Sensitivities ranged from 0.61 to 1.00 and specificities from 0.33 (in sexually transmitted disease clinic patients) to 0.97. Criterion measures varied and included clinical and structured interviews. Internal consistency and test-retest reliability were also examined. In adolescent primary care patients, the intraclass correlation coefficient for the lifetime and past-year CRAFFT total score was 0.93 and 0.91, respectively, at 1 week, indicating high test-retest reliability. The past-year CRAFFT score in particular had high test-retest reliability regardless of age or sex, and is the version recommended for screening.[45]

Besides the CRAFFT screening tool, very few screening instruments that include questions on drug use have been developed and tested specifically in children and adolescents. Most screening instruments include questions about alcohol and/or tobacco use in addition to drug use (also known as "conjoint" screens) or are modifications of validated alcohol screening instruments. The CRAFFT items were developed from the longer Problem-Oriented Screening Test for Teenagers (139 items, self-administered),[57] the Drug and Alcohol Problem Quickscreen (30 items, self-administered),[58] and the Relax, Alone, Friends, Family, Trouble (RAFFT) questionnaire (five items, not validated in adolescent populations).[59] The Simple Screening Instrument for Alcohol and Other Drug Abuse has also shown good internal consistency and test-retest reliability in adolescents receiving care at an adolescent/young adult medical practice.[60] The Alcohol and Drug Abuse Institute at the University of Washington houses a virtual, searchable database of substance use screening and assessment instruments that lists the details of over 900 instruments (available at http://lib.adai.uw.edu/instruments/). Additionally, there are

a number of screening instruments available to identify substance misuse or a substance use disorder in adults that have been described elsewhere.[2,61]

Limitations of the Review

This review has a number of limitations, some of which are related to the body of evidence and some that are related to our approach. As was evident, we were able to include very few studies that were primary care–relevant and tested the effects of a behavioral intervention designed to reduce drug use in youth not meeting diagnostic criteria for drug abuse or dependence. The majority of the literature in this area was not relevant to our review, as it relates to the effectiveness or comparative effectiveness of drug abuse and dependence treatment in specialty outpatient settings, which is outside the primary care focus of this review. The majority of these adolescents were mandated to attend treatment by the criminal justice system or by their parents. An example of this type of study is the Cannabis Youth Treatment study, which found that motivational enhancement therapy plus cognitive behavioral therapy, adolescent community reinforcement approach, and multidimensional family therapy were all effective in increasing days of abstinence from marijuana and the percent of adolescents in recovery.[62-64]

We found minimal evidence on reducing drug use in general U.S. primary care samples. One study specifically enrolled adolescents with asthma and three studies included only girls. Only two studies included screening for drug use. There were no studies that specifically addressed youth who are misusing or identified as having harmful use that had not yet progressed to abuse or dependence (i.e., "at risk"). Therefore, the available evidence offers little direction for a provider seeking to treat a drug-using adolescent to prevent progression to a drug disorder. The included studies enrolled adolescents regardless of their current and past drug use, except for one study that only enrolled adolescents who reported past-year marijuana use. Given the low prevalence of drug use in the samples, one can presume that the majority of youth were not using drugs or had very low use, while a few individuals could be progressing toward more harmful use. Only one study appears to have tailored the intervention based on the adolescents' reports of their past-12-month drug use and associated risks.[38] Because we did not include studies of drug abusing or dependent adolescents, we did not examine the role that primary care–based interventions can play in helping to identify and refer these patients to specialty care. To our knowledge, there are no studies in youth that test the full SBIRT model for problematic drug use—that is, screening and brief intervention or treatment with or without referral. There are a number of trials underway for adults that address components of the SBIRT model (such as http://clinicaltrials.gov/ct2/show/NCT00876941?term=saitz&rank=1).

The scope of this report was limited to studies that were deemed to be relevant to primary care settings. As such, we only included studies that were linked to primary care or could be feasibly administered within primary care or the health care system. Other health care settings, schools, and juvenile and social system settings may also offer opportunities to provide behavioral interventions to reduce drug use in children and adolescents. While we would have included studies conducted in EDs, no studies that took place in an ED met all other eligibility criteria. One study in particular, conducted by Bernstein and colleagues,[65] tested the effects of screening and brief intervention for youth and young adults ages 14 to 21 years presenting to the pediatric

ED. All patients visiting the ED were invited to participate in the study and screened for early use of marijuana. Eligible participants were randomized to the control or intervention (n=210) group—a 20- to 30-minute structured conversation delivered by a peer educator in addition to written materials and booster telephone calls. At the 12-month followup, 45 percent of those in the intervention group reported being abstinent from marijuana use compared with 22 percent of the control group (odds ratio, 2.89 [95% CI, 1.22 to 6.84]; p=0.014). This study was not included in our evidence synthesis because the majority of patients were age 18 years and older and the study's results were not stratified by age.

We also excluded studies that did not include followup data at 6 months or longer given their limited generalizability on persistent behavioral or health effects. There were, however, a few relevant studies that reported outcomes at 3 months. For example, a study by D'Amico and colleagues[66] evaluated the effect of a brief motivational interviewing intervention on alcohol and drug use for high-risk adolescents in a primary care clinic (85.7% Hispanic/Latino). At the 3-month followup, adolescents in the intervention group reported statistically significantly less marijuana use than adolescents assigned to usual care. These preliminary results show promise; there is a need to replicate this study as part of a larger trial with longer-term outcomes.

We excluded one study because it was rated as poor quality.[67] In this study, pregnant adolescent girls were recruited from two regional health clinics in the United States (n=212) to participate in a self-administered series of eight print educational modules about prenatal health prior to each prenatal visit or a usual care control group. Within the eight modules, two appear to have focused on drug use during pregnancy. Following each module, the girls met with a trained health worker to discuss the educational module. Medical outcome data related to maternal mortality and morbidity and a number of birth outcomes (e.g., prematurity, birth defects, and birth weight) were compared among intervention and control groups at approximately 5 to 7 months postbaseline assessment. Rates of maternal anemia and sexually transmitted diseases were statistically significantly higher in the control group than in the intervention group. Given the large number of comparisons made (n=25), however, it is unclear whether these differences reflect random variability or reliable differences. Additionally, the biological plausibility of these outcomes is questionable given the low prevalence of drug use by the girls. It is unlikely that the differences seen in the rates of anemia and sexually transmitted disease are due solely to exposure to the intervention and subsequent substance use. Other confounding factors, such as the girls' socioeconomic, nutrition, and relationship status, may have had an influence on these health outcomes. This study found no differences in the proportion of girls who used marijuana or cocaine in the past 5 months at approximately 5- to 7-months followup. There were a number of threats to internal validity with this study. First, participants were assigned to their given treatment group based on their county of residence; thus, allocation concealment was not possible. The length of followup was not explicitly stated and was assumed to vary across participants. The analysis appears to have been conducted in study completers only, and there was no attempt to impute missing data. Additionally, it was unclear if the analyses controlled for baseline differences. There were also several statistical comparisons made for maternal and birth outcomes, as well as behavioral outcomes, so it is not clear if the differences shown reflect random variability or reliable differences in the outcomes.

Studies were generally not designed to assess the effects of the interventions on health, social,

and legal outcomes and did not evaluate long-term effects. Instead, these studies primarily focused on behavioral outcomes. All of the studies relied on self-reported measures of substance use in which social desirability bias may be of concern. The available studies also used inconsistent measures of drug use, which makes direct comparisons across studies difficult. The three computer-based studies that all found significant effects relied on a self-reported measure of marijuana, prescription drug, and inhalant drug use occasions, which has limitations in its ease of recall by participants and limited clinical applicability. Additionally, there is a concern with this group of computer-based studies that involved the same group of investigators. While replication is an important component for validating and improving the accuracy and precision of effects, there is a concern that study replication among the same team of researchers may lead to spurious confirmation of effects due to group allegiance and other biases.[68] There is a clear need to continue replication of this intervention among other teams of investigators and using more sensitive measures of drug use.

The lack of research on behavioral interventions, with or without screening or referral, is likely heavily influenced by ethical and logistical issues related to including children as human subjects. Assent from the child and parental or legal guardian permission are required, which may influence recruitment.[69] Youth may have little interest in participating in a research study if they perceive that their parents might learn about their substance use, regardless of any assurances of confidentiality by the research team.

Applicability

Although all six trials were conducted completely or partially in the United States, these trials only have limited applicability to child and adolescent patients typically seen in U.S. primary care. Only half of the trials included boys, and one of these was limited to children with asthma. The three trials conducted exclusively in girls had no connection to a health care system and involved broad-based recruitment primarily targeting mothers (e.g., through Craigslist and other media announcements). The mothers in these trials likely had higher levels of motivation to participate than may be typical in primary care settings.

Although all of the included interventions are applicable to primary care, only half of the studies were tested in primary care. Only one trial involved a primary care physician in the intervention.[38] In the others, a research-hired family nurse practitioner[39] or trained research therapist[42] provided the intervention, or it was solely computer-based.[36,40,41]

Two trials in particular had good applicability to U.S. primary care.[38,42] These two trials recruited participants from primary care, the interventions were conducted in primary care, and in one, the primary care provider delivered part of the intervention. While both trials addressed marijuana and alcohol use, neither of the interventions reduced marijuana use in participants in the United States (although one was effective in adolescents in the Czech Republic).

Future Research Needs

We have a number of suggestions for areas of future research based on this review. Since there were a small number of studies of good methodological quality that examined the effectiveness of primary care–relevant interventions, there is a substantial need to design and replicate promising interventions in well-controlled trials in larger, more representative samples of children and adolescents. This research would include involving more diverse samples of children and adolescents (e.g., boys and girls, with or without preexisting health conditions, of varying ages and socioeconomic status). Given the limited number of studies, we were not able to answer any of the subkey questions on the effectiveness of interventions on subgroups or the elements of efficacious interventions. Additionally, while we deemed the three computer-based studies to be feasible and applicable to primary care, research is needed to test this particular intervention and other computer-based interventions in primary care populations using outcomes with clear clinical meaning. If these interventions were offered on a Web-based platform, clinicians could conceivably refer their patients to the program and then use their face-to-face time to check in and reinforce important messages. As noted below, there appear to be a number of ongoing studies in the area that capitalize on this technology, including screening and administering brief interventions via electronic mediums. There is also a need for standardization of outcome measures and followup times to allow for more direct comparisons and quantitative synthesis.

This body of evidence focused on relatively low-risk adolescents. There is a need for more research on screening and brief interventions in primary care for high-risk adolescents, including those with problematic use or abuse. Stand-alone motivational interventions delivered in primary care may have the potential to treat problematic use and also may help facilitate adolescents to accept referrals to additional treatment. In addition, to our knowledge, there has been no attempt to comprehensively review and synthesize the evidence on screening and interventions for all substances (i.e., drug, alcohol, and tobacco use). Given the similar risk factors, prevalence, and natural history of these respective substances, it is likely that interventions designed to prevent or reduce their use would employ similar strategies. Brief motivational interventions, such as motivational interviewing and interventions based on the 5 A's (Ask, Advise, Assess, Assist, and Arrange), show promise for preventing and reducing alcohol and tobacco use in adolescents and are the mainstay of the SBIRT model for substance use in adults. Future research should focus on high-risk adolescents and motivational interventions that target and are tailored for all substances. Given the volatile nature of adolescents' behavior and the biological, psychological, and social transformations that happen during this developmental phase, research evaluating regular screening and brief advice about all risky behaviors is warranted.

The results of our review are consistent with those of a related systematic review recently published on the SBIRT model for adolescent drug and alcohol use.[70] This review included RCTs examining one or more SBIRT components (e.g., screening, brief intervention [≤3 sessions], or referral to treatment) in participants ages 12 to 22 years. Despite including a wider range of settings (i.e., primary care, EDs, schools, and other community settings), only 13 studies were included and the majority of studies addressed brief interventions for alcohol use in adolescents seeking care in EDs. No included studies reported on the referral to treatment process for those individuals identified as needing additional care and no studies addressed the

full spectrum of SBIRT. This review found promising findings for brief interventions in primary care (based on one study not included in our review[66]) and universal screening within schools for substance use.

The next update for this topic could have access to substantially more literature, particularly if combined with studies focused on alcohol and tobacco. We identified 20 ongoing trials with potential relevance to this review (**Appendix C**). Although four appear to be completed, with plans to publish results prior to this review search period, no related publications were identified upon manual searching. The remaining studies appear to be ending within the next few years (2014 to 2016) or are ongoing. Most of these studies target adolescents and/or young adults and include screening and brief intervention to decrease substance use. Several of these studies appear to include Web-based or electronic screening and focus on marijuana use specifically. One study in particular in the developmental phase being conducted by The Center for Adolescent Substance Abuse Research at Children's Hospital of Boston has developed a computerized version of motivational enhancement therapy called "VYou." It includes eight interactive exercises that encourage high-risk youth to consider how using substances affects their values and goals, the pros and cons of using, and negative consequences of use they have experienced, and guides them through the process of developing a plan to change their use (http://www.ceasar.org/isbirt/).[71] Patients coming to a primary care office are screened and the provider asks those with substance use to complete the program in two separate sessions on a personal computer via connection to a secure Web site. When the patient completes a session, the provider gets a notice, goes into the site, reviews what the patient did, and sends them a secure e-mail giving feedback on their responses.[72] The same group of investigators has another trial underway that also looks particularly relevant.[73]

Five of the other ongoing studies include parent-focused interventions to strengthen parent-child communication, coping with parental stress, and parental monitoring of risky behaviors. Three studies target adolescents with chronic medical or mental health conditions. Considering all substances together appears to be a trend in much of the screening and in-process literature.

Response to Public Comments

A draft version of this evidence report was posted for public comment on the USPSTF Web site from October 1 to October 28, 2013. We received comments from three unique organizations. All comments were reviewed and considered. There were no new substantive issues brought up during the public comment period that were not previously raised and resolved. However, we clarified a few details on our methods. Several comments made by one organization referred to the need for more primary research on brief interventions for high-risk adolescents and interventions that take place in schools and colleges. The latter studies are considered outside of the USPSTF's scope. Therefore, no additional studies were included and no comments on the need for this research were incorporated into the final report.

Conclusion

The evidence on the effectiveness of primary care behavioral interventions to reduce drug use in adolescents is limited in quantity, quality, and generalizability. Computer-based interventions that are self-administered in the home at convenient times and involve parents and adolescents show promise; however, youth who are actively using drugs or have problematic use were not well represented in the included trials and primary care–based interventions were generally not effective. Applicability to U.S. primary care settings is also limited. We found no evidence of the adverse events of these interventions.

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Figure 1. Analytic Framework

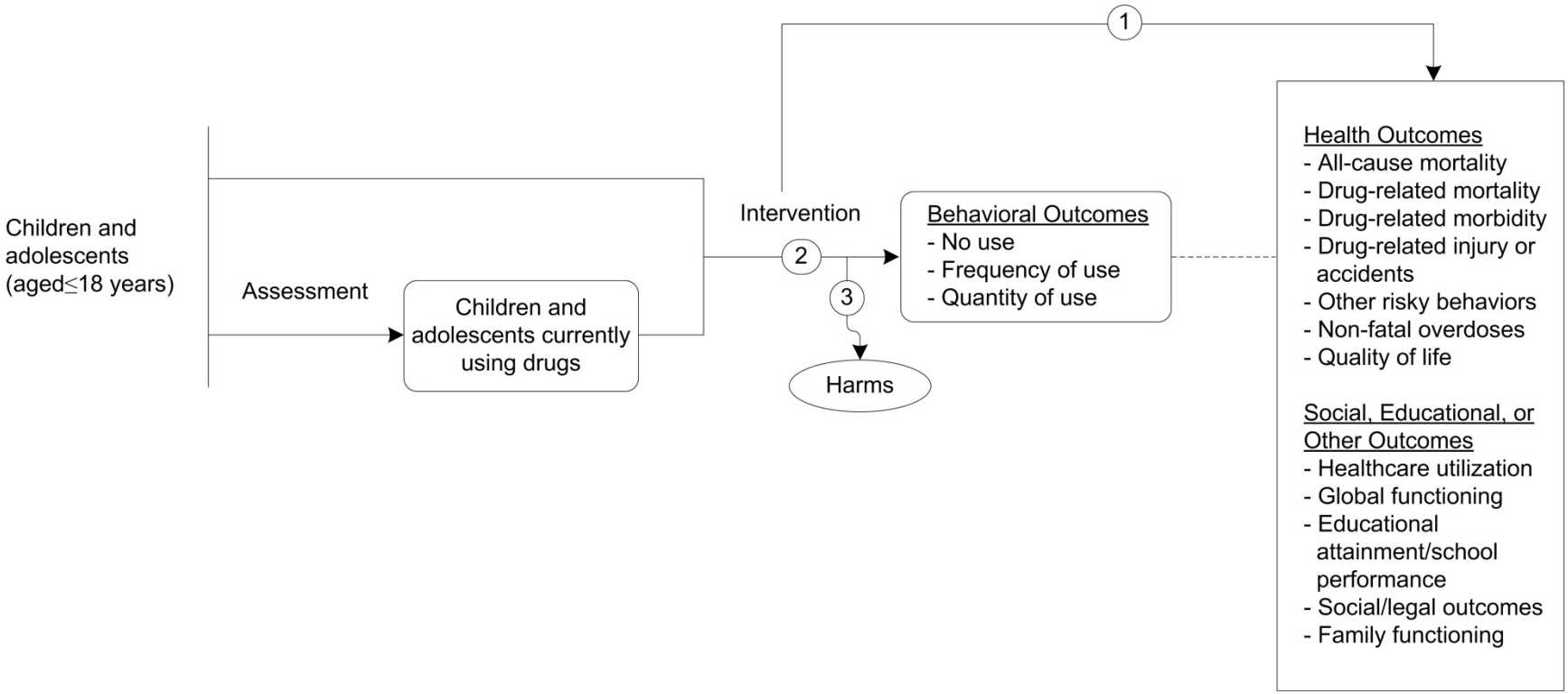

Figure 2. CRAFFT Screening Interview

Begin: "I'm going to ask you a few questions that I ask all my patients. Please be honest. I will keep your answers confidential."

Part A

During the PAST 12 MONTHS, did you:	**No**	**Yes**
1. Drink any alcohol (more than a few sips)? (Do not count sips of alcohol taken during family or religious events)	☐	☐
2. Smoke any marijuana or hashish?	☐	☐
3. Use *anything else* to *get high*? ("anything else" includes illegal drugs, over the counter and prescription drugs, and things that you sniff or "huff")	☐	☐

For clinic use only: Did the patient answer "yes" to any questions in Part A?

No ☐ ▼ **Ask CAR question only, then stop**

Yes ☐ ▼ **Ask all 6 CRAFFT questions in Part B**

Part B

	No	**Yes**
1. Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
2. Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?	☐	☐
3. Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?	☐	☐
4. Do you ever **FORGET** things you did while using alcohol or drugs?	☐	☐
5. Do you **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?	☐	☐
6. Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?	☐	☐

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Table 1. Stages of Substance Use in Children and Adolescents

Stage of use	Description
No use/abstinence	The time before an individual has ever used drugs or alcohol (more than a few sips)
Experimentation	The first 1 to 2 times that a substance is used and the adolescent wants to know how intoxication from using a certain drug(s) feels (sometimes also refers to extremely infrequent or nonpersistent use)
Limited use	Use together with ≥1 friends in relatively low-risk situations and without related problems; typically, use occurs at predictable time, such as on weekends
Problematic/harmful use	Use in a high-risk situation, such as when driving or babysitting; use associated with a problem such as a fight, arrest, or school suspension; or use for emotional regulation, such as to relieve stress or depression
Substance abuse	Drug use associated with recurrent problems or that interferes with functioning, as defined in the DSM-IV-TR. A maladaptive pattern of substance use leading to clinically significant impairment or distress as manifested by one (or more) of the following, occurring within a 12-month period: 1. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (such as repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; or neglect of children or household) 2. Recurrent substance use in situations in which it is physically hazardous (such as driving an automobile or operating a machine when impaired by substance use) 3. Recurrent substance-related legal problems (such as arrests for substance-related disorderly conduct) 4. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (for example, arguments with spouse about consequences of intoxication and physical fights)
Substance addiction (dependence)	Loss of control or compulsive drug use, as defined in the DSM-IV-TR as “dependence.” A maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by three (or more) of the following, occurring any time in the same 12-month period: 1. Tolerance, as defined by either of the following: a) A need for markedly increased amounts of the substance to achieve intoxication or the desired effect or b) Markedly diminished effect with continued use of the same amount of the substance 2. Withdrawal, as manifested by either of the following: a) The characteristic withdrawal syndrome for the substance or b) The same (or closely related) substance is taken to relieve or avoid withdrawal symptoms 3. The substance is often taken in larger amounts or over a longer period than intended 4. There is a persistent desire or unsuccessful efforts to cut down or control substance use 5. A great deal of time is spent in activities necessary to obtain the substance, use the substance, or recover from its effects 6. Important social, occupational, or recreational activities are given up or reduced because of substance use 7. The substance use is continued despite knowledge of having a persistent physical or psychological problem that is likely to have been caused or exacerbated by the substance (for example, current cocaine use despite recognition of cocaine-induced depression or continued drinking despite recognition that an ulcer was made worse by alcohol consumption)
Secondary abstinence	Maintenance of abstinence or re-establishing abstinence after substance relapse

Adapted from Levy SJ, Kokotailo PK. Substance use screening, brief intervention, and referral to treatment for pediatricians. *Pediatrics*. 2011;128(5):e1330-40.[23]

Table 2. Current (Past Month) Illicit Drug, Alcohol, and Cigarette Use, 2011 National Survey on Drug Use in Health

Illicit drug	All adolescents (12–17 years)	Male adolescents (12–17 years)	Female adolescents (12–17 years)	12–13 years	14–15 years	16–17 years
Any illicit drug	10.1	10.8	9.3	3.3	9.2	17.2
Marijuana	7.9	9.0	6.7	1.3	6.7	15.1
Nonmedical use of any psychotherapeutic (pain relievers, specifically)	2.8 (2.3)	2.4 (1.9)	3.2 (2.6)	1.3 (1.1)	2.6 (NR)	4.2 (NR)
Cocaine	0.3	NR	NR	NR	NR	0.5
Hallucinogens	0.9	NR	NR	NR	0.8	1.6
Inhalants	0.9	NR	NR	1.0	0.9	0.7
Alcohol	13.3	13.3	13.3	2.5	11.5	25.3
Cigarettes	7.8	8.2	7.3	1.4	6.0	15.4

Abbreviation: NR = not reported.

Table 3. Study Characteristics of Included Trials

Author, Year Quality Rating	Country, Intervention Setting	Study Design	IG N Enrolled/ Randomized	CG N Enrolled/ Randomized	F/U, m*	% F/U	Key Eligibility Criteria	Age Range (mean), years	% Female	% Nonwhite
Primary care–based										
Harris, 2012[38] Fair	U.S., primary care practices	CCT	1,031	1,075	12	72.0	Patients ages 12–18 years arriving for routine primary care	12–18 (15.8)	58.2	35.4
	Czech Republic, primary care practices	CCT	292	297	12	90.0		13–17 (15.0)	47.2	0
Rhee, 2008[39] Fair	U.S., research center	RCT	20	21	6	85.4	Current diagnosis of asthma by health care provider	14–20 (16.1)	68.3	31.7
Walton, 2013[42] Fair	U.S., primary care clinics	RCT	TBI: 118 CBI: 100	110	12	83.8	Patients ages 12–18 years reporting past-year marijuana use	12–18 (16.3)	66.5	60.7
Computer-based										
Schinke, 2009a[40] Fair	U.S., computer-based intervention at home	RCT	252†	339†	12	90.0	Adolescent girls and their mothers who have private access to a personal computer	11–13 (12.7)	100	73.6
Schinke, 2009b[41] Good	U.S., computer-based intervention at home	RCT	458†	458†	12	94.3	Adolescent girls and their mothers who have private access to a personal computer	11–13 (12.8)	100	76.8
Fang, 2010[36,37] Good	U.S., computer-based intervention at home	RCT	56†	52†	12	96.3	Asian American adolescent girls and their mothers who have private access to a personal computer	11–14 (13.1)	100	100

*Longer followup times may be available; the common followup time in the included trials is reported.
†Number of mother–daughter dyads.

Abbreviations: CBI = computer-based brief intervention; CCT = clinical controlled trial; CG = control group; F/U = followup; IG = intervention group; N = sample size; NR = not reported; RCT = randomized, controlled trial; TBI = therapist-led brief intervention.

Table 4. Intervention Characteristics of Included Trials

Author, Year	Behavioral Targets	Person Targeted	Intervention Description	Role of PC	Mode of Intervention	Duration of Intervention	Estimated Time of Intervention	Control Group Description
Primary care–based								
Harris, 2012[38]	Alcohol and drugs	Child	Self-administered computer-facilitated screening asking about lifetime and past-12-month drug use followed by the CRAFFT questionnaire. Upon completion, the individual's CRAFFT score and risk level were displayed. Adolescents completed educational computer program containing information about drug use. The computer program was followed by brief provider advice informed by the adolescent's screening results.	Conducted in and recruited from PC, provider delivered part	Face, computer	1 visit	8 minutes (2–3 minutes with interventionist)	Usual care
Rhee, 2008[39]	Alcohol, tobacco, and illicit drugs	Child	Brief counseling by family nurse practitioner and CD-ROM programs. The CD-ROM contained a decisionmaking module on all substance use and provided information about smoking and alcohol use. Intervention booster CD-ROMs were mailed at 2- and 4-month contacts.	Recruited from PC, no provider role	Face, computer	1 visit + 2 booster module mailings within 4 months	4.2 hours (10 minutes with interventionist)	Attention control
Walton, 2013[42]	Marijuana (primary), alcohol, other illicit and prescription drug use (secondary)	Child	Therapist-led brief intervention (TBI): motivational interviewing by trained research therapist Computer-based brief intervention (CBI): stand-alone interactive animated program	Conducted in and recruited from PC	Face (TBI), computer (CBI)	1 visit	35–40 minutes (TBI: mean, 41 minutes; CBI: mean, 34 minutes)	Enhanced usual care
Computer-based								
Schinke, 2009a[40]	Alcohol, tobacco, marijuana, prescription drugs and OTC for nonmedical use	Child and parent	Mother–daughter dyads completed 9 weekly 45-minute computer-based sessions at home. Each session was delivered through voice-over narration, skills demonstration, and interactive activities for mothers and daughters to complete jointly.	No PC or provider role	Computer	9 weeks	6.8 hours	No intervention

Table 4. Intervention Characteristics of Included Trials

Author, Year	Behavioral Targets	Person Targeted	Intervention Description	Role of PC	Mode of Intervention	Duration of Intervention	Estimated Time of Intervention	Control Group Description
Schinke, 2009b[41]	Alcohol, tobacco, marijuana, prescription drugs for nonmedical use, and inhalants	Child and parent	Mothers and daughters each had private sessions addressing specific material. Joint session material covered importance of interpersonal relationships; depression from stress, pressure to succeed or look a certain way; emotional closeness; sharing difficult feelings about each other and illustrating important ways to be supportive of each other.	No PC or provider role	Computer	9 weeks + 2 booster sessions within 2 years	8.3 hours	No intervention
Fang, 2010[36,37]	Alcohol, tobacco, marijuana, and prescription drugs for nonmedical use	Child and parent		No PC or provider role	Computer	9 weeks + 1 booster session within 12 months	7.5 hours	No intervention

Abbreviations: NR = not reported; OTC = over-the-counter; PC = primary care.

Table 5. Results of Interventions in Included Trials, Drug Use Behavioral Outcomes

Author, Year Quality Rating	Setting and population (age)	Instrument	Primary Outcome Measure	F/U, m	IG N	IG Results	CG N	CG Results	Effect Size	Between-Group Difference, p-value
Primary care–based										
Harris, 2012[38] U.S. cohort Fair	Primary care practices Adolescents (12–18 years)	12-month timeline followback interview	Any past marijuana use	BL	765	12.4%	758	13.3%	0.77 (0.56, 1.05)§	NSD
				12	765	15.6%	757	17.5%	0.85 (0.61, 1.19)§	NSD
			Marijuana initiation‖	12	670	7.8%	656	8.8%	0.81 (0.54, 1.21)§	NSD
			Marijuana cessation‡	12	95	29.5%	101	26.7%	1.01 (0.57, 1.78)§	NSD
Harris, 2012[38] Czech Republic cohort Fair	Primary care practices Adolescents (13–17 years)	12-month timeline followback interview	Any past marijuana use	BL	264	14.4%	266	13.6%	1.02 (0.63, 1.64)§	NSD
				12	264	17.0%	265	28.7%	0.47 (0.32, 0.71)§	<0.05
			Marijuana initiation‖	12	226	9.7%	229	20.5%	0.47 (0.29, 0.76)§	<0.05
			Marijuana cessation‡	12	38	39.5%	36	19.4%	2.53 (1.06, 6.05)§	<0.05
Rhee, 2008[39] Fair	Research center Adolescents with asthma (14–20 years)	Periodic Assessment of Drug Use	Illicit drug use risk score*, mean (SD)	BL	20	2.10 (9.16)	21	4.05 (10.63)	NR	NSD
				6	17¶	0.63 (1.37)	18¶	3.31 (9.4)	NR	NSD
Walton, 2013[42] (Therapist-led brief intervention) Fair	Primary care clinics Adolescents (12–18 years)	Add Health	Marijuana use frequency, past 3 months, mean (SD)**	BL	118	3.1 (1.9)	110	3.3 (1.9)	NR	NSD
				6	102	2.4 (2.1)	97	2.0 (2.1)	0.25 (0.14)††	NSD
				12	104	2.6 (2.2)	94	2.1 (2.2)	0.15 (0.14)††	NSD
			Other drug use frequency, past 3 months, mean (SD)**	BL	118	0.5 (1.3)	110	1.2 (2.7)	NR	NSD
				6	102	0.3 (0.9)	97	1.2 (4.6)	-0.48 (0.42)††	NSD
				12	104	0.4 (1.7)	94	0.6 (2.1)	0.33 (0.51)††	NSD
Walton, 2013[42] (Computer-based brief intervention) Fair	Primary care clinics Adolescents (12–18 years)	Add Health	Marijuana use frequency, past 3 months, mean (SD)**	BL	100	3.1 (1.9)	110	3.3 (1.9)	NR	NSD
				6	79	2.0 (2.1)	97	2.0 (2.1)	0.08 (0.16)††	NSD
				12	77	2.0 (2.2)	94	2.1 (2.2)	-0.03 (0.16)††	NSD
			Other drug use frequency, past 3 months, mean (SD)**	BL	100	0.9 (3.0)	110	1.2 (2.7)	NR	NSD
				6	79	0.1 (0.5)	97	1.2 (4.6)	-1.41 (0.52)††	<0.01†
				12	77	0.5 (2.1)	94	0.6 (2.1)	0.21 (0.48)††	NSD
Computer-based										
Schinke, 2009a[40] Fair	Home Adolescent girls (11–13 years) and their mothers	American Drug and Alcohol Survey	Marijuana, use occasions in the past 30 days, mean (SD)	BL	252	0.08 (0.01)	339	0.08 (0.02)	NR	NSD
				12	205	0.10 (0.13)	327	0.20 (0.65)	NR	<0.01†
			Prescription drugs (for nonmedical use), use occasions in the past 30 days, mean (SD)	BL	252	0.21 (0.96)	339	0.10 (0.47)	NR	NSD
				12	205	0.06 (0.46)	327	0.17 (1.58)	NR	<0.0001†

Table 5. Results of Interventions in Included Trials, Drug Use Behavioral Outcomes

Author, Year Quality Rating	Setting and population (age)	Instrument	Primary Outcome Measure	F/U, m	IG N	IG Results	CG N	CG Results	Effect Size	Between-Group Difference, p-value
Schinke, 2009b[41] Good	Home Adolescent girls (11–13 years) and their mothers	American Drug and Alcohol Survey	Marijuana, use occasions in the past 30 days, mean (SD)	BL	458	0.08 (0)	458	0.09 (0)	NR	NSD
				12	434¶	0.09 (0)	430¶	0.11 (0.2)	NR	---
				24	415¶	0.10 (0.1)	413¶	0.20 (0.7)	NR	<0.016†
			Prescription drugs, use occasions in the past 30 days, mean (SD)	BL	458	0.12 (0.2)	458	0.09 (0.1)	NR	NSD
				12	434¶	0.09 (0)	430¶	0.10 (0.1)	NR	---
				24	415¶	0.09 (0.1)	413¶	0.11 (0.2)	NR	<0.03†
			Inhalants, use occasions in the past 30 days, mean (SD)	BL	458	0.04 (0.3)	458	0.01 (0.1)	NR	NSD
				12	434¶	0.02 (0.2)	430¶	0.04 (0.3)	NR	---
				24	415¶	0.02 (0.1)	413¶	0.03 (0.2)	NR	<0.024†
Fang, 2010[36,37] Good	Home Asian American girls (11–14 years) and their mothers	American Drug and Alcohol Survey	Marijuana, use occasions in the past 30 days, mean (SD)	BL	56	0.01 (0.12)	52	0.04 (0.19)	NR	NR
				12	54	0 (0)	50	0.12 (0.32)	NR	---
				24	50	0 (0)	43	0.17 (0.38)	NR	0.043†
			Prescription drugs, use occasions in the past 30 days, mean (SD)	BL	56	0.64 (2.98)	52	0.46 (1.64)	NR	NR
				12	54	0.07 (0.32)	50	1.6 (7.15)	NR	---
				24	50	0 (0)	43	3.6 (12.99)	NR	0.047†

*Illicit drug use was constructed by combining the average frequencies of 7 types of illicit drugs in the past year, including marijuana; lysergic acid diethylamide (LSD) or other hallucinogens; cocaine/crack; glue or inhalants; tranquilizers; "uppers," such as speed; or "downers," such as sedatives or sleeping pills.
†Time x intervention group interaction effects.
‡Cessation analyzed only participants reporting any past-12-month use at baseline.
§Adjusted relative risk ratio (95% confidence interval). In the U.S. cohort, adjusted by multisite sampling, baseline past-12-month substance use, age, sex, parent education level, type of visit, perceived parent, sibling and peer substance use, provider sex, and connectedness to provider. In the Czech Republic cohort, adjusted by multisite sampling, baseline past-12-month substance use, age, and sex.
‖Initiation analyzed only participants reporting no past-12-month use at baseline.
¶N is assumed.
**7-point scale: 0 = never; 1 = 1–2 days; 2 = once a month or less; 3 = 2–3 days per month; 4 = 1–2 days per week; 5 = 3–5 days per week; 6 = every day or almost every day. Other drugs included inhalants, cocaine, and sedatives.
††Effect estimate (SE).

Abbreviations: BL = baseline; CG = control group; F/U = followup; IG = intervention group; NR = not reported; NSD = no significant difference; SD = standard deviation; SE = standard error.

Table 6. Results of Interventions in Included Trials, Alcohol and Cigarette Behavioral Outcomes

Author, Year Quality Rating	Setting and population (age)	Instrument	Primary Outcome Measure	F/U, m	IG N	IG Results	CG N	CG Results	Effect Size	Between-Group Difference, p-value
Primary care–based										
Harris, 2012[38] U.S. cohort	Primary care practices Adolescents (12–18 years)	12-month timeline followback interview (frequency of use)	Any past alcohol use	BL	765	25.4%	758	31.7%	0.82 (0.64, 1.06)§	NSD
				12	765	29.3%	758	37.5%	0.73 (0.57, 0.92)§	<0.05
			Alcohol initiation‖	12	571	11.9%	518	17.8%	0.66 (0.47, 0.93)§	<0.05
			Alcohol cessation‡	12	194	19.6%	240	20.0%	1.50 (0.93, 2.42)§	NSD
Harris, 2012[38] Czech Republic cohort	Primary care practices Adolescents (13–17 years)	12-month timeline followback interview (frequency of use)	Any past alcohol use	BL	264	58.0%	266	61.3%	0.89 (0.76, 1.03)§	NSD
				12	264	70.1%	266	74.8%	0.96 (0.86, 1.04)§	NSD
			Alcohol initiation‖	12	111	33.3%	103	43.7%	0.76 (0.53, 1.08)§	NSD
			Alcohol cessation‡	12	153	3.3%	163	5.5%	1.18 (0.37, 3.73)§	NSD
Rhee, 2008[39]	Research center Adolescents with asthma (14–20 years)	Periodic Assessment of Drug Use	Smoking risk score*, mean (SD)	BL	20	1.05 (3.06)	21	1.26 (4.39)	NR	NR
				6	17¶	1.28 (4.99)	18¶	1.69 (3.82)	NR	NSD
			Alcohol risk score**, mean (SD)	BL	20	8.40 (22.40)	21	41.52 (161.54)	NR	NR
				6	17¶	18.38 (44.98)	18¶	7.0 (21.01)	NR	NSD
Walton, 2013[42] (Therapist-led brief intervention) Fair	Primary care clinics Adolescents (12–18 years)	Alcohol Use Disorder Test	Alcohol use frequency, past 3 months, mean (SD)††	BL	118	0.8 (0.9)	100	1.0 (1.1)	NR	NSD
				12	104	0.9 (1.0)	94	0.8 (1.0)	0.37 (0.19)‡‡	0.05
Walton, 2013[42] (Computer-based brief intervention) Fair	Primary care clinics Adolescents (12–18 years)	Alcohol Use Disorder Test	Alcohol use frequency, past 3 months, mean (SD)††	BL	100	0.9 (1.1)	100	1.0 (1.1)	NR	NSD
				12	77	0.6 (0.8)	94	0.8 (1.0)	-0.16 (0.20)‡‡	NSD
Computer-based										
Schinke, 2009a[40]	Home Adolescent girls (11–13 years) and their mothers	American Drug and Alcohol Survey	Cigarettes, use occasions in the past 30 days, mean (SD)	BL	252	0.03 (0.24)	339	0.03 (0.27)	NR	NSD
				12	205	0.05 (0.50)	327	0.11 (0.08)	NR	NSD†
			Alcohol, use occasions in the past 30 days, mean (SD)	BL	252	0.15 (0.17)	339	0.16 (0.31)	NR	NSD
				12	205	0.17 (0.32)	327	0.31 (0.61)	NR	<0.05†
Schinke, 2009b[41]	Home Adolescent girls (11–13 years) and their mothers	American Drug and Alcohol Survey	Cigarettes, use occasions in the past 30 days, mean (SD)	BL	458	1.02 (0.2)	458	1.04 (0.3)	NR	NSD
				12	434¶	1.02 (0.4)	430¶	1.14 (1.2)	NR	---
				24	415¶	1.05 (0.5)	413¶	1.39 (3.6)	NR	NSD†
			Alcohol, use occasions in the past 30 days, mean (SD)	BL	458	0.14 (0.2)	458	0.18 (0.3)	NR	NSD
				12	434¶	0.15 (0.2)	430¶	0.25 (0.5)	NR	---
				24	415¶	0.17 (0.3)	413¶	0.33 (0.7)	NR	<0.006†

Table 6. Results of Interventions in Included Trials, Alcohol and Cigarette Behavioral Outcomes

Author, Year Quality Rating	Setting and population (age)	Instrument	Primary Outcome Measure	F/U, m	IG N	IG Results	CG N	CG Results	Effect Size	Between-Group Difference, p-value
Fang, 2010[36,37]	Home Asian American girls (11–14 years) and their mothers	American Drug and Alcohol Survey	Cigarettes, use occasions in the past 30 days, mean (SD)	BL	56	0.07 (0.42)	52	0.17 (0.88)	NR	NR
				12	54	0.02 (0.13)	50	0.44 (1.58)	NR	---
				24	50	0.02 (0.14)	43	1.95 (9.87)	NR	NSD†
			Alcohol, use occasions in the past 30 days, mean (SD)	BL	56	0.04 (0.19)	52	0.29 (0.80)	NR	NR
				12	54	0.04 (0.18)	50	0.54 (1.51)	NR	---
				24	50	0.05 (0.30)	43	0.10 (2.94)	NR	0.038†

*Smoking risk based on the number of cigarettes per day in the past 30 days.
†Time x intervention group interaction effects.
‡Cessation analyzed only participants reporting any past-12-month use at baseline.
§Adjusted relative risk ratio (95% confidence interval). In the U.S. cohort, adjusted by multisite sampling, baseline past-12-month substance use, age, sex, parent education level, type of visit, perceived parent, sibling and peer substance use, provider sex, and connectedness to provider. In the Czech Republic cohort, adjusted by multisite sampling, baseline past-12-month substance use, age, and sex.
‖Initiation analyzed only participants reporting no past-12-month use at baseline.
¶N is assumed.
**Alcohol use risk computed by multiplying the combined frequency of all 3 types of alcohol (beer, wine, and liquor) by the average quantity of drink per occasion in the past year.
††5-point scale: 0=never, 1=less than monthly, 2=monthly, 3=weekly, 4=daily.
‡‡Generalized estimating equations analyses comparing intervention vs. control by time, estimate (SE).

Abbreviations: BL = baseline; CG = control group; F/U = followup; IG = intervention group; NR = not reported; NSD = no significant difference; SD = standard deviation; SE = standard error.

Table 7. Results of Interventions of Included Studies, Marijuana-Related Consequences and Driving Under the Influence

Author, Year Quality Rating	Setting and population (age)	Instrument	Primary Outcome Measure	F/U, m	IG N	IG Results	CG N	CG Results	Effect Size (SE)	Between-Group Difference, p-value
Primary care–based										
Walton, 2013[42] (Therapist-led brief intervention) Fair	Primary care clinics Adolescents (12–18 years)	Modified Rutgers Alcohol Problems Index (23 items) and Severity of Dependence Scale (5 items)	Number of marijuana-related consequences, past 3 months, mean (SD)*	BL	118	14.2 (15.3)	100	14.0 (15.0)	NR	NSD
				6	102	11.3 (12.9)	97	11.0 (13.6)	-0.08 (0.15)	NSD
				12	104	11.1 (13.0)	94	11.5 (14.4)	-0.07 (0.15)	NSD
		Single item	Driving under the influence of marijuana frequency, past 3 months, mean (SD)†	BL	118	0.4 (0.9)	100	0.3 (0.7)	NR	NSD
				6	102	0.3 (0.8)	97	0.4 (0.9)	-0.68 (0.41)	NSD
				12	104	0.3 (0.9)	94	0.3 (0.9)	-0.32 (0.41)	NSD
Walton, 2013[42] (Computer-based brief intervention) Fair	Primary care clinics Adolescents (12–18 years)	Modified Rutgers Alcohol Problems Index (23 items) and Severity of Dependence Scale (5 items)	Number of marijuana-related consequences, past 3 months, mean (SD)*	BL	100	14.3 (15.5)	100	14.0 (15.0)	NR	NSD
				6	79	10.5 (13.6)	97	11.0 (13.6)	-0.15 (0.16)	NSD
				12	77	12.7 (13.8)	94	11.5 (14.4)	0.08 (0.17)	NSD
		Single item	Driving under the influence of marijuana frequency, past 3 months, mean (SD)†	BL	100	0.5 (1.1)	100	0.3 (0.7)	NR	NSD
				6	79	0.5 (1.1)	97	0.4 (0.9)	-0.34 (0.37)	NSD
				12	77	0.5 (1.0)	94	0.3 (0.9)	-0.17 (0.44)	NSD

*Rutgers Alcohol Problem index (23 items, 5-point scale) and Severity of Dependence Scale (5 items, 4-point scale), range: 0–107.
†5-point scale: 0=never, 1=1–2 times, 2=3–5 times, 3=6–9 times, 4=10 or more times.

Abbreviations: BL = baseline; CG = control group; F/U = followup; IG = intervention group; NR = not reported; NSD = no significant difference; SD = standard deviation; SE = standard error.

Table 8. Results of Interventions of Included Studies, Depressed Mood Outcomes

Author, Year Quality Rating	Setting and population (age)	Instrument	Primary Outcome Measure	F/U, m	IG N	IG Results	CG N	CG Results	Time x Intervention Group Effect, p-value
Computer-based									
Schinke, 2009a[40] Fair	Home Adolescent girls (11–13 years) and their mothers	Children's Depression Inventory	Depression, mean (SD)*	BL	252	1.62 (0.77)	339	1.71 (0.79)	NSD
				12	205	1.52 (0.84)	327	1.79 (0.80)	NSD
Schinke, 2009b[41] Good	Home Adolescent girls (11–13 years) and their mothers	Children's Depression Inventory	Depression, mean (SD)*	BL	458	3.42 (0.7)	458	3.28 (0.8)	<0.05
				12	434†	3.45 (0.8)	430†	3.30 (0.8)	---
				24	415†	3.48 (0.8)	413†	3.23 (0.8)	NSD
Fang, 2010[36,37] Good	Home Asian American girls (11–14 years) and their mothers	Children's Depression Inventory	Depression, mean (SD)*	BL	56	1.36 (0.84)	52	1.66 (0.62)	NR
				12	54	1.23 (0.71)	50	1.71 (0.75)	---
				24	50	1.23 (0.87)	43	1.67 (0.65)	NSD

*Scores are 5-item scales in which lower scores are better.
†N is assumed.

Abbreviations: BL = baseline; CG = control group; IG = intervention group; NR = not reported; NSD = no significant difference; SD = standard deviation.

Table 9. Summary of Evidence for Benefits and Harms of Drug Use Interventions

Intervention	Trials, *k* Observations, *n*	Major limitations	Consistency	Applicability	Quality ratings	Summary of findings
Key Question 1 (health, social, and legal outcomes)						
Primary care-based	k=1, n=328	Only 1 trial.	NA	Good. Primary care–screened population in the U.S.	1: Fair	No differences in marijuana use–related consequences at 12 months in primary care adolescents.
Computer-based	k=3, n=1,615	Only 1 intervention was evaluated (with replication across 3 studies). No trials included boys.	Not consistent	Fair. No links to primary care, volunteer samples, all conducted in U.S.	2: Good 1: Fair	1 of 3 trials found that girls in the intervention group reported less depressed mood compared with girls in the control group after 6 months.
Key Question 2 (behavioral outcomes)						
Primary care-based	k=3, n=3,064	Inconsistent outcome measurement.	Not consistent	Good. All studies in primary care, 1 study limited to asthma patients.	3: Fair	1 of 3 trials found a statistically significant benefit of the intervention in adolescents in the Czech Republic (but not the U.S.) in terms of any marijuana use, marijuana initiation, and marijuana cessation.
Computer-based	k=3, n=1,615	Only 1 intervention was evaluated (with replication across 3 studies). No trials included boys. Baseline and followup drug use measures were use occasions, which do not easily translate to clinical or public health benefit.	Consistent	Fair. No links to primary care, volunteer samples, all conducted in U.S.	2: Good 1: Fair	All trials found a statistically significant benefit of the intervention on marijuana use and nonmedical prescription drug use over 12 to 24 months. 1 trial also showed a significant effect for inhalant use.
Key Question 3 (adverse effects)						
NA	k=0	NA	NA	NA	NA	No studies assessed adverse effects of the intervention.

Abbreviations: NA = not applicable.

Systematic Review Search Strategies

Database of Abstracts of Reviews of Effects (DARE) search strategy

1 (addict* OR abuse* OR abusing OR misus* OR nonmedical OR "non medical"):ti,ab,kw IN DARE FROM 2007 TO 2012
2 (drug OR drugs OR substance* OR opioid* OR opiate* OR prescription* OR psychotherapeutic*):ti,ab,kw IN DARE FROM 2007 TO 2012
3 #1 AND #2
4 (drug use* OR substance use*):ti,ab,kw IN DARE FROM 2007 TO 2012
5 #3 OR #4
6 (child OR children OR teen OR teens OR teenage* OR adolescen* OR youth OR youths OR "young people"):ti,ab,kw IN DARE FROM 2007 TO 2012
7 #5 AND #6

MEDLINE (Ovid) search strategy

Database(s): **Ovid MEDLINE(R) without Revisions** 1996 to November Week 3 2012**, Ovid MEDLINE(R) Daily Update** November 14, 2012**, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations** November 21, 2012

#	Searches
1	substance-related disorders/ or amphetamine-related disorders/ or cocaine-related disorders/ or inhalant abuse/ or marijuana abuse/ or opioid-related disorders/ or heroin dependence/ or morphine dependence/ or phencyclidine abuse/ or substance abuse, intravenous/
2	Prescription Drug$.ti,ab,mh.
3	((drug or drugs or substance* or opioid* or opiate* or prescription* or psychotherapeutic*) adj3 (addict* or abuse* or abusing or misus* or nonmedical or non medical)).ti,ab.
4	(drug use$ or substance use$).ti,ab.
5	1 or 2 or 3 or 4
6	Mass Screening/
7	screen$.ti,ab.
8	6 or 7
9	5 and 8
10	substance abuse detection/
11	9 or 10
12	adolescent/ or child/
13	(child$ or teen or teens or teenage$ or adolescen$ or youth or youths or young people).ti,ab.
14	12 or 13
15	11 and 14
16	limit 15 to systematic reviews
17	limit 16 to (english language and yr="2007 -Current")
18	Behavior Therapy/
19	Cognitive Therapy/
20	Directive Counseling/ or Counseling/
21	Patient Education as Topic/
22	Risk Reduction Behavior/

23 counsel$.ti,ab.
24 advice.ti,ab.
25 advise$.ti,ab.
26 behavio?r$ chang$.ti,ab.
27 behavio?r$ intervention$.ti,ab.
28 behavio?r$ modification$.ti,ab.
29 motivational interview$.ti,ab.
30 substance-related disorders/dt, pc, rh, th or amphetamine-related disorders/dt, pc, rh, th or cocaine-related disorders/dt, pc, rh, th or inhalant abuse/dt, pc, rh, th or marijuana abuse/dt, pc, rh, th or opioid-related disorders/dt, pc, rh, th or heroin dependence/dt, pc, rh, th or morphine dependence/dt, pc, rh, th or phencyclidine abuse/dt, pc, rh, th or substance abuse, intravenous/dt, pc, rh, th
31 (intervention$ or prevention or preventive or psychosocial).ti.
32 or/18-31
33 5 and 14 and 32
34 limit 33 to systematic reviews
35 limit 34 to (english language and yr="2007 -Current")
36 17 or 35
37 remove duplicates from 36

PubMed search strategy (searched only for “publisher” unindexed references**)**

#1 (drug[tiab] OR drugs[tiab] OR substance*[tiab] OR opioid*[tiab] OR opiate*[tiab] OR prescription*[tiab] OR psychotherapeutic*[tiab]) AND (ict*[tiab] OR abuse*[tiab] OR abusing[tiab] OR misus*[tiab] OR nonmedical[tiab] OR "non medical"[tiab])
#2 drug use*[tiab] OR substance use* [tiab]
#3 #1 OR #2
#4 screen* [tiab]
#5 counsel*[tiab]
#6 advice[tiab]
#7 advise*[tiab]
#8 behavi*[tiab] AND change*[tiab]
#9 motivational*[tiab] AND interview*[tiab]
#10 behavi*[tiab] AND intervention*[tiab]
#11 behavi*[tiab] AND modification*[tiab]
#12 #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11
#13 #3 AND #12
#14 child[tiab] OR children[tiab] OR teen[tiab] OR teens[tiab] OR teenage* [tiab] OR adolescen* [tiab] OR youth[tiab] OR youths[tiab] OR "young people"[tiab]
#15 #13 AND #14
#16 #15 AND systematic[sb]
#17 #16 AND publisher[sb]

PsycINFO search strategy

#1 Drug Abuse OR Drug Abuse Prevention OR Drug Addiction OR Drug Dependency OR Drug

Usage OR Intravenous Drug Usage OR Polydrug Abuse:Index Terms
#2 (School Age (6-12 yrs) OR Adolescence (13-17 yrs)): Age Group
#3 (Systematic Review): Methodology
#4 #1 AND #2 AND #3 AND [2007 TO 2012]:PublicationYear

Key Question Search Strategies

Ovid **MEDLINE**(R) without Revisions 1996 to January Week 1 2013, Ovid MEDLINE(R) 1988 to 1995, Ovid MEDLINE(R) Daily Update January 15, 2013, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations January 15, 2013

#	Searches
1	substance-related disorders/
2	amphetamine-related disorders/
3	cocaine-related disorders/
4	inhalant abuse/
5	marijuana abuse/
6	opioid-related disorders/
7	phencyclidine abuse/
8	substance abuse, intravenous/
9	((drug or drugs or substance$ or opioid$ or opiate$ or prescription$ or psychotherapeutic$) adj3 (abuse$ or abusing or misus$ or nonmedical or non medical or extramedical or extra medical)).ti,ab.
10	(drug use$ or substance use$).ti,ab.
11	drug abstinence.ti,ab.
12	street drugs/
13	hallucinogens/
14	marijuana.ti,ab.
15	cocaine.ti,ab.
16	methamphetamine.ti,ab.
17	(mdma or ecstasy).ti,ab.
18	lsd.ti,ab.
19	((ritalin or adderall or methylphenidate or oxycodone or hydrocodone or pain relief or pain reliever$ or pain medication$) adj3 (abuse$ or abusing or misus$ or nonmedical or non medical or extramedical or extra medical)).ti,ab.
20	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19
21	adolescent/ or child/
22	(child$ or teen or teens or teenage$ or adolescen$ or youth or youths or young people or pediatric$ or paediatric$).ti,ab.
23	21 or 22
24	Behavior Therapy/
25	Cognitive Therapy/
26	Counseling/
27	Directive Counseling/
28	Patient Education as Topic/
29	Risk Reduction Behavior/

30 Feedback, psychological/
31 Health education/
32 Health promotion/
33 Motivation/
34 Internet/
35 Motivational interviewing/
36 Persuasive communication/
37 Preventive health services/
38 Self-help groups/
39 Text messaging/
40 Therapy, computer-assisted/
41 counsel$.ti,ab.
42 advice.ti,ab.
43 advise$.ti,ab.
44 behavio?r$ chang$.ti,ab.
45 behavio?r$ intervention$.ti,ab.
46 behavio?r$ modification$.ti,ab.
47 motivational interview$.ti,ab.
48 (cognitive behavio$ or behavio$ therapy or cbt).ti,ab.
49 brief intervention$.ti,ab.
50 computer based.ti,ab.
51 self help.ti,ab.
52 email$.ti,ab.
53 internet.ti,ab.
54 text messag$.ti,ab.
55 (web or website).ti,ab.
56 (intervention$ or prevention or preventive or psychosocial).ti.
57 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56
58 substance-related disorders/pc
59 amphetamine-related disorders/pc
60 cocaine-related disorders/pc
61 inhalant abuse/pc
62 marijuana abuse/pc
63 opioid-related disorders/pc
64 phencyclidine abuse/pc
65 substance abuse, intravenous/pc
66 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67 (clinical trial or controlled clinical trial or meta analysis or randomized controlled trial).pt.
68 clinical trials as topic/ or controlled clinical trials as topic/ or randomized controlled trials as topic/
69 Meta-Analysis as Topic/
70 random$.ti,ab.
71 clinical trial$.ti,ab.
72 controlled trial$.ti,ab.
73 67 or 68 or 69 or 70 or 71 or 72

74 20 and 23 and 57 and 73
75 23 and 66 and 73
76 74 or 75
77 limit 76 to (english language and yr="1992 -Current")
78 remove duplicates from 77

PubMed (publisher subset only) 1/16/2013

Search	Query
#26	Search #24 AND publisher[sb] Filters: Publication date from 1992/01/01 to 2013/12/31; English Sort by: PublicationDate
#25	Search #24 AND publisher[sb]
#24	Search #22 AND #23
#23	Search random*[tiab] OR clinical trial*[tiab] OR controlled trial*[tiab]
#22	Search #10 AND #21
#21	Search #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20
#20	Search intervention*[ti] OR prevention[ti] OR preventive[ti] OR psychosocial[ti]
#19	Search "patient education"[tiab] OR "health education"[tiab] OR "health promotion"[tiab]
#18	Search email*[tiab] OR internet[tiab] OR text messag*[tiab] OR web[tiab] OR website[tiab]
#17	Search cbt[tiab] OR brief intervention*[tiab] OR computer based[tiab] OR self help[tiab]
#16	Search behavio*[tiab] AND therapy[tiab]
#15	Search motivational interview*[tiab] OR cognitive behavio*[tiab]
#14	Search behavio*[tiab] AND modification*[tiab]
#13	Search behavio*[tiab] AND intervention*[tiab]
#12	Search behavio*[tiab] AND chang*[tiab]
#11	Search counsel*[tiab] OR advice[tiab] OR advise*[tiab]
#10	Search #8 AND #9
#9	Search child*[tiab] OR teen[tiab] OR teens[tiab] OR teenage*[tiab] OR adolescen*[tiab] OR youth[tiab] OR youths[tiab] OR "young people"[tiab] OR pediatric*[tiab] OR paediatric*[tiab]
#8	Search #3 OR #4 OR #5 OR #7
#7	Search #2 AND #6
#6	Search ritalin[tiab] OR adderall[tiab] OR methylphenidate[tiab] OR oxycodone[tiab] OR hydrocodone[tiab] OR "pain relief"[tiab] OR pain reliever*[tiab] OR pain medication*[tiab]
#5	Search marijuana[tiab] OR cocaine[tiab] OR methamphetamine[tiab] OR mdma[tiab] OR ecstasy[tiab] OR lsd[tiab]
#4	Search drug use*[tiab] OR substance use*[tiab]
#3	Search #1 AND #2
#2	Search abuse*[tiab] OR abusing[tiab] OR misus*[tiab] OR nonmedical[tiab] OR "non medical"[tiab] OR extramedical[tiab] OR "extra medical"[tiab]
#1	Search drug[tiab] OR drugs[tiab] OR substance*[tiab] OR opioid*[tiab] OR opiate*[tiab] OR prescription*[tiab] OR psychotherapeutic*[tiab]

Ovid PsycINFO 1987 to January Week 2 2013

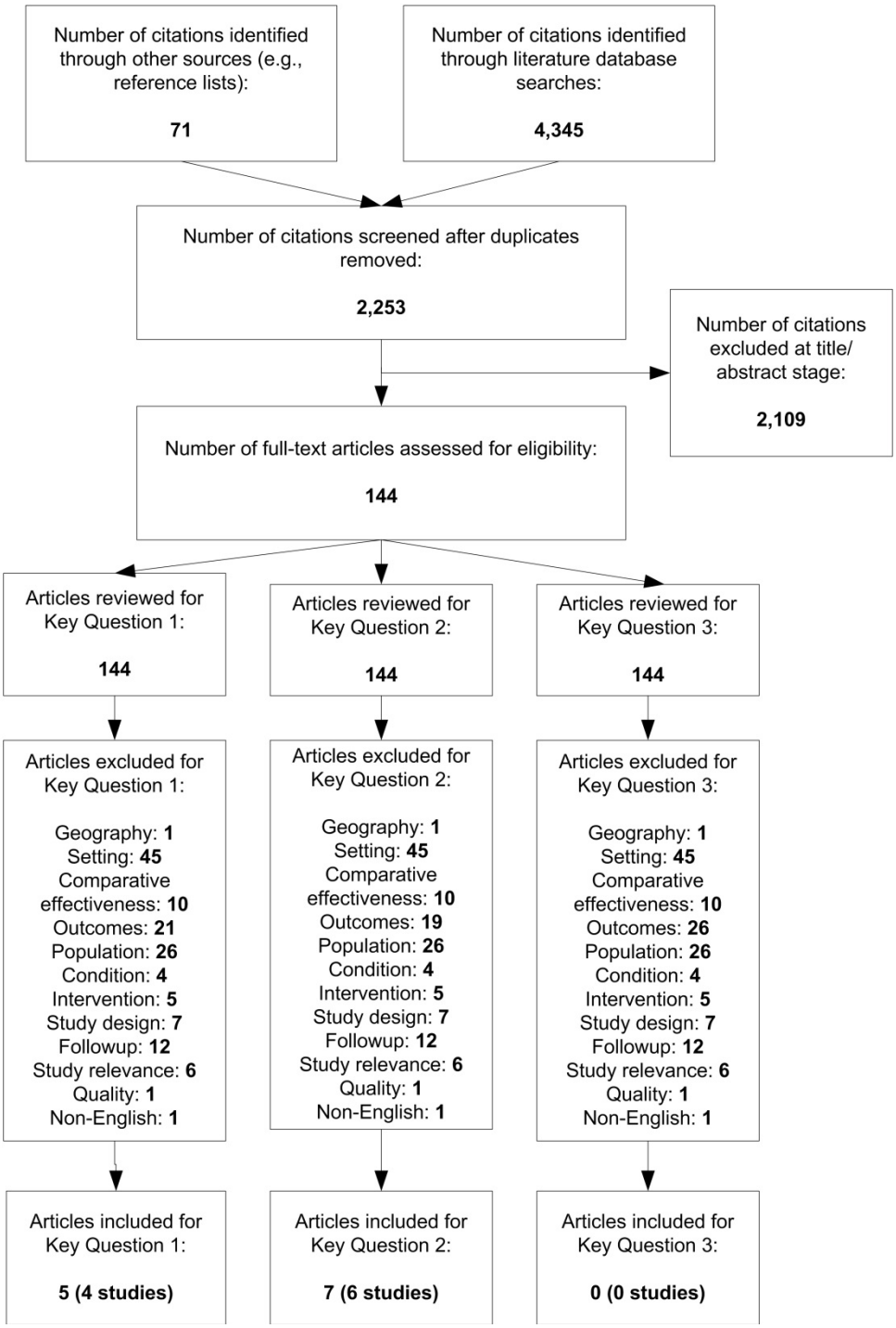
#	Searches
1	Drug Abuse/
2	Drug Usage/
3	Inhalant Abuse/
4	Glue Sniffing/
5	Polydrug Abuse/
6	Drug Abstinence/
7	Intravenous Drug Usage/
8	Marijuana Usage/
9	Cocaine/
10	Opiates/
11	Hallucinogenic Drugs/
12	Phencyclidine/
13	Methamphetamine/
14	Methylenedioxymethamphetamine/
15	Lysergic Acid Diethylamide/
16	((drug or drugs or substance$ or opioid$ or opiate$ or prescription$ or psychotherapeutic$) adj3 (abuse$ or abusing or misus$ or nonmedical or non medical or extramedical or extra medical)).ti,ab.
17	(drug use$ or substance use$).ti,ab.
18	((ritalin or adderall or methylphenidate or oxycodone or hydrocodone or pain relief or pain reliever$ or pain medication$) adj3 (abuse$ or abusing or misus$ or nonmedical or non medical or extramedical or extra medical)).ti,ab.
19	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18
20	Health Promotion/
21	Motivation/
22	behavio?r$ chang$.ti,ab.
23	behavio?r$ intervention$.ti,ab.
24	behavio?r$ modification$.ti,ab.
25	behavior therapy/
26	cognitive behavior therapy/
27	cognitive therapy/
28	Cognitive Techniques/
29	(cognitive behavio$ or behavio$ therapy or cbt).ti,ab.
30	brief intervention$.ti,ab.
31	Behavior Modification/
32	Behavior Change/
33	Persuasive Communication/
34	Motivational Interviewing/
35	motivational interview$.ti,ab.
36	Health Knowledge/
37	Health Behavior/
38	Health Education/
39	Client Education/
40	Feedback/

41 Online Therapy/
42 Computer Assisted Therapy/
43 Computer Mediated Communication/
44 Internet/
45 computer based.ti,ab.
46 text messag$.ti,ab.
47 email$.ti,ab.
48 internet.ti,ab.
49 (web or website).ti,ab.
50 Self Help Techniques/
51 self help.ti,ab.
52 counseling/
53 Group Counseling/
54 counseling.ti,ab.
55 counselling.ti,ab.
56 advice.ti,ab.
57 advise$.ti,ab.
58 (intervention$ or prevention or preventive or psychosocial).ti.
59 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58
60 19 and 59
61 Drug Abuse Prevention/
62 60 or 61
63 (adolescence 13 17 yrs or childhood birth 12 yrs).ag.
64 (child$ or adolescen$ or teen$ or youth$ or young people or pediatric$ or paediatric$).ti,ab.
65 63 or 64
66 62 and 65
67 treatment outcome clinical trial.md.
68 Experiment Controls/
69 controlled trial$.ti,ab.
70 clinical trial$.ti,ab.
71 random$.ti,ab.
72 meta analy$.ti,ab.
73 metaanaly$.ti,ab.
74 67 or 68 or 69 or 70 or 71 or 72 or 73
75 66 and 74
76 limit 75 to (english language and yr="1992 -Current")

Cochrane Central Register of Controlled Trials, Issue 12 of 12, Dec. 2012
#1 drug:ti,ab,kw or drugs:ti,ab,kw or substance*:ti,ab,kw or opioid*:ti,ab,kw or opiate*:ti,ab,kw or prescription*:ti,ab,kw or psychotherapeutic*:ti,ab,kw from 1992 to 2013, in Trials
#2 abuse*:ti,ab,kw or abusing:ti,ab,kw or misus*:ti,ab,kw or nonmedical:ti,ab,kw or "non medical":ti,ab,kw or extramedical:ti,ab,kw or "extra medical":ti,ab,kw from 1992 to 2013, in Trials

#3 #1 and #2 from 1992 to 2013, in Trials
#4 drug next use*:ti,ab,kw or substance next use*:ti,ab,kw from 1992 to 2013, in Trials
#5 marijuana:ti,ab,kw or cocaine:ti,ab,kw or methamphetamine:ti,ab,kw or mdma:ti,ab,kw or ecstasy:ti,ab,kw or lsd:ti,ab,kw from 1992 to 2013, in Trials
#6 ritalin:ti,ab,kw or adderall:ti,ab,kw or methylphenidate:ti,ab,kw or oxycodone:ti,ab,kw or hydrocodone:ti,ab,kw or "pain relief":ti,ab,kw or pain next reliever*:ti,ab,kw or pain next medication*:ti,ab,kw from 1992 to 2013, in Trials #7 #2 and #6 from 1992 to 2013, in Trials
#8 #3 or #4 or #5 or #7 from 1992 to 2013, in Trials
#9 child*:ti,ab,kw or teen:ti,ab,kw or teens:ti,ab,kw or teenage*:ti,ab,kw or adolescen*:ti,ab,kw or youth:ti,ab,kw or youths:ti,ab,kw or "young people":ti,ab,kw or pediatric*:ti,ab,kw or paediatric*:ti,ab,kw from 1992 to 2013, in Trials
#10 #8 and #9 from 1992 to 2013, in Trials
#11 counsel*:ti,ab,kw or advice:ti,ab,kw or advise*:ti,ab,kw from 1992 to 2013, in Trials
#12 behavio*:ti,ab,kw and chang*:ti,ab,kw from 1992 to 2013, in Trials
#13 behavio*:ti,ab,kw and intervention*:ti,ab,kw from 1992 to 2013, in Trials
#14 behavio*:ti,ab,kw and modification*:ti,ab,kw from 1992 to 2013, in Trials
#15 motivational next interview*:ti,ab,kw or cognitive next behavio*:ti,ab,kw from 1992 to 2013, in Trials
#16 behavio*:ti,ab,kw and therapy:ti,ab,kw from 1992 to 2013, in Trials
#17 cbt:ti,ab,kw or brief next intervention*:ti,ab,kw or computer next based:ti,ab,kw or "self help":ti,ab,kw from 1992 to 2013, in Trials
#18 email*:ti,ab,kw or internet:ti,ab,kw or text next messag*:ti,ab,kw or web:ti,ab,kw or website:ti,ab,kw from 1992 to 2013, in Trials
#19 "patient education":ti,ab,kw or "health education":ti,ab,kw or "health promotion":ti,ab,kw from 1992 to 2013, in Trials
#20 intervention*:ti or prevention:ti or preventive:ti or psychosocial:ti from 1992 to 2013, in Trials
#21 #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 from 1992 to 2013, in Trials
#22 #10 and #21 from 1992 to 2013, in Trials

Appendix A Figure 1. Literature Flow Diagram



Appendix A Table 1. Inclusion and Exclusion Criteria

Category	Included	Excluded
Aim	Preventing and/or reducing drug use is a primary aim with or without addressing other substances or behaviors (e.g., addressing drug use *and* alcohol and tobacco use, addressing drug use *and* risky sexual behaviors)	Targeting another behavior is only aim (e.g., alcohol misuse, tobacco use) (i.e., change in drug use is not a stated aim but is reported outcome)
Condition	Children or adolescents who are at the following stages of use: 1) never use, 2) experimentation, 3) regular use, or 4) problem use. Use of the following drugs: ▪ Cannabinoids (marijuana, hashish*, synthetic marijuana) ▪ Prescription drugs for nonmedical purposes* (opioid pain relievers, CNS depressants, stimulants) ▪ Stimulants (cocaine, amphetamine*, methamphetamine*) ▪ Opioids (heroin, opium*) ▪ Club drugs* (MDMA [ecstasy], flunitrazepam, GHB) ▪ Dissociative drugs* (ketamine, PCP and analogs, Salvia divinorum, DXM) ▪ Hallucinogens* (LSD [acid], mescaline, Psilocybin) ▪ Inhalants* (also known as volatile substances) ▪ Other emerging drugs* (Salvia, bath salts) ▪ Use of over-the-counter drugs for psychoactive purposes (e.g., cough and cold medicines, ▪ sleep aids) ▪ Combination of the above drugs	▪ Diagnosis of drug abuse or dependence (DSM-IV-TR) or drug use disorder (DSM V) (studies of children and adolescents narratively described ▪ as "substance abusing" will be included) ▪ Medical use of drugs as prescribed ▪ Nonpsychoactive drugs (e.g., anabolic steroids, laxatives, aspirin)
Population	▪ Children and adolescents (age ≤18 years) (includes studies in which >50% of participants are ≤18 years or subgroup of participants age ≤18 years are analyzed and reported separately from adults), including trials limited to targeted groups with cognitive, mental health, or other health issues and trials limited to pregnant adolescents	▪ Adults (age >18), unless adolescent subgroup results reported separately from adult results ▪ Treatment-seeking children or adolescents ▪ Children and adolescents who are referred to treatment by juvenile justice system, social or health agency, parents, or otherwise directly referred for substance abuse treatment in specialty settings ▪ Trials in which ≥50% of the sample have severe mental health issues, such as schizophrenia, bipolar disorder, major depression, or acute psychosis ▪ Trials in which ≥50% of the sample are diagnosed as having drug abuse or dependence (DSM-IV-TR) or a drug use disorder (DSM V) ▪ Trials limited to other groups not generalizable to primary care: psychiatric inpatients, individuals in juvenile detention centers, court-mandated, juvenile offenders

Appendix A Table 1. Inclusion and Exclusion Criteria

Category	Included	Excluded
Interventions	Primary care–relevant behavioral counseling interventions designed primarily to prevent or reduce the nonmedical use of drugs with or without referral. Including, but not limited to: advice, brief intervention†, motivational interviewing, action plans, written materials, and personalized feedback. Conducted in primary care (i.e., office-based) or judged to be feasible or applicable to primary care: ▪ **Whom targeted:** Individual-level identification ▪ **Who delivered:** Usually involves primary care staff (primary care clinicians [e.g., family medicine, internal medicine, pediatrics], nurses, nurse practitioners, physician assistants, or related clinical staff [e.g., social workers, health educators, other counselors]) in some direct or indirect way or is seen as connected to the health care system by participant ▪ **How delivered:** To individuals or in small groups (≤15). Generally involves no more than 8 group sessions total, and intervention time period is no longer than 12 months ▪ **Where delivered:** Located anywhere, as long as linked to health care (e.g., clinic, research setting, community, home, or interactive technologies [e.g., Web, text]) or primary care referable, such that the intervention is conducted as part of a health care setting or is widely available in the community (i.e., open enrollment)	▪ Detoxification, medically managed withdrawal, or opioid substitution therapy (methadone maintenance programs) ▪ Maintaining abstinence after substance use treatment for abuse or dependence (i.e., secondary abstinence) ▪ Broad public health, media, or policy interventions ▪ Trials within closed (pre-existing) social networks (e.g., worksites, churches, schools) ▪ Inpatient/residential treatment (short- or long-term) ▪ Contingency management/vouchers ▪ Vocational rehabilitation/Customized Employment Supports (CES) ▪ Outward Bound/life skills training ▪ Payer-level interventions aimed at influencing patient utilization
Comparators	▪ No intervention ▪ Usual care ▪ Waitlist ▪ Attention control (e.g., similar in format and intensity, but intervention on a different content area) ▪ Minimal intervention (no more than 1 single brief contact [i.e., <5 minutes] per year or brief written materials such as pamphlets)	Active intervention (i.e., more than a single brief contact per year or brief written materials); comparative effectiveness

Appendix A Table 1. Inclusion and Exclusion Criteria

Category	Included	Excluded
Outcomes	**KQ 1: Health, Social, Educational, and Other Outcomes** *Health Outcomes:* ▪ All-cause mortality ▪ Drug-related mortality (intentional and unintentional) ▪ Drug-related morbidity (including, but not limited to: mental health disorders; STI/HIV transmission; hepatitis B or C transmission; unintended pregnancy/pregnancy complications; respiratory infections; cardiovascular complications; stroke; seizures) ▪ Drug-related injury or accidents ▪ Other risky behaviors (e.g., alcohol, tobacco, other drug use; risky sexual behaviors) ▪ Nonfatal overdose ▪ Quality of life ▪ Other related health outcome *Social, Educational, or Other Outcomes:* ▪ Health care utilization ▪ Global functioning ▪ Educational attainment/school performance ▪ Social/legal outcomes (e.g., incarcerations, out-of-home juvenile placements, criminal activity, violence, drugged driving) ▪ Family functioning ▪ Other related social or educational outcome **KQ 2: Behavioral Outcomes** (Based on self-report or toxicology screen; will favor outcomes with biochemical verification) ▪ No use ▪ Frequency of use ▪ Quantity of use **KQ 3: Adverse Events** ▪ Serious treatment-related harms at any time point after the intervention began (e.g., death, including suicide, seizure, cardiovascular event, or other medical issue requiring urgent medical treatment) ▪ Paradoxical increase in drug use ▪ Demoralization due to failed quit attempt	▪ Attitudes, knowledge, beliefs related to drug use ▪ Intentions to change behavior ▪ Intervention participation/compliance
Outcome assessment timing	≥6-month followup postbaseline assessment (26 weeks) (Note: Studies with shorter followup will not be excluded at the title/abstract review phase so that we can evaluate how many total studies would be excluded for this reason only)	<6-month followup postbaseline assessment
Setting	▪ Primary care settings ▪ Emergency departments ▪ Other settings included if study is linked to primary care or other health care, including: research clinics/offices, community centers, homes, and virtual (e.g., online support groups)	▪ Substance abuse treatment centers ▪ School classrooms ▪ Worksites ▪ Inpatient/residential ▪ Other institutions (e.g., juvenile detention facilities)

Appendix A Table 1. Inclusion and Exclusion Criteria

Category	Included	Excluded
Study Design	**KQs 1–3:** ▪ RCTs ▪ Cluster-randomized controlled trials ▪ Nonrandomized controlled trials (CCTs)	**KQs 1–3:** ▪ Prospective or retrospective cohort studies ▪ Case-control studies ▪ Time series studies ▪ Before-after studies ▪ Cross-sectional studies ▪ Editorials, commentaries, case study, case series
Study geography	Developed countries, rated "Very High" according to the 2011 Human Development Index (http://hdr.undp.org/en/statistics): Andorra, Argentina, Australia, Austria, Bahrain, Barbados, Belgium, Brunei Darussalam, Canada, Chile, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, China (SAR), Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Qatar, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States	Countries with a Human Development Index below "Very High"
Publication language	English	Any language other than English
Publication date	1992 to present	Studies published before 1992
Quality rating	Fair or good quality	Poor quality

*Not included in 2008 review.
†Brief Intervention: typically delivered to those individuals at low to moderate risk. Goal is to provide education or advice, increase motivation to avoid substance use, or to teach behavior change skills that will reduce substance use as well as the chances of negative consequences. Usually involves 1 to 2 sessions that each last 5 minutes to 1 hour.

Abbreviations: CNS = central nervous system; DSM = Diagnostic and Statistical Manual of Mental Disorders; DXM = dextromethorphan; GHB = gamma-hydroxybutyrate; KQ = Key Question, LSD = lysergic acid diethylamine; MDMA = methylenedioxy-methamphetamine; PCP = phencyclidine.

Appendix A Table 2. Quality Criteria and Ratings Used for Article Assessment[29]

Criteria	Good Rating	Fair Rating	Poor Rating
Initial assembly of comparable groups (adequate randomization, including first concealment and whether potential confounders were distributed equally among groups) Maintenance of comparable groups (includes attrition, cross-overs, adherence, contamination) Important differential loss to followup or overall high loss to followup Equal, reliable, and valid measurements (includes masking of outcome assessment) Clear definition of interventions All important outcomes considered Analysis (analyzed according to randomization status [intention-to-treat] rather than intervention received)	Met all criteria: Comparable groups were assembled initially and maintained throughout the study (overall followup at least 90% and difference in followup between groups no greater than 10 percentage points); reliable and valid measurement instruments were used and applied equally to the groups; interventions were spelled out clearly; all important outcomes were considered; and appropriate attention to confounders in analysis; participants were analyzed in the groups to which they were randomized. Conservative data substitution methods were used, such as baseline observation carried forward or multiple imputation, where data substitution is used.	Studies were graded "fair" if any or all of the following problems occurred, without the fatal flaws noted in the "poor" category: Generally comparable groups were assembled initially but some question remained whether some (although not major) differences occurred with followup; measurement instruments were acceptable (although not the best) and generally applied equally; some but not all important outcomes were considered; and some but not all potential confounders were accounted for. Participants were analyzed in the groups to which they were randomized.	Studies were graded "poor" if any of the following fatal flaws existed: Groups assembled initially were not close to being comparable or maintained throughout the study; unreliable or invalid measurement instruments were used or not applied at all equally among groups (including not masking outcome assessment); key confounders were given little or no attention; or participants were analyzed according to intervention received, rather than an intention-to-treat approach.

Appendix B. Excluded Studies

Exclusion code key

E1. Geography: Not a country with a very high Human Development Index ranking
E2a. Setting: Excluded on the basis of setting alone (e.g., substance abuse treatment centers, school classrooms, worksites, inpatient/residential, other institutions [e.g., juvenile detention facilities])
E2b. Setting: Setting potentially applicable to primary care but not directly or indirectly linked to health care or widely available in community to refer to (e.g., research clinic, community centers, homes, virtual)
E3. Comparative effectiveness (control group received active intervention)
E4. No relevant outcomes
E5a. Population: Adults (age >18 years) or average age of study sample >18 years (unless age <18 years subgroup reported)
E5b. Population: Treatment-seeking children or adolescents or mandated treatment
E5c. Population: Psychiatric inpatients, individuals in juvenile detention centers, court-mandated, juvenile offenders
E6a. Condition: >50% of children or adolescents in trial have drug abuse/dependence or drug use disorder
E6b. Condition: Nonpsychoactive drugs
E7a. Intervention: Not a primary care–relevant behavioral counseling intervention
E7b. Intervention: Drug misuse is not a primary target of the intervention
E8. Study design: Not a randomized, controlled trial or clinical controlled trial
E9. Followup: <6 months (24 weeks) followup postbaseline (does not apply to harms)
E10. Study relevance
E11. Poor-quality rating

1. Aalborg AE, Miller BA, Husson G, et al. Implementation of adolescent family-based substance use prevention programs in health care settings: comparisons across conditions and programs. Health Educ J 2012 Jan 1;71(1):53-61. PMID: 22984294. **KQ1E4, KQ2E4, KQ3E4.**
2. Baer JS, Peterson PL, Wells EA, et al. Brief intervention for drug use with homeless adolescents: a preliminary report. Proceedings of the 67th Annual Scientific Meeting of the College on Problems of Drug Dependence. 2005 Jun 19; Orlando, FL. 2005. PMID: None. **KQ1E2a, KQ2E2a, KQ3E2a.**
3. Baer JS, Garrett SB, Beadnell B, et al. Brief motivational intervention with homeless adolescents: evaluating effects on substance use and service utilization. Psychol Addict Behav 2007 Dec;21(4):582-6. PMID: 18072842. **KQ1E9, KQ2E9, KQ3E9.**
4. Bailey KA, Baker AL, Webster RA, et al. Pilot randomized controlled trial of a brief alcohol intervention group for adolescents. Drug Alcohol Rev 2004 Jun;23(2):157-66. PMID: 15370021. **KQ1E10, KQ2E10, KQ3E10.**
5. Barlow A, Mullany B, Neault N, et al. Effect of a paraprofessional home-visiting intervention on American Indian teen mothers' and infants' behavioral risks: a randomized controlled trial. Am J Psychiatry 2013 Jan 1;170(1):83-93. PMID: 23409290. **KQ1E4, KQ2E4, KQ3E4.**
6. Battjes RJ, Gordon MS, O'Grady KE, et al. Evaluation of a group-based substance abuse treatment program for adolescents. J Subst Abuse Treat 2004;27:123-34. PMID: 15450645. **KQ1E5b, KQ2E5b, KQ3E5b.**
7. Behrendt S, Wittchen HU, Hofler M, et al. Transitions from first substance use to substance use disorders in adolescence: is early onset associated with a rapid escalation? Drug Alcohol Depend 2009 Jan 1;99(1-3):68-78. PMID: 18768267. **KQ1E10, KQ2E10, KQ3E10.**
8. Bernat DH, August GJ, Hektner JM, et al. The Early Risers preventive intervention: testing for six-year outcomes and mediational processes. J Abnorm Child Psychol 2007 Aug;35(4):605-17. PMID: 17333359. **KQ1E2a, KQ2E2a, KQ3E2a.**
9. Bernstein E, Edwards E, Dorfman D, et al. Screening and brief intervention to reduce marijuana use among youth and young adults in a pediatric emergency department. Acad Emerg Med 2009 Nov;16(11):1174-85. PMID: 20053238. **KQ1E5a, KQ2E5a, KQ3E5a.**
10. Bohnert KM, Walton MA, Barry K, et al. Three-month efficacy of a brief intervention for reducing marijuana use and consequences among adolescents presenting to indigent primary care clinics. Proceedings of the 73rd Annual Scientific Meeting of the College on Problems of Drug Dependence. 2011 Jun 18; Hollywood, FL. 2011. p. 16. PMID: None. **KQ1E9, KQ2E9, KQ3E9.**

11. Bonds DD, Wolchik SA, Winslow E, et al. Developmental cascade effects of the New Beginnings Program on adolescent adaptation outcomes. Dev Psychopathol 2010;22:771-84. PMID: 20883581. **KQ1E2b, KQ2E2b, KQ3E2b.**
12. Bonsack C, Gibellini MS, Favrod J, et al. Motivational intervention to reduce cannabis use in young people with psychosis: a randomized controlled trial. Psychother Psychosom 2011;80(5):287-97. PMID: 21646823. **KQ1E5a, KQ2E5a, KQ3E5a.**
13. Botvin GJ, Schinke SP, Epstein JA, et al. Effectiveness of culturally focused and generic skills training approaches to alcohol and drug abuse prevention among minority youths. Psychol Addict Behav 1994;8(2):116-27. PMID: None. **KQ1E2a, KQ2E2a, KQ3E2a.**
14. Brody GH, Murry VM, Gerrard M, et al. The strong African American families program: prevention of youths' high-risk behavior and a test of a model of change. J Fam Psychol 2006 Mar;20(1):1-11. PMID: 16569084. **KQ1E3, KQ2E3, KQ3E3.**
15. Brody GH, Yu T, Chen YF, et al. The Adults in the Making program: long-term protective stabilizing effects on alcohol use and substance use problems for rural African American emerging adults. J Consult Clin Psychol 2012 Feb;80(1):17-28. PMID: 22182263. **KQ1E4, KQ2E4, KQ3E4.**
16. Brody GH, Chen YF, Kogan SM, et al. Family-centered program deters substance use, conduct problems, and depressive symptoms in black adolescents. Pediatrics 2012 Jan;129(1):108-15. PMID: 22157131. **KQ1E2b, KQ2E2b, KQ3E2b.**
17. Brody GH, Chen Yf, Beach SRH, et al. Participation in a family-centered prevention program decreases genetic risk for adolescents' risky behaviors. Pediatrics 2009;124(3):911-7. PMID: None. **KQ1E2b, KQ2E2b, KQ3E2b.**
18. Burleson JA, Kaminer Y, Dennis ML. Absence of iatrogenic or contagion effects in adolescent group therapy: findings from the Cannabis Youth Treatment (CYT) study. Am J Addict 2006;15:Suppl-15. PMID: 17182415. **KQ1E10, KQ2E10, KQ3E10.**
19. Burrow-Sanchez JJ, Wrona M. Comparing culturally accommodated versus standard group CBT for Latino adolescents with substance use disorders: a pilot study. Cultur Divers Ethnic Minor Psychol 2012 Oct;18(4):373-83. PMID: 22866693. **KQ1E5c, KQ2E5c, KQ3E5c.**
20. Catalano RF, Gainey RR, Fleming CB, et al. An experimental intervention with families of substance abusers: one-year follow-up of the focus on families project. Addiction 1999 Feb;94(2):241-54. PMID: 10396792. **KQ1E7a, KQ2E7a, KQ3E7a.**
21. Comulada WS, Weiss RE, Cumberland W, et al. Reductions in drug use among young people living with HIV. Am J Drug Alcohol Abuse 2007;33(3):493-501. PMID: 17613977. **KQ1E5a, KQ2E5a, KQ3E5a.**
22. Connell AM, Dishion TJ, Deater-Deckard K. Variable- and person-centered approaches to the analysis of early adolescent substance use: linking peer, family, and intervention effects with developmental trajectories. Merrill-Palmer Quarterly 2006;52(3):421-48. PMID: None. **KQ1E2a, KQ2E2a, KQ3E2a.**
23. Conrod PJ, Castellanos-Ryan N, Strang J. Brief, personality-targeted coping skills interventions and survival as a non-drug user over a 2-year period during adolescence. Arch Gen Psychiatry 2010 Jan;67(1):85-93. PMID: 20048226. **KQ1E2a, KQ2E2a, KQ3E2a.**
24. Corby EA, Russell JC. Substance abuse risk reduction: verbal mediational training for children by parental and nonparental models. Subst Abuse 1997;18(4):145-64. PMID: None. **KQ1E2a, KQ2E2a, KQ3E2a.**
25. Cordova D, Huang S, Pantin H, et al. Do the effects of a family intervention on alcohol and drug use vary by nativity status? Psychol Addict Behav 2012 Sep;26(3):655-60. PMID: 22141423. **KQ1E2b, KQ2E2b, KQ3E2b.**
26. Correia CJ, Benson TA, Carey KB. Decreased substance use following increases in alternative behaviors: a preliminary investigation. Addict Behav 2005;30:19-27. PMID: 15561446. **KQ1E2a, KQ2E2a, KQ3E2a.**
27. D'Amico EJ, Fromme K. Brief prevention for adolescent risk-taking behavior. Addiction 2002 May;97(5):563-74. PMID: 12033657. **KQ1E2a, KQ2E2a, KQ3E2a.**
28. D'Amico EJ, Miles JN, Stern SA, et al. Brief motivational interviewing for teens at risk of substance use consequences: a randomized pilot study in a primary care clinic. J Subst Abuse Treat 2008 Jul;35(1):53-61. PMID: 18037603. **KQ1E9, KQ2E9, KQ3E9.**

29. Danielson CK, McCart MR, Walsh K, et al. Reducing substance use risk and mental health problems among sexually assaulted adolescents: a pilot randomized controlled trial. J Fam Psychol 2012 Aug;26(4):628-35. PMID: 22686269. **KQ1E2b, KQ2E2b, KQ3E2b.**
30. Edwards J, Elkins K, Hinton M, et al. Randomized controlled trial of a cannabis-focused intervention for young people with first-episode psychosis. Acta Psychiatr Scand 2006 Aug;114(2):109-17. PMID: 16836598. **KQ1E5a, KQ2E5a, KQ3E5a.**
31. Erickson SJ, Gerstle M, Feldstein SW. Brief interventions and motivational interviewing with children, adolescents, and their parents in pediatric health care settings: a review. Arch Pediatr Adolesc Med 2005 Dec;159(12):1173-80. PMID: 16330743. **KQ1E8, KQ2E8, KQ3E8.**
32. Fang L, Schinke SP, Cole KC. Preventing substance use among early Asian-American adolescent girls: initial evaluation of a web-based, mother-daughter program. J Adolesc Health 2010 Nov;47(5):529-32. PMID: 20970090. **KQ3E4.**
33. Fang L, Schinke SP. Two-year outcomes of a randomized, family-based substance use prevention trial for Asian American adolescent girls. Psychol Addict Behav 2012 Dec 31 PMID: 23276322. **KQ3E4.**
34. Fischer B, Dawe M, McGuire F, et al. Feasibility and impact of brief interventions for frequent cannabis users in Canada. J Subst Abuse Treat 2013 Jan;44(1):132-8. PMID: 22520278. **KQ1E5a, KQ2E5a, KQ3E5a.**
35. Fors SW, Jarvis S. Evaluation of a peer-led drug abuse risk reduction project for runaway/homeless youths. J Drug Educ 1995;25(4):321-33. PMID: 8907403. **KQ1E4, KQ2E4, KQ3E4.**
36. Garfein RS, Golub ET, Greenberg AE, et al. A peer-education intervention to reduce injection risk behaviors for HIV and hepatitis C virus infection in young injection drug users. AIDS 2007 Sep 12;21(14):1923-32. PMID: 17721100. **KQ1E4, KQ2E4, KQ3E4.**
37. Gonzales NA, Dumka LE, Millsap RE, et al. Randomized trial of a broad preventive intervention for Mexican American adolescents. J Consult Clin Psychol 2012 Feb;80(1):1-16. PMID: 22103956. **KQ1E2b, KQ2E2b, KQ3E2b.**
38. Goti J, Diaz R, Serrano L, et al. Brief intervention in substance-use among adolescent psychiatric patients: a randomized controlled trial. Eur Child Adolesc Psychiatry 2010 Jun;19(6):503-11. PMID: 19779855. **KQ1E9, KQ2E9, KQ3E9.**
39. Gray E, McCambridge J, Strang J. The effectiveness of motivational interviewing delivered by youth workers in reducing drinking, cigarette and cannabis smoking among young people: quasi-experimental pilot study. Alcohol Alcohol 2005 Nov;40(6):535-9. PMID: 16131498. **KQ1E2a, KQ2E2a, KQ3E2a.**
40. Griffin KW, Samuolis J, Williams C. Efficacy of a self-administered home-based parent intervention on parenting behaviors for preventing adolescent substance use. J Child Family Stud 2011;20(3):319-25. PMID: None. **KQ1E4, KQ2E4, KQ3E4.**
41. Gross J, McCaul ME. An evaluation of a psychoeducational and substance abuse risk reduction intervention for children of substance-abusers. J Community Psychol 1992:75-87. PMID: None. **KQ1E8, KQ2E8, KQ3E8.**
42. Haggerty KP, Skinner ML, MacKenzie EP, et al. A randomized trial of Parents Who Care: effects on key outcomes at 24-month follow-up. Prev Sci 2007 Dec;8(4):249-60. PMID: 17987388. **KQ1E3, KQ2E3, KQ3E3.**
43. Haggerty KP, Skinner M, Fleming CB, et al. Long-term effects of the Focus on Families project on substance use disorders among children of parents in methadone treatment. Addiction 2008 Dec;103(12):2008-16. PMID: 18855808. **KQ1E7a, KQ2E7a, KQ3E7a.**
44. Harris SK, Csemy L, Sherritt L, et al. Computer-facilitated substance use screening and brief advice for teens in primary care: an international trial. Pediatrics 2012 Jun;129(6):1072-82. PMID: 22566420. **KQ1E4, KQ3E4.**
45. Henderson CE, Rowe CL, Dakof GA, et al. Parenting practices as mediators of treatment effects in an early-intervention trial of multidimensional family therapy. Am J Drug Alcohol Abuse 2009;35(4):220-6. PMID: 20180674. **KQ1E3, KQ2E3, KQ3E3.**

46. Hides L, Carroll S, Scott R, et al. Quik Fix: a randomized controlled trial of an enhanced brief motivational interviewing intervention for alcohol/cannabis and psychological distress in young people. Psychother Psychosom 2013;82(2):122-4. PMID: 23295899. **KQ1E3, KQ2E3, KQ3E3.**
47. Hollen PJ, Tyc VL, Donnangelo SF, et al. A use decision aid for medically at-risk adolescents: results of a randomized controlled trial for cancer-surviving adolescents. Cancer Nurs 2013 Jan 25 PMID: 23357887. **KQ1E4, KQ2E4, KQ3E4.**
48. Horigian VE, Robbins MS, Dominguez R, et al. Principles for defining adverse events in behavioral intervention research: lessons from a family-focused adolescent drug abuse trial. Clin Trials 2010 Feb;7(1):58-68. PMID: 20156957. **KQ1E4, KQ2E4, KQ3E4.**
49. Humeniuk R, Ali R, Babor T, et al. A randomized controlled trial of a brief intervention for illicit drugs linked to the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) in clients recruited from primary health-care settings in four countries. Addiction 2012 May;107(5):957-66. PMID: 22126102. **KQ1E5a, KQ2E5a, KQ3E5a.**
50. Kaminer Y, Burleson JA, Blitz C, et al. Psychotherapies for adolescent substance abusers: a pilot study. J Nerv Ment Dis 1998 Nov;186(11):684-90. PMID: 9824170. **KQ1E6a, KQ2E6a, KQ3E6a.**
51. Kaminer Y, Burleson JA. Psychotherapies for adolescent substance abusers: 15-month follow-up of a pilot study. Am J Addict 1999;8(2):114-9. PMID: 10365191. **KQ1E6a, KQ2E6a, KQ3E6a.**
52. Kaminer Y, Burleson JA, Goldberger R. Cognitive-behavioral coping skills and psychoeducation therapies for adolescent substance abuse. J Nerv Ment Dis 2002 Nov;190(11):737-45. PMID: 12436013. **KQ1E5b, KQ2E5b, KQ3E5b.**
53. Kamon J, Budney A, Stanger C. A contingency management intervention for adolescent marijuana abuse and conduct problems. J Amer Acad Child Adolesc Psychiatry 2005 Jun;44(6):513-21. PMID: 15908833. **KQ1E8, KQ2E8, KQ3E8.**
54. Kemp R, Harris A, Vurel E, et al. Stop Using Stuff: trial of a drug and alcohol intervention for young people with comorbid mental illness and drug and alcohol problems. Australas Psychiatry 2007 Dec;15(6):490-3. PMID: 17852064. **KQ1E5a, KQ2E5a, KQ3E5a.**
55. Kim HK, Leve LD. Substance use and delinquency among middle school girls in foster care: a three-year follow-up of a randomized controlled trial. J Consult Clin Psychol 2011 Dec;79(6):740-50. PMID: 22004305. **KQ1E2b, KQ2E2b, KQ3E2b.**
56. Knight JR, Sherritt L, Van HS, et al. Motivational interviewing for adolescent substance use: a pilot study. J Adolesc Health 2005 Aug;37(2):167-9. PMID: 16026730. **KQ1E8, KQ2E8, KQ3E8.**
57. Koniak-Griffin D, Anderson NL, Verzemnieks I, et al. A public health nursing early intervention program for adolescent mothers: outcomes from pregnancy through 6 weeks postpartum. Nurs Res 2000 May;49(3):130-8. PMID: 10882317. **KQ1E10, KQ2E10, KQ3E10.**
58. Kumpfer KL, Whiteside HO, Greene JA, et al. Effectiveness outcomes of four age versions of the Strengthening Families Program in statewide field sites. Group Dyn 2010;14(3):211-29. **KQ1E2a, KQ2E2a, KQ3E2a.**
59. Latimer WW, Winters KC, D'Zurilla T, et al. Integrated family and cognitive-behavioral therapy for adolescent substance abusers: a stage I efficacy study. Drug Alcohol Depend 2003 Sep 10;71(3):303-17. PMID: 12957348. **KQ1E3, KQ2E3, KQ3E3.**
60. Lecallier D, Hadj SF, Landry M, et al. Screening, referring and counseling of adolescents for substance abuse. A randomized controlled study on 2120 students: Reperer, orienter, conseiller les adolescents consommateurs de substances psycho-actives (ROC-ADO). etude prospective randomisee controlee aupres de 2120 adolescents. Presse Med 2012;41:e411-e419. PMID: 22445839. **KQ1E12, KQ2E12, KQ3E12.**
61. Lee CM, Neighbors C, Kilmer JR, et al. A brief, web-based personalized feedback selective intervention for college student marijuana use: a randomized clinical trial. Psychol Addict Behav 2010 Jun;24(2):265-73. PMID: 20565152. **KQ1E2a, KQ2E2a, KQ3E2a.**

Appendix B. Excluded Studies

62. Liddle HA, Dakof GA, Turner RM, et al. Treating adolescent drug abuse: a randomized trial comparing multidimensional family therapy and cognitive behavior therapy. Addiction 2008 Oct;103(10):1660-70. PMID: 18705691. **KQ1E6a, KQ2E6a, KQ3E6a.**
63. Liddle HA, Dakof GA, Parker K, et al. Multidimiensional family therapy for adolescent drug abuse: Results of a randomized clinical trial. Am J Drug Alcohol Abuse 2001;27(4):651-88. PMID: 11727882. **KQ1E5b, KQ2E5b, KQ3E5b.**
64. Lochman JE, Wells KC. The Coping Power program at the middle-school transition: universal and indicated prevention effects. Psychol Addict Behaviors 2002 Dec;16(4:Suppl):Suppl-54. PMID: 12502276. **KQ1E2a, KQ2E2a, KQ3E2a.**
65. Lord SE, D'Amante D, Clements K, et al. Efficacy of an online substance abuse prevention program for early adolescents. Proceedings of the 70th Annual Scientific Meeting of the College on Problems of Drug Dependence. 2008 Jun 14; San Juan, Puerto Rico. 2008. p. 116. PMID: None. **KQ1E4, KQ2E4, KQ3E4.**
66. Mackesy-Amiti ME, Ouellet LJ, Golub ET, et al. Predictors and correlates of reduced frequency or cessation of injection drug use during a randomized HIV prevention intervention trial. Addiction 2011 Mar;106(3):601-8. PMID: 21182555. **KQ1E5a, KQ2E5a, KQ3E5a.**
67. Marsden J, Stillwell G, Barlow H, et al. An evaluation of a brief motivational intervention among young ecstasy and cocaine users: no effect on substance and alcohol use outcomes. Addiction 2006 Jul;101(7):1014-26. PMID: 16771893. **KQ1E2b, KQ2E2b, KQ3E2b.**
68. Marsden J, Stillwell G, Barlow H, et al. An evaluation of a brief intervention model for use with young non-injecting stimulant users. Drugs 2005;12(Suppl1):90-3. PMID: None. **KQ1E2b, KQ2E2b, KQ3E2b.**
69. Martin G, Copeland J. The adolescent cannabis check-up: randomized trial of a brief intervention for young cannabis users. J Subst Abuse Treat 2008 Jun;34(4):407-14. PMID: 17869051. **KQ1E3, KQ2E3, KQ3E3.**
70. Martinez CR, Jr., Eddy JM. Effects of culturally adapted parent management training on Latino youth behavioral health outcomes. J Consult Clin Psychol 2005 Oct;73(5):841-51. PMID: 16287384. **KQ1E4, KQ2E4, KQ3E4.**
71. Mason M, Pate P, Drapkin M, et al. Motivational interviewing integrated with social network counseling for female adolescents: a randomized pilot study in urban primary care. J Subst Abuse Treat 2011 Sep;41(2):148-55. PMID: 21489741. **KQ1E9, KQ2E9, KQ3E9.**
72. Mason WA, Kosterman R, Hawkins JD, et al. Influence of a family-focused substance use preventive intervention on growth in adolescent depressive symptoms. J Res Adolesc 2007;17(3):541-64. PMID: None. **KQ1E2b, KQ2E2b, KQ3E2b.**
73. Mason WA, Haggerty KP, Fleming AP, et al. Family intervention to prevent depression and substance use among adolescents of depressed parents. J Child Fam Stud 2012;21(6):891-905. PMID: None. **KQ1E2b, KQ2E2b, KQ3E2b.**
74. McCambridge J, Strang J. The efficacy of single-session motivational interviewing in reducing drug consumption and perceptions of drug-related risk and harm among young people: results from a multi-site cluster randomized trial. Addiction 2004 Jan;99(1):39-52. PMID: 14678061. **KQ1E2a, KQ2E2a, KQ3E2a.**
75. McCambridge J, Strang J. Deterioration over time in effect of Motivational Interviewing in reducing drug consumption and related risk among young people. Addiction 2005 Apr;100(4):470-8. PMID: 15784061. **KQ1E2a, KQ2E2a, KQ3E2a.**
76. McCambridge J, Slym RL, Strang J. Randomized controlled trial of motivational interviewing compared with drug information and advice for early intervention among young cannabis users. Addiction 2008 Nov;103(11):1809-18. PMID: 18778385. **KQ1E3, KQ2E3, KQ3E3.**
77. McCambridge J, Day M, Thomas BA, et al. Fidelity to Motivational Interviewing and subsequent cannabis cessation among adolescents. Addict Behav 2011 Jul;36(7):749-54. PMID: 21440994. **KQ1E9, KQ2E9, KQ3E9.**

78. McCambridge J, Hunt C, Jenkins RJ, et al. Cluster randomised trial of the effectiveness of motivational interviewing for universal prevention. Drug Alcohol Depend 2011 Apr 1;114(2-3):177-84. PMID: 21075562. **KQ1E2a, KQ2E2a, KQ3E2a.**
79. McGillicuddy NB, Rychtarik RG, Duquette JA, et al. Development of a skill training program for parents of substance-abusing adolescents. J Subst Abuse Treat 2001 Jan;20(1):59-68. PMID: 11239729. **KQ1E9, KQ2E9, KQ3E9.**
80. Milburn NG, Iribarren FJ, Rice E, et al. A family intervention to reduce sexual risk behavior, substance use, and delinquency among newly homeless youth. J Adolesc Health 2012 Apr;50(4):358-64. PMID: 22443839. **KQ1E9, KQ2E9, KQ3E9.**
81. Miller WR, Toscova RT, Miller JH, et al. A theory-based motivational approach for reducing alcohol/drug problems in college. Health Educ Behav 2000 Dec;27(6):744-59. PMID: 11104373. **KQ1E2a, KQ2E2a, KQ3E2a.**
82. Molina BS, Flory K, Hinshaw SP, et al. Delinquent behavior and emerging substance use in the MTA at 36 months: prevalence, course, and treatment effects. J Am Acad Child Adolesc Psychiatry 2007 Aug;46(8):1028-40. PMID: 17667481. **KQ1E8, KQ2E8, KQ3E8.**
83. Morris J, Parker H, Aldridge J. The Integrated Programme: An evaluation of a multi-component drugs prevention programme in northern England (1996-1999). Drugs 2002;9(2):153-68. PMID: None. **KQ1E2a, KQ2E2a, KQ3E2a.**
84. Mullany B, Barlow A, Neault N, et al. The Family Spirit Trial for American Indian teen mothers and their children: CBPR rationale, design, methods and baseline characteristics. Prev Sci 2012 Oct;13(5):504-18. PMID: None. **KQ1E4, KQ2E4, KQ3E4.**
85. Murphy DA, Chen X, Naar-King S, et al. Alcohol and marijuana use outcomes in the Healthy Choices motivational interviewing intervention for HIV-positive youth. Aids Patient Care STDS 2012 Feb;26(2):95-100. PMID: 22191456. **KQ1E5a, KQ2E5a, KQ3E5a.**
86. Murry VM, Berkel C, Chen YF, et al. Intervention induced changes on parenting practices, youth self-pride and sexual norms to reduce HIV-related behaviors among rural African American youths. J Youth Adolesc 2011 Sep;40(9):1147-63. PMID: 21373904. **KQ1E4, KQ2E4, KQ3E4.**
87. Naar-King S, Wright K, Parsons JT, et al. Healthy choices: motivational enhancement therapy for health risk behaviors in HIV-positive youth. AIDS Educ Prev 2006 Feb;18(1):1-11. PMID: 16539572. **KQ1E5a, KQ2E5a, KQ3E5a.**
88. Naar-King S, Lam P, Wang B, et al. Brief report: maintenance of effects of motivational enhancement therapy to improve risk behaviors and HIV-related Health in a randomized controlled trial of youth living with HIV. J Pediatr Psychol 2008 May;33(4):441-5. PMID: 17905800. **KQ1E5a, KQ2E5a, KQ3E5a.**
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Appendix C. Trials Pending Assessment

Author	Design	Population	Intervention(s)	Comparator(s)	Relevant outcomes	Reported status
Arnaud, 2012[74] Germany	RCT	Adolescents ages 16 to 18 years with a positive screen on the CRAFFT for risky substance use	WISEteens Web-based screening and brief intervention	No intervention	Reductions in frequency and quantity of use of drugs, consumption per occasion	Ongoing, estimated completion 2013
Blow, 2012[75] United States	RCT	Adolescents ages 12 to 18 years	1) Brief motivational intervention by therapist 2) Computerized brief motivational intervention	Drug prevention booklet	Marijuana use, other substance use, initiation of drug use	Estimated completion November 2013
Bukstein, 2011[76] United States	RCT	Adolescents ages 11 to 14 years with a disruptive behavior diagnosis and using ≥1 substances regularly	Adolescent skills, parent management, parent-adolescent negotiation, home-based treatment	Treatment as usual (for behavioral problems and substance use)	Substance use	Completed May 2009, no publications
Chaplin, 2013[77] United States	RCT	Parents of 12- to 14-year-olds reporting high parenting stress	Parenting-focused, mindfulness-based stress reduction	Parent advice only	Substance use	Ongoing
Collins, 2010[78] United States	RCT	Rural Mexican American female adolescents ages 13 to 19 years	Community-based cognitive behavioral intervention based on an AIDS risk reduction model, including individual and group sessions with support groups	Enhanced counseling	Substance use	Ongoing
Epton, 2013[79] United Kingdom	RCT	Undergraduate student entering a university	Online health behavior intervention, including self-affirmation, theory-based message, and implementation intentions	Control	Recreational drug use	Ongoing
Hides, 2011[80] Australia	RCT	Adolescents and young adults ages 16 to 25 years with a Kessler 10 score of ≥18 and weekly cannabis use	Two sessions of brief motivational interviewing	One session assessment feedback/ intervention	Reduction in cannabis use	Ongoing
Knight, 2011[81] United States	RCT	Adolescents ages 12 to 18 years screened for substance use	Internet-facilitated screening, brief intervention, and referral to treatment	Treatment as usual	Substance use	Estimated completion, October 2016
Knight, 2011[73] United States	RCT	Adolescents and young adults ages 12 to 21 years	1) Internet/intranet-based motivational enhancement therapy 2) Internet/intranet-based motivational enhancement therapy + technological extenders	Treatment as usual	Substance use, initiation and cessation of substance use	Completed September 2011, no publications
Knight, 2011[82] United States	RCT	Adolescents and young adults ages 12 to 21 years who used alcohol, marijuana, or other drugs in the last 3 months	Brief motivational enhancement therapy	Enhanced standard care	Substance use, driving or riding while under the influence of substances, substance-related risk behaviors	Completed May 2010, no publications

Appendix C. Trials Pending Assessment

Author	Design	Population	Intervention(s)	Comparator(s)	Relevant outcomes	Reported status
Laporte, 2012 United States	RCT	French adolescents and young adults ages 15 to 25 years who are repeat or regular users of cannabis	Brief intervention for cannabis use	Control (details NR)	Marijuana use	Estimated completion, March 2014
Levy, 2012[83] United States	RCT	Adolescents ages 14 to 18 years with a chronic medical condition (e.g., diabetes, asthma, ulcerative colitis, rheumatologic disorder)	Brief motivational intervention aimed at encouraging the participant to decrease substance use	Treatment as usual (brief health education brochure)	Days abstinent from substance use	Estimated completion, December 2014
Lewis, 2012[84] Australia	RCT	Adolescents and young adults ages 16 to 25 years diagnosed with anxiety or depression and substance misuse	BEST Plus, SHADEY or SHADEY and BEST Plus cognitive therapy, and family education	Waitlist control and those who refused to participate	Adolescent Substance Abuse Subtle Screening Inventory Score	Ongoing
Metzler, 2013[85] United States	RCT	Families of 3- to 8-year-olds with elevated behavior problems	Internet-based Triple P Positive Parenting Program	Usual community services/waitlist control	Substance abuse	Ongoing
Mericle, 2012[86] United States	RCT	Adolescents ages 12 to 18 years	1) Computer-assisted screening and brief advice 2) Computer-assisted screening and brief advice + motivational enhancement therapy	Treatment as usual	Substance use	Estimated completion, February 2016
Shaw, 2012[87] United States	RCT	Families of children ages 2 to 4 years	Family-centered early intervention	NR	Reductions in substance use risk from ages 2 to 10 years	Ongoing
Skeer, 2013[88] United States	RCT	Parents and guardians of preadolescents ages 9 to 12 years	Brief, sex-specific substance use and misuse prevention intervention	Control	Intentions of use of substances, attitudes and expectancies regarding substance use	Ongoing
Spirito, 2012[89] United States	RCT	Preadolescent children with a history of emotional/behavioral problems and their families	Individually-tailored family program utilizing principles of motivational interviewing	Standard care	Marijuana use	Completed March 2011, no publications
Van Hook, 2013[71,72] United States	RCT	Patients coming to primary care office	VYou: computerized motivational enhancement therapy tool with 8 interactive exercises	NR	Substance use	Trial not yet conducted, awaiting funding
Walker, 2010[90] United States	RCT	Adolescents ages 14 to 19 years who use marijuana	Motivational enhancement treatment with optional skills training	Educational feedback	Marijuana use	Estimated completion, September 2014