

NCI Monograph 24

Tobacco and Alcohol: Understanding Co-Use to Reduce Cancer Incidence and Mortality

Chapter 8

Prevention of Tobacco Use in Relation to Alcohol

Chapter Contents

Introduction.....	495
Scope of the Chapter.....	496
Literature Search Strategy.....	498
Common Modifiable Risk and Protective Factors for Tobacco and Alcohol Use	498
History of Tobacco and Alcohol Prevention Programs for Adolescents and Young Adults.....	500
Individual-Level Interventions.....	508
Summary of Individual-Level Interventions.....	510
Group-Level Interventions.....	510
School-Based Interventions in Kindergarten Through Twelfth Grade.....	510
School-Based Tobacco Prevention Programs.....	512
School-Based Alcohol Prevention Programs.....	514
School-Based Programs That Addressed Multiple Substances	515
College Campus Tobacco and Alcohol Prevention Programs and Policies	518
College Campus Tobacco and Alcohol Prevention Programs.....	518
College Campus Tobacco and Alcohol Policies.....	519
Family-Based Interventions	521
Family-Based Tobacco Prevention Programs.....	521
Family-Based Alcohol Prevention Programs.....	522
Family-Based Interventions to Prevent Both Tobacco and Alcohol Use	522
Summary of Group-Level Interventions	523
Population-Level Interventions.....	523
Multilevel Programs.....	523
Examples of Multilevel Programs That Focused on Alcohol Use and Reported Effects on Tobacco Use	524
Tobacco and Alcohol Prevention for Different Populations.....	529
Media Literacy Interventions.....	529
Industry-Sponsored Adolescent and Young Adult Prevention Programs.....	530
Mass Media Campaigns.....	531
Other Population-Level Interventions.....	533
Summary of Population-Level Interventions.....	533
Policy Influences on Tobacco and Alcohol Use	533
Minimum Legal Drinking Age and Tobacco 21 Laws	534
Vertical Identification Card Laws.....	535
Challenges in Pursuing Macro-Level Prevention Interventions and Efforts to Overcome Them	536
Chapter Summary	537
Research Needs	538
Conclusions.....	539
References.....	566

Figures and Tables

Figure 8.1	Conceptual Model of Selected Risk and Protective Factors for Tobacco and Alcohol Use	499
Figure 8.2	Timeline of Selected Tobacco and Alcohol Prevention-Related Contextual Milestones	506

Table 8.1	Psychological and Behavioral Theories Relevant to Understanding Tobacco and Alcohol Prevention.....	501
Table 8.2	Selected Conclusions From Reports of the Surgeon General and the National Academies of Science, Engineering, and Medicine Related to Tobacco Use Among Adolescents and Young Adults	511
Table 8.3	Selected Effective or Promising Tobacco and Alcohol Prevention Interventions.....	526
Table 8A	Studies Meeting Initial Inclusion Criteria Regarding Cross-Substance Effects of Tobacco and Alcohol Policies	543

Appendices

Appendix 8A	Literature Search Strategy.....	541
Appendix 8B	Summary of Meta-Analyses and Systematic Reviews Described in This Chapter.....	545

This page left blank intentionally.

Chapter 8

Prevention of Tobacco Use in Relation to Alcohol

Introduction

Despite the substantial progress made in reducing smoking among both youth and adults in the United States, 8.1% of middle and high school students reported using at least 1 tobacco product in the past month in 2024.¹ E-cigarettes are the most used product, with 5.9% of middle and high school students reporting current use.¹ According to the 2023 National Health Interview Survey, 19.5% of adults reported currently using any tobacco product (every day or some days)² and 6.5% of adults reported currently using e-cigarettes.³ Adolescents who use tobacco have an increased risk of also using other substances, including alcohol,^{4,5} and similarly, adolescents who consume alcohol have an increased risk of using tobacco.⁶ In 2024, 13.3% of underage youth (ages 12–20) reported past-month alcohol use.⁷ The epidemiology of tobacco and alcohol use, including variation across demographic groups and trends over time, is described in detail in chapters 2 and 3.

Efforts to prevent substance use and establish healthy behaviors are especially timely as adolescents and young adults transition through important developmental periods involving increased independence, risk-taking, and individuation from parents.^{8–10} The effects of tobacco and alcohol use during these stages can disrupt development in critical regions of the brain, such as the prefrontal cortex, which governs learning, memory, and reward,^{8,11} and the amygdala, which regulates fear-sensing.^{8,12} Adverse health behaviors established in adolescence and young adulthood, such as tobacco and alcohol use, can persist into adulthood, leading to harmful health and social outcomes.^{13,14} The risks associated with the use of tobacco and alcohol underscore the importance of identifying effective intervention programs and policy responses to prevent and reduce the use of tobacco and alcohol by adolescents and young adults. Such programs and policies could mitigate the adverse health and social consequences of tobacco and alcohol use and thereby enhance public health.

Because tobacco use and alcohol use are influenced by many of the same risk and protective factors,^{15,16} it is possible that programs that target one substance might be effective in preventing use of the other substance. Numerous health education and policy interventions exist to prevent tobacco use, alcohol use, and other substance-related behaviors.^{17–19} Health education and prevention interventions must first reach and engage young people to change their behavior.¹⁵ To reach large numbers of adolescents efficiently via multiple channels, tobacco and alcohol prevention programs are typically delivered at multiple levels ranging from the individual to the societal.^{16–19} Some interventions focus on preventing use of one substance, whereas others focus on preventing use of multiple substances, as well as preventing other risky health behaviors and/or promoting positive health behaviors and coping skills.

The literature on prevention of tobacco and alcohol use tends to be siloed, with many evaluations focusing on one substance or the other but not both. For example, evaluations of alcohol prevention programs rarely assess effects on tobacco use, and likewise, evaluations of tobacco prevention programs rarely assess effects on alcohol use. Similarly, research on tobacco

and alcohol policies is often siloed. Although similar policies exist for tobacco and alcohol separately (e.g., policies to restrict underage access, laws against possession, policies governing pricing and taxation, bans on flavors that appeal to adolescents and young adults), few evaluations of the effectiveness of alcohol prevention policies have assessed effects on tobacco use, and vice versa. This chapter summarizes evidence from the scientific literature to evaluate the extent to which alcohol-focused and general substance use prevention programs and policies are effective in preventing tobacco use among adolescents and young adults. The secondary goal of this chapter is to evaluate the extent to which tobacco-focused and more general substance use prevention efforts are effective in preventing alcohol use. Special attention is given to programs and policies that have been implemented to prevent initiation and progression of tobacco use among adolescents and young adults and tobacco prevention programs that include a focus on alcohol and other substances.

The 2012 Surgeon General's report, *Preventing Tobacco Use Among Youth and Young Adults*,²⁰ reviewed the epidemiology of tobacco use and the effectiveness of tobacco prevention programs. That report concluded that most tobacco use begins in adolescence or young adulthood, so prevention programs are needed for both age groups. It also concluded that multiple strategies are effective for preventing tobacco use, including mass media campaigns, comprehensive community programs, comprehensive statewide tobacco control programs, increases in cigarette prices, and specific evidence-based prevention programs in schools. Because the 2012 Surgeon General's report was released before the proliferation of novel tobacco products in the marketplace (e.g., e-cigarettes) and before substantial changes in the policy and media environment, an updated review is needed. This chapter extends beyond the 2012 Surgeon General's report by investigating the effects of tobacco-focused, alcohol-focused, and general or multiple substance use prevention program and policies on both tobacco and alcohol use.

Scope of the Chapter

This chapter reviews the potential of alcohol prevention programs and policies to prevent tobacco use, and vice versa. The programs and policies reviewed in this chapter focus on adolescents and young adults, because adolescence and early adulthood are the developmental periods when tobacco and alcohol initiation and escalation typically occur.^{15,20} This chapter examines psychosocial prevention programs and policies delivered at the individual level (e.g., text-based, internet, and video game programs for individuals), group level (e.g., school-based and family-based programs), and population level (e.g., underage access policies, health education messages in traditional or social media) that focus on tobacco, alcohol, and/or polysubstance use prevention and measure tobacco use as an outcome. This chapter also examines some policies that have the prevention of tobacco and alcohol use among young people as a primary goal, specifically the National Minimum Drinking Age Act, Tobacco 21 legislation, and vertical identification card laws, while broader discussion of policies that affect tobacco and alcohol use more generally (e.g., clean indoor air laws, taxation) are covered in chapter 9. Additionally, treatment interventions aimed specifically at cessation, including studies with adolescents, are covered in chapter 7.

This chapter highlights interventions that address knowledge, attitudes, and behaviors to prevent tobacco use, as well as interventions that target upstream social determinants of health, such as access, pricing, and other critical economic influences on the uptake of tobacco and alcohol.

Because this monograph focuses on understanding how addressing tobacco use in the context of alcohol use can improve tobacco control, this chapter is limited to prevention studies that assessed effects on tobacco use or attitudinal precursors to tobacco use, such as intentions and susceptibility (i.e., the lack of a firm commitment not to use). The review of prevention programs is limited to randomized controlled trials (RCTs) conducted in the United States and published in English-language peer-reviewed journals. When possible, meta-analyses and systematic reviews are cited in lieu of individual studies. Systematic reviews and meta-analyses cited in this chapter are summarized in Appendix 8B, and summaries of evidence for effective or promising intervention programs are summarized in Table 8.3.

It is important to note that prevention is a broad term that can refer to preventing initial experimentation with tobacco or alcohol, preventing initiation of regular use, or preventing escalation to higher levels of use. Villanti and colleagues (2019)²¹ described a concept called “preescalation,” which generally refers to preventing escalation of substance use during the transition from adolescence through young adulthood. This concept acknowledges that the process of developing substance use patterns and dependence involves a series of transitions that can occur throughout adolescence and young adulthood (e.g., nonsusceptible to susceptible, susceptible to experimentation, experimentation to more regular use, regular use to dependence). Some adolescents progress quickly from first experimentation to regular use and dependence in early adolescence, others initiate use later and reach regular use and dependence in young adulthood, and still others experiment during adolescence and/or young adulthood but then desist from use and never reach regular use or dependence. Prevention programs delivered during adolescence or young adulthood could intervene at any step on this continuum from experimentation to dependence. Because prevention programs are typically targeted to large segments of the population (e.g., all students at a high school or college, the general population via media campaigns), they generally reach people at all stages of the process from first experimentation to regular use or dependence. For example, a prevention program for adolescents or young adults will reach some never users; some experimenters; and some dependent, regular users. The goal of such programs is to prevent future use, regardless of the individual’s history of use. An important corollary of this philosophy is that experimentation with tobacco or alcohol does not imply a failure of a prevention program or of an individual; rather, experimentation presents an opportunity to prevent escalation to the next stage in the use process. The concept of preescalation integrates prevention for adolescents and young adults by focusing on disrupting and reversing the progression from never use to regular, dependent use, meeting the individual wherever they are in the use process. Viewing tobacco and alcohol use and dependence as a gradual process that unfolds over the approximately 2 decades of adolescence and young adulthood presents continuing opportunities to halt and reverse the process at any stage and at any age, allowing prevention programs to be delivered to populations at varying stages of substance use.²¹ As this chapter will demonstrate, integration and continuity of prevention strategies across the life course is a strength, not a weakness, of prevention programs.

Literature Search Strategy

Literature searches were conducted to identify published articles about tobacco or alcohol prevention programs among adolescents and young adults, as well as empirical studies of youth-focused policy evaluations of crossover impact on tobacco and alcohol use (see Appendix 8A for search details). Relevant articles are summarized in a narrative format in this chapter. Because the results of tobacco-industry sponsored prevention programs may be biased by conflicts of interest,^{22,23} such trials are considered in a separate section of the chapter (“Industry-Sponsored Adolescent and Young Adult Prevention Programs” section).

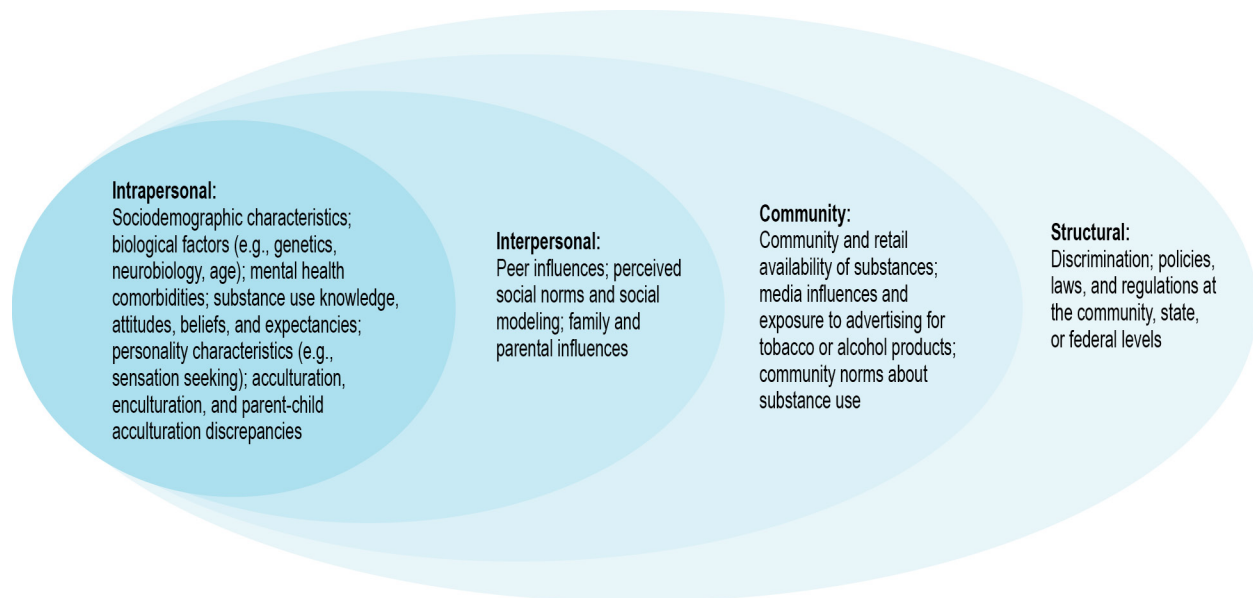
The policies reviewed in this chapter are ones for which the primary intended effect is to prevent adolescent and young adult initiation of tobacco and alcohol use. Policies that are broader in their intended effects (i.e., have prevention effects and effects on reducing prevalence and/or exposure to tobacco use), such as economic, retail, and smokefree policies, are reviewed in chapter 9. Furthermore, this chapter reviews restrictions on tobacco advertising and promotion when they occur in the context of specific prevention efforts; restrictions on advertising and promotion more broadly are reviewed in chapter 9. Exposure to tobacco advertising and promotion is a known risk factor for tobacco use, with the 2012 Surgeon General’s report concluding that “advertising and promotional activities by tobacco companies have been shown to cause the onset and continuation of smoking among adolescents and young adults.”^{20,p.8} Effects of tobacco use and media exposure were also covered extensively in the 2008 NCI Tobacco Control Monograph 19, *The Role of Media in Promoting and Reducing Tobacco Use*, with the report concluding that “the total weight of evidence—from multiple types of studies, conducted by investigators from different disciplines, and using data from many countries—demonstrates a causal relationship between tobacco advertising and promotion and increased tobacco use.”^{24,p.8-9} Similarly, exposure to alcohol use through media and advertisements is associated with alcohol use.²⁵⁻²⁷ The evidence reviewed in previous Surgeon General’s reports and NCI Tobacco Control Monographs is not revisited in this chapter; instead, attention is focused on other prevention effects. Although the policies reviewed in this chapter are those that focus primarily on prevention, they may also reduce the toll of tobacco use in other ways, such as by increasing cessation or reducing secondhand smoke exposure.²⁸

Common Modifiable Risk and Protective Factors for Tobacco and Alcohol Use

It is important to understand the modifiable risk and protective factors for tobacco and alcohol use, because these factors are the targets of effective prevention programs.^{29,30} Prevention programs can be effective only to the extent that they target the antecedents of substance use in a population.^{15,31} For example, programs based on teaching refusal skills will be effective only if adolescents or young adults want to refuse to use a substance. If adolescents or young adults perceive that substance use will allow them to fit in with a social group, to self-medicate a mental health problem, or to rebel against their parents, a program that centers only on the refusal skills approach is unlikely to be effective. A thorough understanding of the risk and protective factors for substance use can guide prevention program development and ensure that prevention programs actually modify the most salient intrapersonal, interpersonal, community, and structural antecedents of substance use.

Figure 8.1 shows a conceptual model of the risk and protective factors for tobacco and alcohol use, which are complex and exist at multiple levels. This conceptual model is a variation of the social-ecological model,³²⁻³⁵ which identifies interactions among individuals, groups/communities, and their broader environment as affecting health. These varied factors include genetic influences; mental health comorbidities; individual knowledge, attitudes, and beliefs; peer and parental influences; perceived social norms and social modeling; access to substances; media influences; community-, state-, or federal-level policies; social determinants of health (e.g., poverty, discrimination based on race, ethnicity, or sex); and numerous other factors.³⁶⁻³⁸ More comprehensive lists of risk and protective factors are published elsewhere.^{37,39} Decades of research have identified numerous factors that affect the likelihood of adolescent and young adult substance use, substance use patterns, and health outcomes associated with substance use.^{37,40-44} Contributing factors at the intrapersonal, interpersonal, community, and structural levels can be considered to understand these different behaviors and health outcomes.

Figure 8.1 Conceptual Model of Selected Risk and Protective Factors for Tobacco and Alcohol Use



Note. This conceptual model is a variation of the social-ecological model,³²⁻³⁵ highlighting specific factors that influence youth tobacco and alcohol use at the intrapersonal, interpersonal, community, and structural levels.

Intrapersonal factors include substance use knowledge and expectancies,^{45,46} personality characteristics such as sensation seeking and impulsivity,⁴⁷ acculturation (the process by which individuals adapt their own cultural beliefs, values, and practices to another culture⁴⁸), and mental health conditions such as depression and attention-deficit/hyperactivity disorder.⁴⁹ Family and parental factors include substance use of parents and siblings,^{50,51} parent-child communication,⁵² parental monitoring and support,^{51,53} family conflict,⁵¹ and parental attitudes and rules about substance use.^{51,53} Peer factors include substance use by friends and close others in one's social network,⁵⁴⁻⁵⁶ substance use offers from friends,⁵⁷ and perceptions of substance use norms.⁵⁸⁻⁶⁰ These peer factors are consistent with social cognitive theory,⁶¹ which states that people are motivated to imitate a peer's behavior if they witness the peer receiving tangible

or social reinforcement for performing the behavior. Community-level factors include community and retail availability of substances (see chapter 9), community norms about substance use,⁶² and exposure to advertising for tobacco or alcohol products.^{63,64} Structural-level factors including policies and regulations are discussed in chapter 9 and in this chapter in the section “Policy Influences on Tobacco and Alcohol Use.”

Additional factors that influence the risk of substance use among subpopulations of adolescents and young adults can be grouped along the continuum of influences described in Figure 8.1. Individual level factors such as acculturation to the U.S. culture (absent retention of the heritage culture) is a risk factor,⁶⁵ whereas enculturation (learning about or connecting to the heritage culture) is protective.⁶⁶⁻⁶⁸ Family and parental factors such as parent-child acculturation discrepancies (i.e., greater adolescent orientation to U.S. culture versus greater parental orientation to heritage culture) increase the risk of substance use by impairing family functioning.^{69,70} A more expansive view of community- and structural-level influences includes stressors that are unique to immigrant and racial and/or ethnic minority adolescents, including discrimination, bicultural stress, and perceived negative context of reception in the United States, all of which are also risk factors for substance use.⁷¹ Cultural socialization (i.e., the process by which parents convey cultural heritage, pride, values, and practices to their children)⁷² and a positive sense of one’s racial and ethnic identity may protect against adolescent substance use.⁷³ The disparities in tobacco and alcohol use (see chapter 3) and their associated health outcomes among certain populations suggest that it may be beneficial to tailor prevention programs for these groups.^{28,74,75} For example, the Next Legends prevention campaign from the U.S. Food and Drug Administration’s (FDA) Center for Tobacco Products,⁷⁶⁻⁷⁸ was developed to address e-cigarette use among American Indian/Alaska Native (AI/AN) adolescents; consequently, the campaign messaging was designed to be congruent with the cultural considerations identified through formative research with AI/AN adolescents.⁷⁶

History of Tobacco and Alcohol Prevention Programs for Adolescents and Young Adults

For much of the 20th century, use of tobacco and alcohol was widespread in the United States. Contributing factors included the repeal of alcohol prohibition in 1933, promotion and distribution of cigarettes to soldiers during the first and second World Wars, and the ubiquitous promotion of tobacco products in the media.^{79,80} Smoking prevention was recognized as an important public health challenge after the landmark 1964 Surgeon General’s report, *Smoking and Health: Report of the Advisory Committee of the Surgeon General of the Public Health Service*,⁸¹ documented the causal relationship between cigarette smoking and lung cancer, and called for appropriate remedial action. Early studies determined that tobacco and alcohol use typically co-occur⁸² and identified common psychological and social risk factors for tobacco and alcohol use that were consistent with existing and subsequent behavioral theories (see Table 8.1).⁸³

Table 8.1 Psychological and Behavioral Theories Relevant to Understanding Tobacco and Alcohol Prevention

Theoretical framework	Brief description	Key concepts	Examples of use in tobacco and alcohol use prevention programs
Cognitive Dissonance Theory ⁸⁴	People are motivated to act in ways that are consistent with their previous statements. Dissonance between cognitions or between cognitions and behavior is psychologically uncomfortable, and individuals are motivated to reduce this dissonance, such as by avoiding dissonant information or changing behaviors and cognitions to be consonant.	Consonant relationship: Cognitions that are relevant to and consistent with one another Dissonant relationship: Cognitions that are relevant to but inconsistent with one another Dissonance magnitude: Number and importance of cognitions that are consonant versus dissonant Dissonance reduction: Removing/reducing importance of dissonant cognitions or adding/increasing importance of consonant cognitions	When applied to prevention programs, having adolescents make a public commitment to not use tobacco or alcohol should motivate them to subsequently act in accord with these previous statements.
Common Liability to Addiction Model ⁸⁵	Dependence on more than one substance is caused by a common propensity for substance use, which consists of a complex array of genetic, physiological, intrapersonal, social, and environmental factors.	Liability: Extent to which an individual would be affected by or resilient to developing a substance use disorder	When targeting antecedents to tobacco and alcohol use in prevention programs, it should be recognized that these targets can be leveraged to decrease likelihood of use for both tobacco and alcohol, given the shared liability for substance addiction that underlies use disorders for both substances.
Elaboration Likelihood Model ⁸⁶	A dual-process model proposing two routes for information processing in relation to attitude change: a central route and a peripheral route. When individuals have the motivation, opportunity, and capability to process information presented, they will engage in more deliberate, thoughtful elaboration of the information (through this central route), and their resultant attitudes will be more persistent.	Central route: Engagement of this route is available with sufficient motivation, opportunity, and capability. Persuasion results from engaging in a high degree of thought/elaboration on the presented information; resultant changes in attitudes will be relatively more persistent and more likely to influence behavior. Peripheral route: Engagement of this route is not dependent on having sufficient motivation, opportunity, and capability. Persuasion is based on simple inferences from positive or negative associations with the presented information, including aspects unrelated to informational message content (e.g., who delivers the message, how professional a message looks).	When applied to prevention programs, content may be tailored to the situation. In situations where individuals may have the motivation, opportunity, and capability to engage in attitude change (e.g., in a health class in school), well-reasoned, justified, and defensible arguments will be more persuasive. In situations where individuals may have limited motivation, opportunity, or capability to engage in a high degree of thought about a message (e.g., viewing an advertisement on TV, hearing an advertisement on the radio), using messages that have clear negative or positive connotations to direct the recipient to a positive or negative position will be useful (e.g., presenting smoking with images of diseased lungs).

Table 8.1 (continued)

Theoretical framework	Brief description	Key concepts	Examples of use in tobacco and alcohol use prevention programs
Problem Behavior Theory ⁸⁷	Health-compromising behaviors tend to co-occur in individuals, presumably because similar risk and protective factors associated with the behaviors increase or decrease the likelihood of engaging in these behaviors.	Risk factor: Increases the likelihood of an individual engaging in risky or negative health behaviors Protective factor: Decreases the likelihood of an individual engaging in health-compromising behaviors	Recognizing that tobacco and alcohol use co-occur because of shared risk and protective factors, prevention programs can work to address use of both substances and to identify the most important shared risk and protective factors to address.
Reasoned Action Approach ^{32,34,88-90}	Originally proposed as the Theory of Reasoned Action, this approach posits that attitudes and perceived norms influence intentions, which then influence behavior. It was further modified into the Theory of Planned Behavior with the inclusion of perceived behavioral control on intentions and behaviors. It was again modified into the Reasoned Action Approach by including indirect effects on behavior (such as perceived norms and antecedents predicting attitudes) and by including feedback effects from behavior to antecedents.	Attitudes: Favorable or unfavorable beliefs about a behavior, based on anticipated outcomes and past experiences Perceived norms: Whether the behavior should or ought to be done (injunctive norm) and whether others engage in the behavior (descriptive norm) inform perceived social pressure to engage in the behavior Perceived behavioral control: The extent to which individuals believe they can engage in a behavior Intentions: An individual's perception of their likelihood of engaging in a behavior	When applied to tobacco and alcohol use, prevention programs may focus on creating more positive attitudes about not using substances (or negative attitudes about using substances), changing perceived norms around use, enhancing perceived behavioral control over choosing not to use a substance, or forming intentions not to use a substance.
Self-Determination Theory ⁹¹	Individuals are driven to fulfill the psychological needs of autonomy, competence, and relatedness, and these drives motivate behavior. Fulfillment of these needs supports autonomous or intrinsic motivation.	Autonomy: Feeling in control over one's behaviors and outcomes Competence: Having the necessary skills to engage in a behavior Relatedness: Having close relationships with others and experiencing belonging Intrinsic motivation: Engaging in a behavior for outcomes inherent to behavioral engagement itself (e.g., a feeling of mastery, enjoying the activity); enhanced by fulfilling autonomy, competence, and relatedness Extrinsic motivation: Engaging in a behavior for outcomes external to the individual (e.g., social positioning, financial costs)	Prevention programs that support autonomy (e.g., by providing options, recognizing adolescents' perspectives), competence (e.g., by teaching coping strategies or skills to not use tobacco or alcohol), and relatedness (e.g., engaging in program activities with close others) will result in greater intrinsic motivation not to use tobacco or alcohol. Prevention programs that impose external costs only may be effective in the short-term, but once the costs are removed, participants will no longer have the extrinsic motivation not to use tobacco or alcohol.

Table 8.1 (continued)

Theoretical framework	Brief description	Key concepts	Examples of use in tobacco and alcohol use prevention programs
Social-Ecological Model ^{32,92-94}	The social-ecological model considers that a complex interplay between multiple levels of protective and risk factors contribute to the development and maintenance of substance use and dependence. This approach acknowledges the interconnectedness of individual choices and broader environmental influences in shaping substance-use-related behaviors and outcomes.	Individual level: Biological (e.g., genetics, neurobiology, and age); psychological (e.g., psychiatric comorbidities and trauma); and behavioral factors (e.g., frequency and quantity of substance use, decision-making, and motivation to quit or reduce substance use) substance use knowledge, attitudes, beliefs, expectancies; personality characteristics (e.g., sensation seeking); acculturation, enculturation, and parent-child acculturation discrepancies Interpersonal level: Family dynamics (e.g., history of addiction, parenting styles, and family support/conflict); peer influence (e.g., social network and peer pressure); and relationships (e.g., quality of personal relationships, including romantic, friendship, and social interactions) Community level: Social norms (e.g., community and cultural norms surrounding substance use); access to substances (e.g., availability and accessibility); community support (e.g., access to substance use treatment and mental health services); and cultural and media influences (e.g., media portrayal of substance use via advertisement and entertainment) Structural level: Policies and laws pertaining to substance use prevention (federal, state, and local levels), discrimination, influence of industries producing and marketing substances (e.g., tobacco and alcohol)	The social-ecological model recognizes that prevention programs must consider addressing multiple levels simultaneously. Prevention efforts should consider not only individual factors but also the broader context in which substance use occurs. Effective strategies often involve a combination of education, policy changes, access to treatment, and support at various levels to reduce the prevalence and impact of substance use in society.
Social Cognitive Theory ^{32,34,61,88}	Originally proposed as social learning theory, it posits that individuals learn new behaviors by observing behaviors and their consequences in others and imitating them. It was extended into social cognitive theory with the inclusion of cognitive processes that mediate learning and the inclusion of self-efficacy.	Observational learning: Acquiring new skills or behaviors by watching the behavior of others, both in person and through other mediums (e.g., a video) Vicarious reinforcement: Increasing (or decreasing) the likelihood of engaging in a behavior by watching another person who has engaged in that behavior receive reinforcement; learning behavior through observing others receive reinforcements or punishments for that behavior Reciprocal determinism: Cognitions, behaviors, and the environment all influence each other Self-efficacy: Belief in one's abilities to successfully engage in a behavior	When applied to tobacco and alcohol use, prevention programs may focus on modeling the desired behavior with reinforcements, or the undesired behavior with punishments, and on enhancing confidence in one's abilities not to use a substance. For example, prevention programs may include role-playing activities in which students watch a facilitator refuse an offer of tobacco or alcohol from a peer and then practice refusing an offer themselves.

Table 8.1 (continued)

Theoretical framework	Brief description	Key concepts	Examples of use in tobacco and alcohol use prevention programs
Social Influence Theory ^{88,89,95,96}	Individuals' emotions, cognitions, and behaviors are influenced by others through informational and normative influence processes, which operate by eliciting compliance, identification, and/or internalization.	Compliance: Behaving as others expect or request out of a desire for a positive response from others Identification: Accepting a belief/behavior out of a desire to create or maintain a relationship with others or a group Internalization: Accepting information and behaving accordingly because its content is aligned with one's existing beliefs Informational social influence: Accepting information from others as accurate or truthful; can lead to re-evaluation of one's thoughts and behaviors, or internalization of that information, or acceptance of that information via identification Normative social influence: Conforming to others' expectations; leads to behaviors consistent with those expectations regardless of one's beliefs, or compliance	Prevention programs can use social influence to promote anti-tobacco and anti-alcohol norms, which will elicit identification and compliance. Prevention programs can also frame information in self-relevant values to enhance internalization of that information.
Social Inoculation Theory ^{97,98}	Attitudes can be resistant to change from counterattitudinal messages (e.g., advertising, peer pressure) through exposure to counterarguments paired with successful refutation, making those attitudes more resistant to future persuasion attempts.	Threat: Message content that creates a perception that one's current attitudes are vulnerable. When activated, threat motivates individuals to protect those attitudes. Preemptive refutation: Message content that allows one to strengthen their attitudes and make them more resistant to change, typically by raising and refuting counterarguments.	People can learn to counterargue against misleading tobacco and alcohol advertising messages; therefore, prevention programs may contain media literacy components.

Note. Theories are listed in alphabetical order.

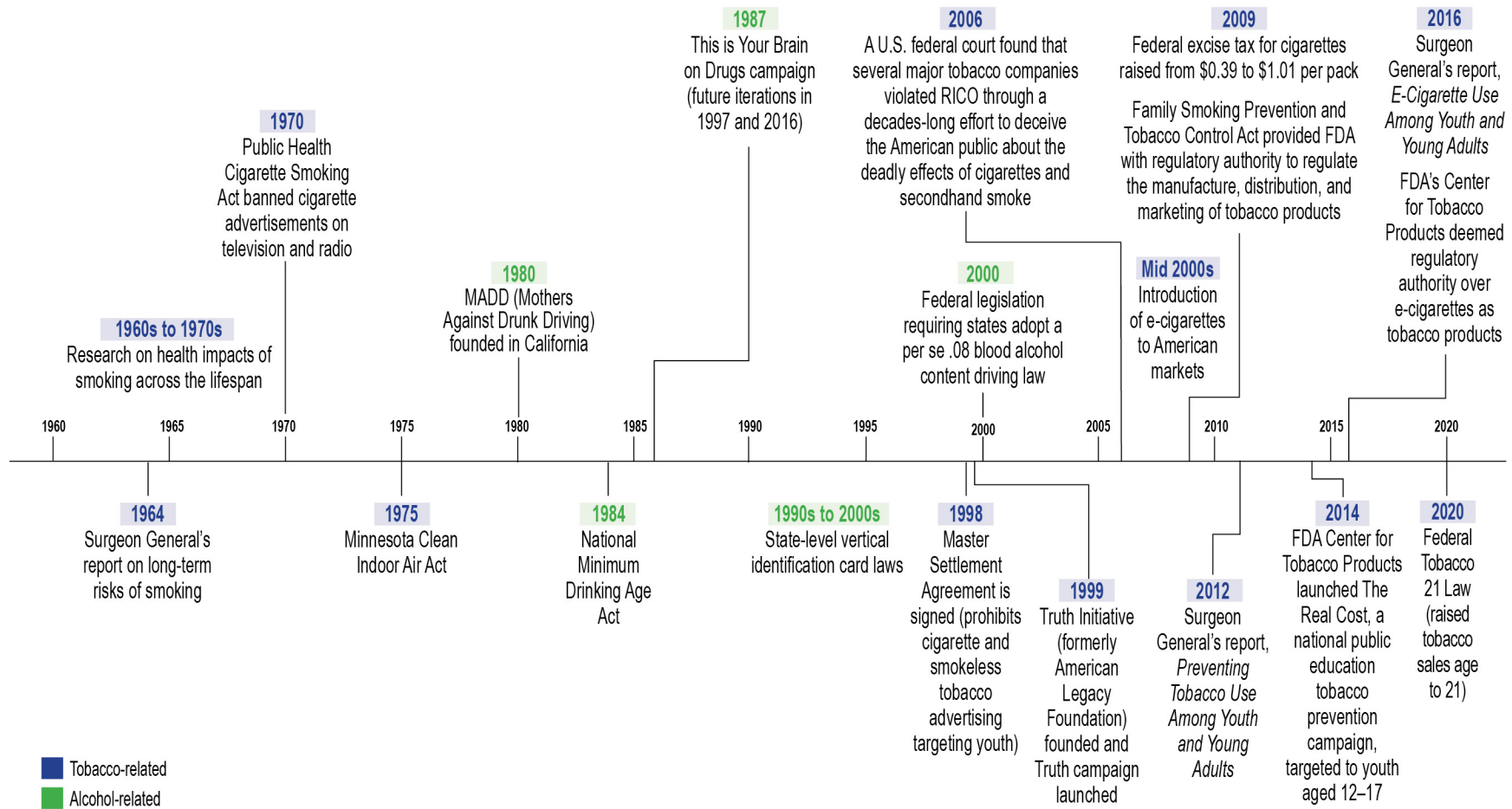
The earliest tobacco prevention programs in the 1960s used fear appeals and information about the health consequences of tobacco use, with the expectation that adolescents who understood the risks of tobacco would make the logical decision not to use the substance.^{99,100} However, these programs were not effective at preventing tobacco use because knowledge alone is rarely sufficient to change behavior, and these early approaches focused on future health consequences rather than more salient immediate consequence of substance use.^{99,100}

Subsequently, in the 1970s, the National Institute on Drug Abuse provided nationwide technical assistance, planning, and funding for primary prevention of substance use, including use of tobacco, alcohol, and other drugs, among school-age adolescents.⁸⁹ This initiative funded a series of school-based substance use prevention education studies to improve adolescents' development, strengthen self-esteem, clarify positive values, and provide alternative activities to substance use. However, most of these early trials had substandard experimental designs and did not provide a strong evidence base for effectiveness.⁸⁹

In the 1980s, prevention research brought knowledge from epidemiology, social psychology, and biology to bear on prevention topics and identified common risk and protective factors for the use of tobacco and alcohol across multiple domains, including individual, peer, family, and community.⁸⁹ Interventions based on psychological theories (Table 8.1) included role-playing activities to build refusal skills, education to correct misperceptions that substance use is normative and approved by peers, media literacy, and requests asking students to publicly commit to their peers to abstain from substance use. This convergence of scientific research from multiple fields produced more effective intervention approaches, as well as evaluation methodologies such as group-randomized trials, assessments of the fidelity of program delivery, and common measures of substance use and related constructs.⁸⁹ For example, Albert Bandura's social learning theory⁶¹ postulated that people are influenced by the modeled behavior of their peers, especially when the peer modeling behavior receives reinforcement and/or if the peer has high social status. Therefore, prevention programs often included role-playing activities in which students watch a facilitator refuse an offer of tobacco or alcohol from a peer and then practice refusing an offer themselves.⁸⁹ Studies also found that adolescents and young adults commonly overestimate the prevalence of substance use among their peers,¹⁰¹ leading them to use substances in an attempt to conform to their distorted perception of peer norms. Therefore, interventions were developed that aimed to correct adolescents' misperceptions that substance use is normative and to demonstrate that most of their peers, in fact, do not use substances and do not approve of substance use.⁸⁹ William J. McGuire's social inoculation theory⁹⁸ posited that people can learn to counterargue against misleading advertising messages, so interventions also focused on media literacy.⁸⁹ Because cognitive dissonance theory⁸⁴ posited that people are motivated to act in ways that are consistent with their previous statements, interventions encouraged adolescents to publicly commit to their peers not to use substances.¹⁰² Programs also continued to include information about the negative short-term and long-term physical and social consequences of substance use.⁸⁹

Selected notable events that have affected tobacco and alcohol use norms are summarized in Figure 8.2.

Figure 8.2 Timeline of Selected Tobacco and Alcohol Prevention-Related Contextual Milestones



Note. FDA = Food and Drug Administration; RICO = Racketeer Influenced and Corrupt Organizations.

Source: American Lung Association 2024,¹⁰³ Bellou and Bhatt 2013,¹⁰⁴ Campaign for Tobacco-Free Kids,¹⁰⁵ Farrelly et al. 2017,¹⁰⁶ Griffin 2021,¹⁰⁷ H.R.6543 — 91st Congress (1969–1970),¹⁰⁸ Mothers Against Drunk Driving 2024,¹⁰⁹ NIAAA,¹¹⁰ PACE Recovery Center 2017,¹¹¹ U.S. Department of Health Education and Welfare 1964,⁸¹ USDHSS 2012,²⁰ USDHSS 2014,⁷⁴ USDHSS 2016,¹¹² Truth Initiative,¹¹³ White 2016.¹¹⁴

Although smoking prevalence began to decrease after the 1964 Surgeon General's report⁸¹ demonstrated the causal relationship between smoking and lung cancer,¹¹⁵ alcohol use was actually increasing.^{116,117} The minimum legal drinking age (MLDA) had been 21 in most states since the end of Prohibition, but in the 1970s, 29 states lowered their alcohol purchase ages to 18, 19, or 20, reasoning that young adults who were old enough to vote and be drafted into the military were also old enough to purchase and use alcohol.¹¹⁸

By the mid-20th century, the medical community was aware of the acute and long-term hazards of alcohol use,¹¹⁹ and alcohol use disorder (previously referred to as alcoholism) was increasingly understood through a disease model of addiction, with contributing genetic, neurological, psychological, and social mechanisms.^{120,121}

In the early 1980s, advocacy organizations such as Mothers Against Drunk Driving (MADD) highlighted the deadly effects of alcohol-impaired driving on victims of car crashes.¹²² MADD's emphasis on the effect of alcohol-impaired driving on other people (e.g., pedestrians, passengers, and drivers of other cars) was an effective rebuttal to the argument that individuals should have the freedom to engage in behaviors that could damage their health,¹²² similar to counterarguments to tobacco use that highlight the adverse effects of secondhand smoke and the right of nonsmokers to breathe smokefree air.¹²³ In response to grassroots movements to reduce deaths caused by drunk drivers, many of whom were adolescents or young adults, the U.S. Congress passed and President Reagan signed into law the 1984 National Minimum Drinking Age Act (23 U.S.C. § 158). The Act required states to establish a minimal legal purchase age and drinking age of 21 by 1987 or face a decrease in federal highway funding. Faced with a loss of federal funding, states with lower age limits returned their MLDA to age 21 by 1988,¹¹⁸ where it has remained ever since.¹²⁴ Subsequent laws aimed at reducing alcohol-impaired driving have focused on reducing the allowable blood alcohol content for drivers, particularly for individuals under the legal drinking age¹²⁵; making criminal and driving records available to police during traffic stops; eliminating plea bargains for charges of driving under the influence; and instituting mandatory jail sentences, higher minimum fines, liability laws for servers, and highway sobriety checkpoints.¹²²

In the latter half of the 20th century, antismoking social norms were increasing, with information about the adverse health consequences of smoking appearing in the media,¹¹⁵ and tobacco advertisements were banned from radio and television after the Public Health Cigarette Smoking Act was signed into law in 1970.¹²⁶ At the same time, television featured numerous alcohol commercials but few anti-alcohol messages, except for those about the dangers of alcohol impaired driving.¹²⁶ Advertisements for both tobacco and alcohol were still prevalent on billboards and in magazines.^{127,128} The Master Settlement Agreement¹²⁹ between 52 state and territory attorneys general and the 4 largest U.S. tobacco companies, signed in 1998, permanently removed tobacco advertising from billboards, transit and outdoor advertisements, and outdoor signs, and some tobacco companies agreed to remove tobacco advertisements from magazines with substantial adolescent readership.^{24,130} The contrast between the numerous tobacco prevention efforts that appeared through the end of the 20th century and the fewer alcohol prevention efforts reflects how youth tobacco use tended to be prioritized over youth alcohol use as a public health issue.

The following sections of this chapter describe the interventions that have been implemented at various levels (e.g., individual, group, population), highlighting evidence about whether alcohol-focused and general substance use prevention programs are effective in preventing tobacco use and whether tobacco-focused and general substance use prevention programs are effective in preventing alcohol use.

Individual-Level Interventions

Substance use primary prevention programs have typically been delivered to groups rather than individuals for the sake of efficiency and cost-effectiveness,¹⁵ with the exception of one-to-one counseling by physicians, dentists, or other health professionals.¹³¹ Individual-level interventions to prevent substance use, including those targeted to tobacco and alcohol use, have evolved in parallel with the available technology. Some more recent interventions use technologies such as smartphone apps, educational video games, virtual reality, or text messaging to deliver prevention content to individuals.¹³³⁻¹³⁸ Notably, the timing of the evolution of individual-level prevention interventions toward technology-based delivery has coincided with the increased availability and use of e-cigarettes¹¹², which has resulted in several interventions focused on preventing e-cigarette use.

A 2017 systematic review of individual substance use prevention interventions delivered via wireless technology (e.g., web-based, text messaging, smartphone applications) identified 12 studies.¹³² The interventions were based on diverse theoretical frameworks including the theory of planned behavior, social cognitive theory, self-determination theory, motivational enhancement therapy, the elaboration likelihood model, and dialectical behavioral therapy. Most interventions delivered text messages to enhance motivation to avoid substance use, increase intrinsic motivation, provide social support, or reinforce the participant's commitment not to use substances. Some interventions also provided opportunities for self-monitoring, guidance on planning for situations with a high likelihood of substance use, or feedback comparing the individual's actual substance use behavior with their plan not to use substances. However, among the 12 studies identified, 10 focused on alcohol use, 2 focused on use of other substances, and none studied tobacco use. In addition, rather than focusing on prevention among young people not using substances, the interventions generally targeted adolescents, young adults, and adults who reported already using substances.¹³²

A 2019 systematic review and meta-analysis of e-health interventions conducted in schools but delivered at the individual level analyzed 11 studies that focused on changing multiple health behaviors, including improving nutrition, increasing physical activity, and decreasing screen time, smoking, and alcohol use.¹³⁴ These interventions used a variety of electronic intervention approaches including electronic self-assessments, online games that simulated decision-making, personalized feedback based on self-reported behavior, and multimedia education including videos and animation. This meta-analysis found that the interventions had no significant effect on smoking or alcohol use, although they did have beneficial effects on physical activity and fruit and vegetable intake. The authors noted that most of the interventions were based on the stages of change model, which is typically used in cessation interventions, rather than social influence theories, which are typically used in substance use prevention programs.¹³⁴

A 2021 systematic review and meta-analysis focused on online interventions that targeted multiple risk behaviors including alcohol use and smoking among adults ages 18 and older (primarily college students).¹³⁵ Of the 11 studies reviewed, 3 addressed both alcohol use and smoking, as well as nutrition and physical activity.¹⁴⁰⁻¹⁴² All three studies recruited interested participants by advertising broadly to a population (either college students or community members), rather than randomly assigning all members of a population to an experimental condition. Thus, the results of these studies are generalizable only to people who are motivated to participate in a health-focused intervention and have access to a computer or smartphone. Among the three studies, a study of college undergraduates¹⁴⁰ and a community-based study¹⁴² reported no significant effects on alcohol use or smoking. The other study of undergraduates¹⁴¹ demonstrated a significant reduction in the prevalence of current smoking but not alcohol use.

A 2022 meta-analysis of prevention programs that focused on both tobacco and alcohol use among adolescents and young adults identified only two individual-level interventions.¹³⁶ One of these interventions, RealTeen,¹⁴³ recruited a nationwide sample of 13- and 14-year-old girls via Facebook advertisements and randomly assigned them to a 9-session online intervention or a control group. The intervention focused on improving girls' knowledge about drug use and improving their cognitive and behavioral skills for coping with stress, managing moods, making decisions, maintaining a healthy body image, and refusing offers of drug use. This intervention showed significant prevention effects on cigarette smoking and binge drinking. An earlier version of this intervention, delivered to adolescent girls,¹⁴⁴ had significant prevention effects on past-month alcohol use but not past-month cigarette smoking. In a 2023 rapid review of digital substance use interventions for young people, 6 of the studies focused on prevention and incorporated web-based programs, video games, and virtual reality.¹³⁷ In addition to the 2018 RCT¹⁴³ that demonstrated that RealTeen was effective in preventing cigarette smoking and binge drinking, this review¹³⁷ also identified a 2019 study¹⁴⁵ that reported 2- and 3-year follow-up results from the 2018 study. At the 2- and 3-year follow-up points, the RealTeen intervention remained effective in reducing cigarette smoking, but not alcohol use.¹⁴⁵

Just-in-time adaptive interventions (JITAIs) are individual-level electronic interventions that are specifically targeted to the individual's risk of using substances at a particular moment in time, defined by the individual's location (e.g., near a tobacco or alcohol retailer) or state of mind (e.g., self-reported craving).¹⁴⁶ A 2022 review of 14 studies that used JITAIs to deliver substance use prevention messages found 7 alcohol prevention studies and 4 tobacco prevention studies, but no studies that addressed both substances.¹³⁸ The JITAIs were all delivered to individuals with previous substance use who were attempting to remain abstinent. Although the interventions were too varied to draw conclusions about overall effectiveness, the authors concluded that JITAIs are a promising strategy for substance use prevention. However, given the intensive data collection and analysis necessary to deliver interventions exactly when they are needed,¹⁴⁶ the high participant burden, and the expense of paying participants for adherence to the data collection prompts,¹³⁸ it is unlikely that JITAIs can be used broadly to prevent substance use in the general population.

A 2024 systematic review of interventions to prevent e-cigarette use identified 14 studies that delivered content at the individual level.¹³³ These interventions included three video game interventions that allowed adolescents to role-play decision-making and e-cigarette refusal, and two interventions that sent text messages about the health risks of e-cigarettes and nicotine dependence. The interventions and measures were too variable to conduct a meta-analysis. All of the video game and text messaging interventions produced significant improvements in e-cigarette knowledge and harm perceptions, but they did not produce significant changes in e-cigarette use or intentions to use.¹³³ Furthermore, none of these studies addressed or measured alcohol use.

Summary of Individual-Level Interventions

Individual-level tobacco and alcohol prevention programs for adolescents and young adults vary widely, from multisession, self-paced curricula to interventions that seek to distract participants from craving tobacco and alcohol by playing a video game. Although more identified individual-level interventions focus on alcohol prevention than on tobacco prevention, all the interventions could potentially be adapted to focus on both substances. The small number of individual-level prevention programs may be attributed to several factors: the relative newness of individually tailored electronic interventions, the difficulty of recruiting and following individuals relative to groups (e.g., schools), and the high participant burden. With the proliferation of smartphones and social media, it is possible that more individual-level interventions will be developed in the future, especially if barriers to recruitment, adherence, and frequent data collection can be overcome.

Group-Level Interventions

Health education and prevention programs for adolescents and young adults typically occur in settings where many individuals can be reached simultaneously, including primary and secondary schools, college campuses, and communities.¹⁵ Some interventions are delivered to families, either to one family at a time or to groups of parents and adolescents. This section reviews school-based, college campus-based, and family interventions that address tobacco and alcohol.

School-Based Interventions in Kindergarten Through Twelfth Grade

Substance use prevention programs for elementary school students (typically ages 5–10), middle school students (typically ages 11–13), and high school students (typically ages 14–18) often involve multiple classroom sessions with group activities to help students learn the short- and long-term physical and social consequences of substance use, practice skills to refuse substance use offers, and restructure normative beliefs about the prevalence and acceptability of substance use.^{15,20} Prevention curricula have also focused on increasing various personal and social competencies including self-esteem, decision-making, stress management, and effective communication. Numerous programs have been developed to teach these concepts and skills to adolescents and young adults. These strategies are described in detail in the 2012 Surgeon General's report²⁰; although much of the research on school-based prevention was conducted prior to 2012, this report's conclusions remain relevant today (see Table 8.2).

However, youth and young adults' tobacco use behaviors have changed in several ways since 2012. First, the average age of cigarette smoking initiation has gradually increased from early adolescence to young adulthood.¹⁴⁷ Second, youth and young adults' tobacco use now reflects the diversity of the tobacco marketplace; since 2014, e-cigarettes have consistently been the most commonly used tobacco product by youth.^{1,148,149} Though research on the efficacy of e-cigarette prevention programs is still emerging, the 2016 Surgeon General's report, *E-Cigarette Use Among Youth and Young Adults*,¹¹² suggested that "over 50 years of research offers a strong body of evidence on the effectiveness of certain tobacco prevention and control measures. Much of this evidence can also be applied to e-cigarettes."^{112,p.243} For example, expanding smokefree policies to include e-cigarettes, regulating advertising of e-cigarettes to adolescents, raising taxes on e-cigarette products, and limiting access to e-cigarettes through approaches such as restrictions on retail licensure for the sale of e-cigarettes may be effective. However, the bulk of existing tobacco prevention programs, including most of those reviewed in this section, have not been directly tested for efficacy at preventing e-cigarette use.

Table 8.2 Selected Conclusions From Reports of the Surgeon General and the National Academies of Science, Engineering, and Medicine Related to Tobacco Use Among Adolescents and Young Adults

2012 Surgeon General's Report, *Preventing Tobacco Use Among Youth and Young Adults*

- Cigarette smoking by youth and young adults has immediate adverse health consequences, including addiction, and accelerates the development of chronic diseases across the full life course.
- Prevention efforts must focus on both adolescents and young adults because among adults who become daily smokers; nearly all first use of cigarettes occurs by 18 years of age (88%), with 99% of first use by 26 years of age.
- Advertising and promotional activities by tobacco companies have been shown to cause the onset and continuation of smoking among adolescents and young adults.
- After years of steady progress, declines in the use of tobacco by youth and young adults have slowed for cigarette smoking and stalled for smokeless tobacco use.
- Coordinated, multicomponent interventions that combine mass media campaigns, price increases including those that result from tax increases, school-based policies and programs, and statewide or community-wide changes in smokefree policies and norms are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

2016 Surgeon General's Report, *E-Cigarette Use Among Youth and Young Adults*

- E-cigarette use among youth and young adults has become a public health concern. In 2014, current use of e-cigarettes by young adults 18–24 years of age surpassed that of adults 25 years of age and older.
- E-cigarettes are now the most commonly used tobacco product among youth, surpassing conventional cigarettes in 2014. E-cigarette use is strongly associated with the use of other tobacco products among youth and young adults, including combustible tobacco products.
- The use of products containing nicotine poses dangers to youth, pregnant women, and fetuses. The use of products containing nicotine in any form among youth, including in e-cigarettes, is unsafe.
- E-cigarette aerosol is not harmless. It can contain harmful and potentially harmful constituents, including nicotine. Nicotine exposure during adolescence can cause addiction and can harm the developing adolescent brain.
- E-cigarettes are marketed by promoting flavors and using a wide variety of media channels and approaches that have been used in the past for marketing conventional tobacco products to youth and young adults.

2018 NASEM Report, *Public Health Consequences of E-Cigarettes*

- There is substantial evidence that e-cigarette use increases risk of ever using combustible tobacco cigarettes among youth and young adults.
- Among youth and young adult e-cigarette users who ever use combustible tobacco cigarettes, there is moderate evidence that e-cigarette use increases the frequency and intensity of subsequent combustible tobacco cigarette smoking.
- Among youth and young adult e-cigarette users who ever use combustible tobacco cigarettes, there is limited evidence that e-cigarette use increases, in the near term, the duration of subsequent combustible tobacco cigarette smoking.

Note. NASEM = National Academies of Science, Engineering, and Medicine.

Source: Quoted from USDHHS 2012,²⁰ USDHHS 2016,¹¹² NASEM 2018.¹⁵⁰

A 1988 meta-analysis of 47 school-based smoking prevention programs and 29 alcohol prevention programs published in the 1970s and 1980s found small but significant prevention effects for both tobacco and alcohol use.¹⁵¹ This analysis found that most interventions also increased tobacco and alcohol knowledge and in the short-term (but not long-term) improved attitudes. The authors recognized that the greater effect sizes observed in the smoking prevention studies may have been partially attributable to anti-smoking messages in the media and the emergence of smoking regulations.¹⁵¹

After the 1980s, the literature on school-based tobacco prevention programs began to diverge from the literature on alcohol prevention programs. Whereas earlier reviews were likely to report effects on both tobacco and alcohol use, subsequent reviews began to focus on one substance or the other, making comparisons across substances difficult. It is also important to view these early studies in their social context. These studies coincided with an increase in antismoking norms and media containing information about the adverse health consequences of smoking, especially after the Master Settlement Agreement in 1998.^{115,129} In contrast, alcohol advertising and promotion in the media, including television, remained prevalent and subject to limited federal regulation.¹⁵²⁻¹⁵⁷ In the next two sections, school-based tobacco use and alcohol use prevention programs are discussed separately.

School-Based Tobacco Prevention Programs

By 1993, there were 94 published evidence-based school-based interventions for smoking prevention with rigorous evaluations.¹⁵⁸ A 1993 meta-analysis divided these interventions into four categories: rational (provide information about substances and their effects), developmental (enhance social-emotional constructs such as self-esteem, self-reliance, decision-making, and interpersonal skills), social norms (correct overestimations of prevalence and acceptability), and social reinforcement (teach adolescents to recognize and resist peer pressure to use).¹⁵⁸ This meta-analysis found that although interventions in all four categories produced significant improvements in smoking behaviors in early follow-ups, programs with a social reinforcement orientation produced the largest effects on smoking prevention, followed by developmental and social norms programs; traditional programs with a rational orientation showed the smallest effect.¹⁵⁸ A 1998 meta-analysis of 120 school-based substance use prevention programs found that programs with interactive activities involving face-to-face peer interactions were more effective than traditional didactic programs.¹⁵⁹

A series of Cochrane reviews illustrates the evolving knowledge of what works in school-based smoking prevention programs.¹⁶⁰⁻¹⁶² Thomas and colleagues produced Cochrane reviews of the effectiveness of school-based smoking prevention programs in 2002,¹⁶⁰ 2006,¹⁶¹ and 2013.¹⁶² The first review found inconclusive evidence for effectiveness: half of the highest quality studies reported beneficial effects on smoking, but half did not.¹⁶⁰ The second review found some evidence that social influences-based programs were effective in preventing smoking, but many studies produced null effects.¹⁶¹ The authors called for more rigorous evaluations of programs that used an approach that combined social influence and social competence interventions. The 2013 review of 134 studies concluded that there was no significant overall short-term prevention effect (1 year or less), but the studies with longer follow-up times showed significant prevention effects.¹⁶² Furthermore, interventions that combined social influences and social competence curricula had a beneficial effect, whereas programs that emphasized information only or social influences only were not effective. A 2015 systematic review and meta-analysis by the same researchers focused on 50 RCTs.¹⁶³ This meta-analysis reached conclusions similar to those of the 2013 Cochrane review; studies with more than 1 year of follow-up showed significant smoking prevention effects, whereas studies with shorter follow-up did not. Among the studies with long-term follow-up, the average reduction in smoking initiation among participants who never smoked was 12%. Importantly, this evidence excludes programs that are unable to conduct longer-term follow-up studies due to lack of institutional support. It is unlikely that long-term follow-up data collection alone made these programs more effective. Instead, it is likely that programs that had the resources to conduct long-term follow-up were better resourced and had institutional and community support. This review also supported the superiority of interventions that emphasized both social competence and social influences over those that emphasized information only or social influences only. Furthermore, this analysis also found that booster sessions and peer-led activities did not enhance program effects with 1 year of follow-up or less.

Overall, the evidence suggests that school-based tobacco prevention programs that emphasize social competence and social influences are effective in preventing smoking initiation in adolescents, although the effect sizes are small, and some studies showed null effects. It is important to note that these trials were conducted before the rapid increase in prevalence of e-cigarette use among youth in the early 2010s.^{1,148,149} Most identified evidence-based tobacco prevention programs focused on cigarettes (the most commonly used tobacco product by youth prior to 2014)^{1,148,149} and targeted adolescents (i.e., ages 12–18), rather than young adults (i.e., ages 18–25). All of these reviews focused on tobacco use; none reported program effects on alcohol use.

Several school-based interventions have been developed or adapted to focus on e-cigarette prevention among adolescents. These include CATCH My Breath¹⁶⁴ and Youth Engaged Strategies for Changing Adolescent Norms! (YES-CAN!).¹⁶⁵ These interventions have shown short-term effects on e-cigarette-related knowledge, attitudes, and beliefs.¹⁶⁵⁻¹⁶⁹ A meta-analysis of nine e-cigarette prevention programs for adolescents conducted between 2014 and 2020 found that most interventions also focused on other tobacco products and were based on behavioral theories such as social cognitive theory, social influences, and the theory of planned behavior.¹⁷⁰ Among the 5 studies that reported e-cigarette prevention outcomes, only 3 found significant effects of the intervention (versus control) in reducing e-cigarette use at follow-up (6 to 36 months), 1 found significant increases in e-cigarette use in the intervention condition relative

to control at follow-up, and 1 found no significant difference in e-cigarette use, leading to an overall nonsignificant effect of the interventions on e-cigarette use. The most effective interventions were those that included multiple components such as classroom education, teacher training, and parent education. The effective interventions were the United States-based CATCH My Breath,¹⁶⁴ the Sweden Tobacco-Free Duo,¹⁷¹ and the England Learning Together programs.¹⁷² However, these studies did not assess intervention effects on alcohol use.

The Stanford Tobacco Prevention Toolkit is an online educational resource to prevent use of all tobacco products among adolescents.¹⁷³ The toolkit includes lessons and activities that can be delivered in group settings such as schools or after-school programs. It includes modules about e-cigarettes but does not address alcohol use. This toolkit is unique in that it was developed using a community-based participatory research framework with input from students and school personnel.¹⁷⁴ The toolkit includes curricula, lessons, activities, quizzes, materials, and resources, all available for free online. As of 2020, the online toolkit had been accessed by more than 186,000 users,¹⁷⁴ but an RCT of its effectiveness has not yet been published as of 2026. A small evaluation study conducted without a control group in one Kentucky high school found that exposure to the toolkit produced short-term (same day) improvements in knowledge about e-cigarettes, perceived harms and benefits of e-cigarettes, perceptions of addictiveness, refusal skills, and intentions to use, as well as decreased agreement that tobacco companies are truthful regarding their products' addictiveness and negative health effects.¹⁷⁵ However, this single-day study could not assess changes in e-cigarette use. A small study in Alabama using a pre-post design found improvements in e-cigarette knowledge and perceived addictiveness and decreased intent to try e-cigarettes between pre-test and post-test following a five-session in-person e-cigarette prevention curriculum based on the Stanford Tobacco Prevention Toolkit.¹⁷⁶

School-Based Alcohol Prevention Programs

School-based alcohol prevention programs evolved in parallel with school-based smoking prevention programs and used many of the same theoretical perspectives and intervention strategies, including correcting students' overestimation of alcohol use prevalence, modeling skills to resist an alcohol offer, and encouraging students to make a public commitment not to use alcohol.¹⁷⁷ They also used traditional strategies such as providing information about the consequences of alcohol use, fostering self-esteem, and offering life skills training.¹⁷⁷ Whereas many smoking prevention programs focused only on tobacco, most alcohol prevention programs focused on other substances in addition to alcohol.¹⁷⁷ Even some programs that advertised themselves as alcohol prevention programs (e.g., the Adolescent Alcohol Prevention Trial¹⁷⁸) also addressed tobacco and other substances. A small number of programs (e.g., the Alcohol Misuse Prevention Study¹⁷⁹) focused solely on alcohol use and did not assess effects on tobacco. A 2012 Cochrane review of prevention programs identified 11 school-based studies that evaluated alcohol-specific interventions¹⁸⁰; 6 of these studies found significant prevention effects on alcohol use. This Cochrane review also evaluated 39 trials that focused on substance use in general, not just alcohol. Among these trials, 14 (36%) found significant prevention effects on alcohol use. A 2010 meta-analysis of 6 alcohol prevention curricula for younger adolescents (ages 10–15) found significant prevention effects against both alcohol and cannabis use for programs that used a comprehensive approach, integrating refusal skills, self-management skills, and social skills, rather than an information-only approach.¹⁸¹ A 2016 systematic review of 70 studies, representing 40 alcohol prevention programs, concluded that the interventions with

the most evidence for effectiveness across multiple trials were the Climate Management and Treatment Education (CLIMATE) Schools program in Australia and the Project Adolescent Learning Experiences in Resistance Training (ALERT) and All Stars programs in the United States.¹⁸² A 2015 meta-analysis of 17 studies examined the effectiveness of school-based brief alcohol interventions (i.e., those that provided <5 hours of programming).¹⁸³ These brief interventions differ from school-based tobacco prevention curricula in that they emphasize cognitive decision-making processes rather than other constructs that have been demonstrated successful for tobacco prevention. Hennessy and Tanner-Smith (2015)¹⁸³ found that these brief school-based interventions effectively prevent or reduce alcohol use, specifically when delivered individually rather than in a group setting, or when programs used motivational enhancement components.

A 2011 qualitative review of reviews concluded that effective alcohol prevention programs, primarily delivered to middle school students but sometimes to high school or elementary school students, had several key characteristics.¹⁸⁴ Effective programs (1) are theory driven, based on the social influences model; (2) address social norms and reinforce that alcohol use is not common or acceptable among adolescents; (3) build skills to resist pressure to use alcohol; (4) use interactive teaching techniques; (5) use peer leaders to facilitate program delivery; (6) involve parents and other members of the community; (7) are delivered across multiple sessions and multiple years; (8) provide adequate training for facilitators; and (9) are culturally and developmentally appropriate for the students. However, all of these reviews focused on program effects on alcohol use without considering effects on tobacco use.

School-Based Programs That Addressed Multiple Substances

Numerous studies have implemented school-based programs to prevent the use of multiple substances including tobacco and alcohol, as well as influence other health-related behaviors. Because these programs have been reviewed extensively,^{136,185,186} this section describes the findings from several meta-analyses and Cochrane reviews. This section also describes several programs that have been used extensively in school settings and several programs with demonstrated effectiveness in preventing tobacco use (see Table 8.3).

A 2018 Cochrane review¹⁸⁵ examined individual-, family-, and school-level interventions for adolescents that targeted risk behaviors from at least two of the following categories: substance use (including alcohol, tobacco, cannabis, and other substances), risky sexual behaviors, antisocial behaviors, vehicle-related risk behaviors, self-harm, gambling, and physical activity/diet-related behaviors. This review included 70 studies; 28 (40%) were universal (i.e., delivered to all students, not just students who used substances) school-based studies. Behaviors that were most frequently addressed included alcohol use, drug use, antisocial behavior, and tobacco use. Most of the effective school-based programs were comprehensive; they included multiple years of prevention programming beginning in elementary or middle school and used multiple components, including social skills training, parent education, and changes to the school environment. This review concluded that universal school-based interventions are effective in preventing tobacco and alcohol use, especially when they are reinforced by interventions in the family and/or community.¹⁸⁵

The findings from MacArthur and colleagues' 2018 review¹⁸⁵ of interventions aimed at multiple risk behaviors contrast with findings from a more focused 2022 meta-analysis of interventions that addressed use of at least two substances (including tobacco, alcohol, cannabis, and other substances) but no other risk behaviors.¹³⁶ Tinner and colleagues' 2022 meta-analysis¹³⁶ of interventions among young people ages 8–25 found moderate quality evidence that the 41 universal school-based interventions had little or no short-term benefit (up to 12 months) in reducing alcohol, tobacco, cannabis, or other drug use. However, it is important to note that the wide age range of the participants in the included studies is a limitation in interpreting and drawing conclusions from these findings because the needs of younger and older adolescents differ according to developmental stage.

A 2020 systematic review took a slightly broader approach to assessing school-based substance use prevention programs, including prevention programs that addressed at least one substance (e.g., alcohol, cannabis, or other substances).¹⁸⁶ Interventions could address tobacco use in addition to use of other substances, but interventions that addressed only tobacco use were not included because the authors did not classify tobacco as a mind-altering substance.¹⁸⁶ The 90 identified studies represented 16 different prevention programs. Among these 16 programs, 4 targeted alcohol alone, 4 targeted alcohol and nicotine (with or without other targeted substances), 4 targeted all psychoactive substances, 2 targeted all abused substances, and 2 targeted alcohol and non-tobacco drugs. The evaluated programs with the largest combined sample sizes were the Drug Abuse Resistance Education (DARE) program, Project ALERT, Life Skills Training, Adolescent Alcohol Prevention Trial, and Project Choice. The programs that focused on alcohol use only included the Alcohol Misuse Prevention Study, Protecting You/Protecting Me, the School Health and Alcohol Harm Reduction Project (SHAHRP), and the Seventh Generation Program; none of the evaluations of the alcohol-focused programs measured tobacco use outcomes. Among the programs that targeted multiple substances, the following reported significant effects on tobacco use in RCTs in the United States: the Adolescent Alcohol Prevention Trial,^{187,188} Life Skills Training,¹⁸⁹⁻¹⁹⁴ and Project ALERT.^{195,196} Several of the widely used interventions are reviewed in this section.

Some school-based prevention programs that originally targeted one substance have been expanded to incorporate other substances. For example, Project Towards No Tobacco Use (TNT) originally focused on preventing cigarette smoking among middle school students.^{197,199} TNT was one of the first school-based tobacco prevention programs to be evaluated rigorously in group-randomized trials. Sussman and colleagues (1993)¹⁹⁹ and Dent and colleagues (1995)¹⁹⁷ evaluated the 1- and 2-year effectiveness of 3 prevention strategies: teaching refusal skills, building awareness of social value misperceptions, and providing information on the physical consequences of tobacco use. In a large RCT of 48 middle schools, smoking prevention effects were strongest in schools that were assigned a combination of all 3 strategies.^{197,199} These studies provided more evidence that comprehensive, multicomponent strategies prevent adolescent tobacco use.

TNT was later adapted to address multiple substances and became Towards No Drug Abuse (TND).²⁰⁰ The program was adapted for implementation in alternative high schools, which typically have a higher prevalence of substance use than traditional high schools, and students may be diverted to these schools because of substance use, failing grades, or previous disciplinary actions. TND focuses on preventing use of tobacco, alcohol, cannabis, and other

drugs, and the program follows the same basic structure and uses the same prevention strategies as TNT (e.g., motivation, skills training, decision-making). Although TND was developed from an effective tobacco prevention program (TNT), the initial evaluation of TND produced significant prevention effects on alcohol use but not on tobacco use.¹⁹⁸ At 5-year follow-up, significant prevention effects persisted for use of cocaine, hallucinogens, stimulants, inhalants, and other drugs but not for tobacco or alcohol use.²⁰¹ A replication of this study in traditional high schools found prevention effects for alcohol and other drug use but not for use of cigarettes or cannabis.²⁰² A third evaluation in continuation high schools (alternative high school programs for students who are at risk of not graduating) found significant prevention effects for all substances, but only when the curriculum was delivered in a group setting by trained health educators.²⁰² TNT has since been updated to include content about e-cigarettes. This new program, Towards No Nicotine, is being evaluated in an after-school setting,²⁰³ but as of 2026 results are not yet available.

Project ALERT. Project ALERT is a substance use prevention curriculum delivered in middle schools.^{195,196} It is based on several theories, including the health belief model, which emphasizes cognitive factors that motivate behavior; social learning theory, which emphasizes social norms and social influences; and social cognitive theory, which emphasizes self-efficacy.¹⁹⁶ Like other prevention curricula, Project ALERT focuses on the physical and social consequences of using substances, correcting overestimates of substance use prevalence, and building self-efficacy to refuse substance use offers.¹⁹⁵ The program focuses on cigarettes, alcohol, and cannabis.²⁰⁴ Tremblay and colleagues (2020)¹⁸⁶ reviewed 12 evaluations of Project ALERT. Among these studies, one¹⁹⁶ demonstrated prevention effects on alcohol, and two^{195,196} demonstrated prevention effects on tobacco. However, one study reported that Project ALERT decreased tobacco use among students who experimented with tobacco but increased tobacco use among those who used tobacco regularly.²⁰⁴ The other eight studies reported no significant effects on tobacco or alcohol use, or did not measure either tobacco or alcohol use.

DARE. DARE is a widely disseminated substance use prevention program for elementary, middle, and high school students that is delivered by police officers.²⁰⁵ DARE was developed in 1983 to prevent tobacco, alcohol, and other drug use, and quickly spread to school districts nationwide. In 1994, a review of DARE programs reported that 52% of U.S. school districts had adopted DARE,²⁰⁶ and in 2007, approximately 75% of school districts were implementing DARE.²⁰⁵ Like many other substance use prevention programs, DARE focuses on enhancing psychosocial skills to reduce substance use, including social skills (e.g., peer-pressure resistance), building self-esteem, informing attitudes toward drug use and attitudes toward police, and improving family bonding. DARE was controversial because it was disseminated widely in the absence of RCTs demonstrating its effectiveness and because some communities were not comfortable with police officers delivering a substance use prevention program.²⁰⁷ A 1994 early meta-analysis of eight evaluation studies of DARE found a significant effect for tobacco use but not for alcohol or cannabis use, and effect sizes were substantially lower than those of other more interactive classroom-based social influences programs.²⁰⁸ The largest effects were on knowledge, social skills, and positive attitudes toward police officers. A 2009 meta-analysis of 20 evaluations of DARE,²⁰⁵ which updated previous meta-analyses,²⁰⁸ found very small effect sizes for the prevention of tobacco, alcohol, or other drug use. In both meta-analyses, the authors concluded that DARE is largely ineffective for preventing tobacco, alcohol, and other drug use, despite its widespread use.^{205,208}

In 2018, DARE partnered with an evidence-based prevention program, *keepin' it REAL*, to adapt *keepin' it REAL* to be delivered by DARE officers to 5th grade students.²⁰⁹ The adapted program produced statistically significant reductions at 1-year follow-up in the prevalence of past-month alcohol use, drunkenness, and e-cigarette use when compared with virtual controls (i.e., expected substance use prevalence data derived from baseline age and psychosocial predictor percentiles, and anticipated trajectories).²⁰⁹ However, effects on cigarette smoking were not analyzed because the prevalence of cigarette smoking among participants was too low.

College Campus Tobacco and Alcohol Prevention Programs and Policies

As of 2022, approximately 39% of young adults ages 18–24 were enrolled in college.²¹⁰ Compared with young adults who are not in college, college students report a higher prevalence of heavy alcohol consumption, including binge drinking,²¹¹ but a lower prevalence of tobacco use.²¹² Most middle school or high school prevention programs have focused only on tobacco use or on use of multiple substances; in contrast, on college campuses, there has been an abundance of alcohol prevention programs but fewer tobacco prevention programs.²¹³ Before passage in 2019 of legislation that raised the federal minimum age of sale of tobacco products from 18 to 21 years of age, college students in many states were old enough to purchase tobacco legally. Therefore, colleges may not have had legal justification for preventing students from purchasing or possessing tobacco. Colleges could, however, implement smokefree policies (described in detail in the section “Policy Influences on Tobacco and Alcohol Use”), though the efficacy of those policies depended on effective enforcement, which could be difficult.^{214,215} In addition, college students (and other young adults) do not often experience the serious adverse health effects of tobacco use, because these effects typically occur after decades of tobacco use.⁷⁴ In contrast, alcohol use on college campus often produces immediate hazards both to students who use alcohol and others around them; campus alcohol use often manifests as binge drinking, which has been linked with unintentional injury, physical and sexual assault, and driving under the influence of alcohol.²¹⁶ In addition, campus alcohol use poses negative consequences for the schools themselves, such as increased costs for health care and security, campus vandalism, and damage to a school’s reputation.²¹⁷

College Campus Tobacco and Alcohol Prevention Programs

Many college campuses implement programs to prevent or reduce alcohol use by students,²¹⁸ most of whom are below the legal age to purchase alcohol, which has been age 21 since enactment of the 1984 National Minimum Drinking Age Act.²¹⁹ A 2007 meta-analysis of 62 campus-based interventions identified a wide variety of strategies including alcohol education, decisional balance, expectancy challenge, feedback on consumption, feedback on expectancies or motives, feedback on problems, goal setting, identification of high-risk situations, educational materials, motivational interviewing, moderation strategies, normative comparisons, skills training, and values clarification (most campus-based programs used multiple strategies).²²⁰ These interventions produced reductions in alcohol use quantity, frequency, and problems at short-term (4–13 weeks post-intervention) and intermediate-term (14–26 weeks post-intervention) follow-ups, and effects on alcohol use frequency and alcohol-related problems persisted at long-term follow-up (more than 27 weeks). This review concluded that the most effective interventions included motivational interviewing, normative feedback, feedback on

expectancies and/or motives for drinking alcohol, and/or used decisional balance exercises. However, these interventions were less effective among students who drank heavily than among students who drank occasionally. This review and a subsequent 2012 review by the same authors²²¹ both concluded that in-person or face-to-face interventions were more effective than computer-delivered interventions. However, these studies did not examine tobacco use as an outcome.

Many colleges implement substance use prevention programs as part of larger student wellness initiatives. A 2019 review of 88 college campus substance use prevention programs found that 70 programs focused on alcohol use; only 9 programs focused on tobacco use, and the rest focused on use of other drugs.²¹³ This analysis found support for the effectiveness of the alcohol prevention programs on multiple alcohol-related outcomes (e.g., alcohol consumption, blood alcohol content, negative consequences related to alcohol consumption, binge drinking). However, the effectiveness of tobacco prevention programs was mixed, with only 4 (44%) of the studies reporting a reduction in tobacco use frequency. The review included studies that measured tobacco use frequency, but it did not evaluate complete abstinence from tobacco, which is often the main outcome variable in tobacco cessation studies. The relative lack of tobacco prevention programs on college campuses is a missed opportunity to prevent disease caused by tobacco, especially because between 2002 and 2018, the average age of transition from smoking initiation to daily smoking shifted closer to young adulthood from adolescence.¹⁴⁷

Some alcohol prevention programs on college campuses focus on students who have violated campus alcohol policies, for example, by possessing alcohol or being intoxicated on campus. These programs include mandatory participation in alcohol education groups, parental notification, individual counseling including motivational interviewing, and computer-delivered alcohol education.²²² A 2016 meta-analysis of 31 mandated alcohol prevention programs found that the interventions decreased alcohol consumption (e.g., drinks per week/month, drinks per drinking interval, peak consumption, frequency of drinking days and heavy drinking, typical and peak blood alcohol content) and alcohol-related problems in the short term (within 3 months), but these effects diminished over time.²²³ None of these studies assessed tobacco use as an outcome.

College Campus Tobacco and Alcohol Policies

Many college campuses have implemented tobacco-free and/or alcohol-free campus policies alone or in conjunction with health education programs. A 2015 meta-analysis of 19 studies of the effectiveness of tobacco-free college campus policies through 2013 found that the majority of students and faculty supported these policies.²²⁴ However, only two of the studies assessed policy effects on student tobacco use^{225,226}; both studies found statistically significant reductions in student tobacco use, and Seo and colleagues (2011)²²⁶ also found a decrease in students' perception that smoking is normative among their peers. A 2017 publication reviewed 11 evaluations of tobacco-free college campus policies that assessed student tobacco use.²²⁷ However, only three of these studies^{225,226,228} were longitudinal; the rest reported student tobacco use outcomes after a campus tobacco-free policy was instituted, compared colleges with and without tobacco-free policies, or compared colleges with comprehensive versus partial tobacco-free policies. This review concluded that more comprehensive tobacco policies (i.e., broad tobacco-free campus policies rather than policies solely restricting tobacco use in or near

buildings) are more successful in reducing student tobacco use and increasing smoking cessation attempts. This review noted several threats to validity, including reliance on students' self-reports of tobacco use, varying measures of tobacco use across studies, and study populations of primarily White students. Interestingly, campuses that instituted designated smoking areas as an anti-tobacco policy had a higher smoking prevalence than campuses that implemented comprehensive tobacco-free policies, perhaps because designated smoking areas offer students who smoke a place to socialize with fellow students, which reinforces the smoking behavior. The social aspect of smoking is likely particularly relevant in the college context. None of the studies in this 2017 review focused on e-cigarette use.²²⁷

A 2024 review identified 54 studies of smokefree or tobacco-free policies on college campuses published from 2005 to 2022.²²⁹ A total of 15 studies found that smokefree or tobacco-free campus policies were significantly associated with reduced smoking prevalence over time. The review included 6 studies that measured e-cigarette use outcomes. Five of the six studies found that smokefree or tobacco-free campus policies were associated with increased initiation of e-cigarette use or e-cigarette use prevalence among students, with the remaining study finding no effect.²³⁰⁻²³⁴ However, the studies examining e-cigarette outcomes were conducted from 2012 to 2019,²³⁰⁻²³⁴ a period that coincided with a rapidly increasing prevalence of e-cigarette use overall.²³⁵ As a result, it is unclear whether the increase in e-cigarette use was due to the overall increase in e-cigarette use occurring at that time, to students switching from cigarettes to easier-to-conceal e-cigarettes in response to the tobacco-free campus policy, or to a combination of these and other factors. None of these studies assessed the impact of campus tobacco policies on alcohol use, although one study found that frequent alcohol consumption had a negative effect on compliance with policies.²³⁶

Very few studies have focused on the effects of tobacco-free policies on alcohol use. Two small studies found that new smokefree bar policies in communities surrounding college campuses did not affect college students' alcohol use²³⁷ or intention to go to bars that served alcohol.²³⁸

Alcohol-free college campuses are uncommon, and few studies have addressed the effectiveness of campus alcohol-free policies.^{239,240} One study found that the prevalence of student alcohol use was lower on campuses with alcohol-free policies,²⁴⁰ but this might reflect self-selection of alcohol-using students into campuses without alcohol-free policies or underreporting of alcohol use on campuses that prohibit alcohol consumption. A 2005 nationally representative study of college students across 120 universities found associations between self-reported campus alcohol policies and smoking behavior.²⁴¹ Adolescents and young adults on campuses where their peers rated ease of alcohol availability as very easy and/or alcohol policy enforcement as low were more likely to report cigarette smoking than those on campuses where alcohol was perceived as less available or alcohol policy enforcement was perceived as greater. A limitation of this study is that the authors measured students' perceptions of alcohol availability and alcohol policy enforcement, rather than the actual availability of alcohol and implementation of specific policies on campuses.

Many colleges ban alcohol use in specific situations or settings, such as sporting and tailgating events, fraternity and sorority houses, and dormitories.²⁴² A 2007 review of policies listed numerous strategies to restrict alcohol access among underage students, for example, banning alcohol at parties, banning beer kegs and self-service of alcohol at parties, requiring an

identification card for alcohol purchase, and banning alcohol advertising and sponsorship on campus.²⁴³ This review concluded that multicomponent strategies as well as social norms campaigns are promising but need more rigorous evaluation. Research produced through 2017 has been used to inform the College Alcohol Intervention Matrix,^{217,244} which evaluates the effectiveness of individual interventions and environmental policies for preventing alcohol-related problems. The College Alcohol Intervention Matrix suggests numerous policies and interventions that are rated as effective based on evidence in published, peer-reviewed studies, such as normative re-education or prohibiting alcohol sale or consumption at college sporting events. None of the studies identified in the literature search for this chapter evaluated the effect of alcohol policies on prevention of tobacco use. The literature on campus tobacco and alcohol policies tends to remain siloed, with studies of campus tobacco policies not measuring alcohol use, and studies of campus alcohol policies not measuring tobacco use.

Family-Based Interventions

Some substance use prevention programs are delivered to families to improve parenting behaviors that are protective against adolescent substance use, such as supportive parent-child relationships, positive discipline methods, rule-setting, monitoring and supervision, family advocacy for children, and information seeking and support for the benefit of children.^{245,246} The Community Preventive Services Task Force (known as “the Community Guide”) recommends family-based interventions as effective for preventing substance use among youth, including tobacco and alcohol. Their systematic review included studies where the family-based intervention was delivered primarily to families with youth aged 10 to 14 years old.²⁴⁶ In addition, a systematic review of economic evidence on family-based youth substance use prevention programs suggests that the societal benefits of the programs outweighed societal costs.²⁴⁷ Interventions with published results include the Family Check Up²⁴⁸⁻²⁵³ (for youth ages 2–17), RaiseSmoke Free Kids²⁵⁴ (also known as ONE Step, targeting parent behavior to help children), Parents Who Care²⁵⁵ (for preadolescents to adolescents), Strengthening Families Program²⁵⁶⁻²⁶⁰ (for families and children from birth to age 17), and Familias Unidas²⁶¹⁻²⁶⁶ (for adolescents). The types of interventions that have shown significant prevention effects are parent training (primarily cognitive behavioral parent training), family skills training (including training on parenting, children’s social skills, and family relationships), and family therapy (structural, functional, or behavioral family therapy).^{246,267} Family interventions can be classified as universal (delivered to the general population of families), selected (delivered to families at high-risk of experiencing problems), or indicated (delivered to families that are already experiencing problems).

Family-Based Tobacco Prevention Programs

A 2015 meta-analysis of family-based smoking prevention interventions identified 27 studies, including 6 that focused on tobacco use alone; 2 that focused on tobacco and alcohol; 3 that focused on tobacco, alcohol, and cannabis; 1 that focused on alcohol use alone; 2 that focused on tobacco and cardiovascular health; 1 that focused on general substance use; 2 that focused on HIV and unsafe sex and associated tobacco use outcomes; and 10 that focused on family function, child development, and modifying adolescent behavior.²⁶⁸ The analysis found moderate quality evidence that family-based interventions, used alone or with school-based programs, are effective against adolescent smoking initiation. The most effective interventions were those that

encouraged authoritative parenting (high warmth and high demandingness, including interest in the adolescent, care for the adolescent, and rule setting), as compared with authoritarian (low warmth and high demandingness) or permissive (high warmth and low demandingness) parenting styles.^{268,269}

Family-Based Alcohol Prevention Programs

Meta-analyses have examined the effectiveness of family-based alcohol prevention programs. Family-based alcohol prevention programs typically involve parenting interventions designed to foster positive parenting, parent-child communication, and parental monitoring of adolescents' activities.²⁴⁶ Some programs focus on parents, whereas others include activities for parents and adolescents, to complete either separately or together. A 2008 meta-analysis of 18 studies of 9 RCTs found that family-based alcohol prevention interventions were generally effective in preventing adolescent alcohol use initiation, past-month use, and frequent use.²⁷⁰ The authors noted that family-based alcohol prevention programs are more effective when all families within a given school system are receiving the intervention, potentially because intervention effects are amplified within a school setting as intervention recipients' attitudinal and behavioral changes feed into new norms and peer influences. This result suggests that family-based prevention programming should be part of a comprehensive alcohol prevention package. They also noted that studies varied in how they analyzed families that were lost to attrition. As a result, it is unclear whether prevention effects generalize to families who drop out of family-based interventions. This qualification is important because adolescents in these families are typically at higher risk for substance use.²⁷⁰

A 2019 Cochrane review of 46 studies examined the effects of family-based interventions on adolescent alcohol use delivered to adolescents with no known risk factors (universal interventions), those at increased risk of alcohol use (selective interventions), and those already using alcohol (indicated interventions).²⁷¹ Most of the interventions focused on prevention of alcohol, tobacco, and other drug use; 10 focused on alcohol use only. This review found no significant pooled effect of family-based intervention as compared with either no intervention or standard of care on prevalence or frequency of alcohol use, and the results were similar for universal and selected or indicated interventions. Interventions had only a very small effect on the volume of alcohol consumed by adolescents.

Family-Based Interventions to Prevent Both Tobacco and Alcohol Use

A 2016 meta-analysis of 116 studies of family-based substance use prevention programs categorized the interventions according to the components of family function that they emphasized, including parental monitoring and behavior management; fostering school success; positive family relationships; substance use knowledge, attitudes and values; self-regulation and stress management; problem solving; resisting peer pressure psychoeducation; ethnic identity; and future orientation.²⁷² This meta-analysis found that programs that included an emphasis on positive family relations or future orientation had significant effects on adolescent substance use. Effect sizes were similar for use of tobacco, alcohol, and other drugs. The authors also concluded that the most effective family-based programs included activities for both parents and adolescents, not just for parents.²⁷²

A 2022 meta-analysis of parenting interventions to modify multiple behaviors (including tobacco, alcohol, or other drug use; physical activity; diet; and sedentary behavior) among adolescents included 46 studies of 36 RCTs.²⁷³ These programs typically addressed multiple behaviors, often targeting both tobacco and alcohol use or both diet and physical activity. Among the 36 trials, 20 targeted both tobacco and alcohol use, and 1 targeted use of alcohol and other drugs but not tobacco use. All studies that focused on tobacco and alcohol use included face-to-face group sessions for parents to provide emotional and practical social support. Other parent-based intervention strategies included goal setting, problem solving, feedback and monitoring, parenting skills, information about consequences of use, and behavioral practice of parenting skills. This meta-analysis found that the reviewed programs had no significant prevention effects on adolescent tobacco or alcohol use.²⁷³

Summary of Group-Level Interventions

School-based interventions for preventing tobacco and alcohol use can be effective, particularly when they contain components to address social influence, social competence, and perceived social norms; are interactive; and more intensive in terms of dose and content, including multiple levels of interventions (e.g., at the family and community levels) and multiple components (e.g., activities to teach students to recognize and resist peer pressure, parental education) that begin early (e.g., in elementary school or middle school) and persist over time. In elementary, middle, and high schools, as well as in colleges, tobacco prevention programs and alcohol prevention programs are often administered and evaluated separately, and there is a lack of literature addressing cross-substance program effects. Family-based interventions are effective for preventing adolescent substance use, including tobacco and alcohol use. Some evidence indicates that effectiveness of family-based prevention interventions may be bolstered by including the school context.

Population-Level Interventions

Some prevention programs have targeted entire communities (variously defined as cities, counties, states, etc.). This section describes population-level interventions, including multilevel programs and mass media campaigns, that have addressed both tobacco and alcohol use.

Multilevel Programs

Multilevel programs deliver prevention messages in multiple settings including schools, communities, and the media. Several reviews have evaluated the effectiveness of multilevel alcohol prevention programs. For example, a 2008 review of school-based, family-based, and community-based interventions aggregated the findings of 25 earlier reviews and synthesized the evidence for effectiveness of 127 different interventions.¹⁹¹ Of these interventions, 12 met the criteria for most promising evidence of effectiveness against alcohol use, and 29 met the criteria for mixed or emerging evidence. This review noted that the effects of many interventions on alcohol use could not be disentangled from those for use of other substances because many studies reported composite measures of substance use, rather than program effects on the use of specific substances.¹⁹¹ This section describes some multilevel programs for tobacco and/or alcohol and general substance use prevention that reported cross-substance outcomes, with selected programs rated as effective or promising by Blueprints or the Department of Justice highlighted in Table 8.3.

Examples of Multilevel Programs That Focused on Alcohol Use and Reported Effects on Tobacco Use

Project Northland. One intervention that focused on alcohol but also examined effects on tobacco was Project Northland.²⁷⁴⁻²⁷⁶ Project Northland was created specifically to focus on alcohol use because the authors noted that earlier studies of multisubstance prevention programs typically showed significant effects on tobacco use but not on alcohol use, suggesting that alcohol-specific programming was needed.²⁷⁶ Project Northland was implemented in rural Minnesota, in communities that were predominantly White. This prevention program for 6th through 8th grade adolescents was comprehensive and included school-based curricula, parent education, homework activities for adolescents and parents to complete together, and community-wide task forces mobilized in support of alcohol-related local ordinances and resolutions. The intervention produced a reduction in adolescent alcohol use and tobacco and alcohol co-use (defined as having used alcohol in the past month and having smoked cigarettes on more than one or two occasions), although the effects on tobacco use alone did not reach statistical significance.²⁷⁶ This study demonstrated the power of a comprehensive, multicomponent, multiyear intervention to reduce both tobacco and alcohol use. However, because all the program components were implemented simultaneously, it is difficult to identify an active ingredient (e.g., school curricula, family activities, legislation promoted by community task forces, or a combination of these interventions). Furthermore, large budgets are required to implement programs in many school districts and to mobilize an entire community to prevent adolescent substance use.

Project Northland was replicated among 6th through 8th grade students in an urban, low-income setting in Chicago; most of the students were African American or Hispanic.²⁷⁵ The areas included in this study likely had substantially more alcohol advertising and more alcohol retailers than the original Project Northland setting, and parents perceived that other problems, such as gang violence, were much more important than adolescent alcohol use. In a study evaluating the adapted program, tobacco use was not assessed separately but was included in a tobacco and other drug use composite variable. This study reported no significant effects on alcohol, tobacco, or other drug use, although a secondary analysis found that higher participation in the home-based intervention component was significantly associated with lower scores on a composite variable representing any use of any substance. The authors attributed the lack of effect of the intervention in urban Chicago to several factors including higher student attrition, ubiquitous exposure to alcohol retailers and advertising, competition with other challenges facing the community (e.g., drug trafficking, gangs, violence, and housing concerns) low community acceptance of the problem of teen alcohol use, and limited time among residents to volunteer for community action teams.²⁷⁵ Additionally, this study highlights the importance of replicating the findings of substance use prevention programs in different community settings.

Midwestern Prevention Project. The Midwestern Prevention Project was a comprehensive substance use prevention program implemented in Kansas in the 1980s.²⁷⁷ The program included mass media programming, a school-based educational curriculum, parent education and organization, community organization, and health policy components, with these components rolled out over a 6-year period. In the first 2 years of the project, 22,500 sixth- and seventh-grade adolescents from 42 schools received mass media programming and a school-based educational program component that included parental involvement in homework.²⁷⁷ Analyses indicated that

the use prevalence for all three substances (cigarettes, alcohol, and cannabis) was significantly lower at 1-year follow-up in the intervention condition relative to the delayed intervention condition.²⁷⁷ The success of this project could be because prevention messages were reinforced community-wide with interventions that spanned school curricula, a media campaign, community events, and new health policies. However, the effectiveness of each individual component of the program is difficult to evaluate because all components were delivered simultaneously.

Communities That Care. Communities That Care (CTC) is a comprehensive, community-based program to prevent substance use and other unhealthy behaviors among adolescents.²⁷⁸

The program involves five phases. In phase 1, key leaders assess community readiness to adopt the CTC approach to prevention. In phase 2, the community forms a prevention board, and in phase 3, the community board uses community-specific epidemiological data to assess community risks and strengths and conduct a resource assessment of prevention programs already occurring in the community. The board then assesses the epidemiology of problem behaviors in their community, identifies risk and protective factors that influence outcomes, and prioritizes the risk and protective factors and outcomes that should be addressed. In phase 4, the community board selects empirically supported prevention programs to address the prioritized risk factors and outcomes. During phase 5, the board supports the implementation of these programs, evaluates their effectiveness in the community, and revises their plans as necessary. The Community Youth Development Study^{279,280} tested the effectiveness of the CTC intervention in a community-randomized trial in which 24 communities across the United States were randomized to receive the CTC program or a control condition. The study followed 5th grade students in the communities after the implementation of the program. One study investigated the effect of the intervention on substance use initiation among the students through 7th grade.²⁷⁹ However, because the authors aggregated all substances (including alcohol, cigarettes, cannabis, inhalants, cocaine, barbiturates, ecstasy, and prescription drugs) into a single substance use variable, it was not possible to separate out the intervention's effects on tobacco and alcohol use. The intervention and control groups did not significantly differ in substance use during 6th and 7th grade, leading the authors to conclude that the intervention was not effective in preventing substance use.²⁷⁹ However, another study from the same trial found significant prevention effects for both tobacco and alcohol use by 8th grade;²⁸⁰ over the following 2-year period, 6th graders in the control communities were 60% more likely to initiate alcohol use and 79% more likely to initiate cigarette smoking between 7th and 8th grade than 6th graders in the CTC intervention condition. An 8-year follow-up study of this cohort found that the CTC program significantly prevented both tobacco and alcohol use.²⁸¹ A 10-year longitudinal study of this cohort, collected when participants were approximately 21 years old, reported significant prevention effects on any "gateway drug" use (i.e., alcohol, tobacco, or cannabis)²⁸²; however, the effects on tobacco and alcohol use individually were not significant. Discrepant findings on the effectiveness of this intervention in preventing substance use may be attributed to differences in coding of substance use variables and analytic strategies across the studies. Additionally, the program's effect may diminish over time, so that its effects decrease as students grow older.

Table 8.3 Selected Effective or Promising Tobacco and Alcohol Prevention Interventions

Intervention	Target population	Published effects on tobacco use	Published effects on alcohol use	Evidence rating: DOJ Model Programs Guide	Evidence rating: Blueprints for Healthy Youth Development
Communities That Care ²⁷⁸⁻²⁸²	Grades 5–9	Among Grade 5 cohort: - By Grade 7: No significant effect on substance use initiation (alcohol, cannabis, cigarettes, or other illicit drugs). - By Grade 8: Initiation of cigarette smoking (aOR = 1.79, 95% CI = 1.09–2.92) and smokeless tobacco use (aOR = 2.34, 95% CI = 1.34–4.09) was significantly higher in the control communities than intervention communities. - By Grade 12: Abstinence from cigarette smoking (aRR = 1.13, 95% CI = 1.01–1.27) was higher in the intervention communities than control communities. - By Age 21 (11 years after initial implementation): No significant main effect on tobacco use initiation. Among male participants only, there was a significant increase in the likelihood of sustained abstinence from tobacco use among the intervention group ($d = 0.23$; adjusted risk ratio = 1.30 [95% CI, 1.07–1.68]).	Among Grade 5 cohort: - By Grade 7: No significant effect on substance use initiation (alcohol, cannabis, cigarettes, or other illicit drugs). - By Grade 8: Initiation of alcohol use (aOR = 1.60, 95% CI = 1.05–2.44) was significantly higher in the control communities than intervention communities. - By Grade 12: Abstinence from alcohol use (aRR = 1.31, 95% CI = 1.09–1.58) was higher in the intervention communities than control communities. By Age 21 (11 years after initial implementation): No significant main effect on alcohol use initiation. Significant intervention effects were observed for any “gateway drug” use (alcohol, tobacco, cannabis) ($d = 0.26$; adjusted risk ratio = 1.49 [95% CI, 1.03–2.16]).	Promising	Promising
Familias Unidas ²⁶²	Grade 8 and Hispanic	From baseline to 30-month follow-up, past-30-day substance use increased from 15% to 25% among intervention participants, but increased significantly more among participants in the control group, from 13% at baseline to 34% at the 30-month follow-up.	From baseline to 30-month follow-up, past-30-day substance use increased from 15% to 25% among intervention participants but increased significantly more among participants in the control group, from 13% at baseline to 34% at the 30-month follow-up.	Effective	Promising
Midwestern Prevention Project ²⁷⁷	Grades 6–7	1-year follow-up: Past-month cigarette smoking prevalence was significantly lower among participants in the intervention condition (17%) than participants in the delayed intervention condition (24%).	1-year follow-up: Past-month alcohol use prevalence was significantly lower in the intervention condition (11%) than in the delayed intervention condition (16%).	Effective	Not dissemination ready

Table 8.3 (continued)

Intervention	Target population	Published effects on tobacco use	Published effects on alcohol use	Evidence rating: DOJ Model Programs Guide	Evidence rating: Blueprints for Healthy Youth Development
Project Northland ²⁷⁴⁻²⁷⁶	Grades 6–8	Implementation in rural Minnesota, 3-year follow-up: - No significant main effect on lifetime cigarette smoking (defined as more than 2 or 3 lifetime occasions of use). - There was a significant difference in cigarette and alcohol co-use (lifetime cigarette smoking and past-month alcohol use) between the intervention and control groups (14.3% versus 19.4%, $p < .03$). Implementation in Chicago, 30-month follow-up: - Tobacco use was not measured independently. - There was no significant main effect on the composite drug use outcome (alcohol, tobacco, and cannabis use).	Implementation in rural Minnesota, 3-year follow-up: - The prevalence of recent alcohol use was significantly lower in the intervention group than in the control group: past week alcohol use, 10.5% versus 14.8%, $p < .05$; past-month alcohol use, 23.6% versus 29.2%, $p < .05$. - There was a significant difference in cigarette and alcohol co-use (lifetime cigarette smoking and past-month alcohol use) between the intervention and control groups (14.3% versus 19.4%, $p < .03$). Implementation in rural Minnesota, 7-year follow-up: There was a significantly smaller increase in past-month alcohol use in the intervention group than in the control group during phase 1 (Grades 6–8) but not phase 2 (Grades 11–12): phase 1, mean growth rate 0.11 vs 0.16, $p < .01$; phase 2, mean growth rate 0.13 vs. 0.20, $p = .07$. There was a significantly smaller increase in binge drinking (5 or more drinks in a row in the past 3 weeks) in the intervention group than in the control group during both phases: phase 1, mean growth rate 0.05 vs 0.08, $p < .01$, phase 2, mean growth rate 0.09 vs 0.18, $p = .02$. Implementation in Chicago, 30-month follow-up: - There was no significant main effect on alcohol use alone. - There was no significant main effect on the composite drug use outcome (alcohol, tobacco, and cannabis use).	Promising	Not dissemination ready
Project Towards No Tobacco (TNT) ^{197,199}	Grades 6–8	1-year follow-up: Combined implementation of 3 intervention strategies had the largest effects on initiation and weekly use of cigarettes and smokeless tobacco. 2-year follow-up: Combined implementation of 3 intervention strategies had the largest effects on weekly use of cigarettes and smokeless tobacco.	N/A	Promising	Inconclusive evidence

Table 8.3 (continued)

Intervention	Target population	Published effects on tobacco use	Published effects on alcohol use	Evidence rating: DOJ Model Programs Guide	Evidence rating: Blueprints for Healthy Youth Development
Project Towards No Drug Abuse (TND) ^{198,200,201,202}	Grades 9–11	Continuation high schools, 1st curriculum version, 1-year follow-up: No significant effects on past-30-day cigarette smoking. Continuation high schools, 1st curriculum version, 5-year follow-up: No significant effects on past-30-day cigarette smoking. Traditional high schools, 1st curriculum version, 1-year follow-up: No significant effects on past-30-day cigarette smoking. Continuation high schools, 2nd curriculum version, 1-year follow-up: A significant effect (27% relative reduction in past-30-day cigarette smoking) was observed only for the health educator-led condition.	- Continuation high schools, 1st curriculum version, 1-year follow-up: Past-30-day alcohol use was lower at follow-up among students with higher pretest alcohol use levels. - Continuation high schools, 1st curriculum version, 5-year follow-up: There were no significant effects on past-30-day alcohol use. - Traditional high schools, 1st curriculum version, 1-year follow-up: The intervention resulted in a significant reduction (12%) in past-30-day alcohol use. - Continuation high schools, 2nd curriculum version, 1-year follow-up: A significant effect (9% relative reduction in past-30-day alcohol use) was observed only for the health educator-led condition.	Ineffective	Model
Strengthening Families Program ^{256-260,257,283}	Grade 6	1-year and 2-year follow-ups: Intervention participants were less likely than control participants to progress from nonuse to tobacco or alcohol use, or from use of 1 substance to use of both substances. - At Grade 10 (4-year) follow-up: Significantly reduced tobacco use, $p < .01$. - At age 21 (9-year) follow-up: Significant reductions in polysubstance use ($p < .05$) and marginally significant reductions in cigarette frequency ($p < .10$).	1-year follow-up: Lower alcohol initiation in intervention participants relative to control participants (Cohen's $f = 0.26$, $p < .05$). 2-year follow-up: Lower alcohol initiation in intervention relative to control (Cohen's $f = 0.29$, $p < .01$). - At Grade 10 (4-year) follow-up: Significantly reduced alcohol use ($p < .01$). - At age 21 (9-year) follow-up: Significant reductions in polysubstance and drunkenness frequency ($p < .05$).	Promising	Promising

Note. aOR = adjusted odds ratio; aRR = adjusted risk ratio; CI = confidence interval; DOJ = Department of Justice; N/A = not applicable. Programs are listed alphabetically by program name. For DOJ Model Programs Guide, a rating of "promising" indicates that "Programs have some evidence indicating they achieve their intended outcomes," and a rating of "effective" indicates "programs have strong evidence indicating they achieve their intended outcomes when implemented with fidelity."²⁸⁴ For Blueprints for Healthy Youth Development, a rating of "promising" indicates that an intervention meets the "minimum standard of effectiveness," and a rating of "model" indicates that an intervention meets a higher standard than "promising" and provides a "greater confidence in the program's capacity to change behavior and targeted outcomes."²⁸⁵ DOJ and Blueprints ratings reflect ratings as of August 2025.

Additional sources: [Blueprints for Healthy Youth Development](#); [U.S. Department of Justice, Office of Justice Programs](#).

Tobacco and Alcohol Prevention for Different Populations

Sociodemographic subpopulations, such as immigrant populations and/or groups that may experience discrimination, have additional risk and protective factors that must be considered when developing, implementing, or evaluating prevention interventions for tobacco and alcohol use.²⁸⁶ These factors include acculturation, enculturation, parent-child acculturation discrepancies, discrimination, and cultural stress.²⁸⁷ It is important to determine whether specific sociodemographic groups would benefit from culturally tailored substance use prevention programs, or whether culturally generic prevention programs would be equally effective across cultural groups. It is possible that culturally tailored programs, which incorporate culturally resonant characters, artwork, and language and address specific protective cultural values, could be even more effective.²⁸⁸

Indeed, there is evidence that tailoring prevention program content to the specific norms and values of a cultural group can improve program effectiveness. Programs that are adapted and culturally tailored for a specific population typically produce stronger prevention effects within that population than effects produced using the culturally generic version of the same program. A meta-analysis of 30 RCTs focused on interventions that had been culturally adapted for specific racial and ethnic groups found that the positive effect of culturally tailored interventions on substance use was larger when the control condition was a nontailored, active intervention than when the control condition was nonactive (e.g., waitlist control).²⁸⁸ More than one-half of the interventions (53%) were culturally adapted for Hispanic adolescents, 23% were adapted for Black adolescents, and 23% were adapted for American Indian adolescents. Among the interventions tailored to Hispanic adolescents, most addressed acculturation issues (e.g., adolescents' bicultural competency, parental knowledge of U.S. cultural norms), cultural values, and ethnic identity, with some coverage of racial and ethnic discrimination and immigration-related challenges. The seven interventions tailored to Black adolescents generally focused on cultural socialization (e.g., building positive racial and ethnic pride and cultural pride) and preparation for racial bias (e.g., strategies to handle discrimination, culturally appropriate coping strategies). Interventions tailored to American Indian adolescents included culturally sensitive components that addressed cultural socialization (e.g., incorporating American Indian cultural symbols, cultural values, knowledge, stories, illustrations, and traditional practices into program content), learning about Tribal-specific histories, and promoting ethnic and cultural identity. This meta-analysis found significant prevention effects for both tobacco and alcohol use for intervention participants relative to control participants. Effects were significant for Hispanic, Black, and American Indian adolescents, and there were no significant differences in prevention effects across racial and ethnic groups in the overall effect size.²⁸⁸

Media Literacy Interventions

Some interventions attempt to counter the effects of tobacco and alcohol advertising by teaching media literacy—the ability to view an advertisement and understand its intended audience, the message, the message's producer, and who stands to benefit from the audience viewing the message. For example, individuals who see an advertisement that presents a person who smokes cigarettes or drinks alcohol as attractive would be able to understand that the tobacco or alcohol company producing the advertisement stands to benefit from consumers associating their product with attractiveness but that the product does not actually make people more attractive.

Media literacy interventions teach adolescents and young adults to recognize and understand the tactics used by advertisers to promote products to help the participants develop counterarguments against such advertising. A 2018 meta-analysis of 20 media literacy interventions (10 on smoking, 5 on alcohol use, and 5 on other health behaviors) found an overall significant positive effect on media literacy, attitudes, and behavioral intentions.²⁸⁹ However, these studies did not assess behavioral outcomes longitudinally. None of the smoking media literacy studies assessed alcohol media literacy, and none of the alcohol media literacy studies assessed smoking media literacy.

Industry-Sponsored Adolescent and Young Adult Prevention Programs

The tobacco industry has sponsored adolescent tobacco prevention programs as part of corporate social responsibility efforts.^{20,290-292} The stated purpose of these programs was to decrease tobacco use among adolescent and young adults; however, as noted in NCI Tobacco Control Monograph 21, *The Economics of Tobacco and Tobacco Control*, “the U.S. Surgeon General, the courts, and research studies analyzing previously internal tobacco industry documents have generally concluded that the actual purpose of the industry programs is to discourage legislation, regulation, and programming to effectively reduce youth tobacco use; to improve the tobacco industry’s public image; to generate partnerships with youth-serving organizations; and to limit the threat of litigation.”^{291,p.290} Furthermore, NCI’s Monograph 19 concluded that “tobacco industry youth smoking prevention campaigns have been generally ineffective in reducing youth smoking. Moreover, they may even have increased smoking in some subgroups of youth.”^{24,p.15} Specific strategies used by the tobacco industry, including self-help booklets for families; industry-sponsored, school-based prevention programs; industry/community partnerships; and industry-sponsored antismoking campaigns in the mass media, are described in detail in the 2012 Surgeon General’s report²⁰ and the 2008 World Health Organization’s report, *Tobacco Industry Interference with Tobacco Control*.²⁹²

Similarly, the alcohol industry has sponsored adolescent and young adult alcohol prevention programs. A content analysis of several alcohol prevention programs funded by the alcohol industry found that these programs emphasize themes of personal responsibility, moderate consumption, and individualized problem definitions.²⁹³ Across these programs, with one limited exception, the authors found that, “a striking absence from the discourses is any mention of the role of the alcohol industry and marketing in youth drinking”,^{293,p.17} which they note stands in contrast to research linking alcohol marketing to underage alcohol consumption. Like tobacco industry prevention programs, alcohol industry prevention programs tend to shift responsibility from the alcohol industry to the individual to drink alcohol in moderation, to parents to prevent their children from accessing alcohol, and to adolescents and young adults to resist peer pressure.²⁹³

Overall, industry-sponsored tobacco and alcohol prevention programs appear to share several common characteristics. They disseminate programs and messages that are ineffective at changing behavior; they frame use as an individual choice for adults; they attempt to shift responsibility for adolescent and young adult use from the industry to adolescents, young adults, parents, and peers; they do not publish rigorous effectiveness data about their programs; and they serve to position the industry as a responsible actor in the effort to prevent adolescent and young adult use.^{20,24,290-293} Although the tobacco and alcohol industries have historically worked

together on occasion to oppose restrictions on the use of both substances (e.g., coordinated opposition to excise taxes, and advertising limitations),²⁹⁴ the review for this chapter did not find any published studies that investigated coordinated prevention programming, nor did it find studies on the effects of industry-sponsored tobacco prevention programs on alcohol use or vice versa.

Mass Media Prevention Campaigns

Many mass media campaigns are designed to reach large populations and are successful at changing health behaviors, including tobacco and alcohol use.²⁹⁵ They often focus on determinants of behavior change such as knowledge of the risks of the behavior, attitudes toward the behavior, self-efficacy to change one's behavior, and perceived norms. Mass media campaigns disseminated at the local, state, and national levels have tended to address tobacco and alcohol use separately. Tobacco prevention mass media campaigns that have focused on preventing adolescents and young adults from initiating tobacco use and preventing progression to regular use include the FDA's The Real Cost tobacco prevention campaign²⁹⁶⁻²⁹⁸ and the FinishIT campaign from the Truth Initiative (formerly the American Legacy Foundation).^{299,300} Culturally tailored campaigns have also been developed, such as FDA's Next Legends campaign,⁷⁶⁻⁷⁸ which addressed e-cigarette use among American Indian and Alaska Native adolescents ages 12–17, and FDA's This Free Life campaign,³⁰¹ which addressed cigarette smoking among sexual minority young adults. Alcohol-centered mass media campaigns have focused on specific alcohol-related risk behaviors, such as alcohol-impaired driving with the Drive Sober or Get Pulled Over campaign,³⁰² and on specific populations, such as adults who engage in heavy drinking with the Drink Less, Be Your Best campaign.³⁰³ Alcohol-prevention mass media campaigns have also focused on parent education to reduce adolescent and young adult alcohol use, such as the "Talk. They Hear You" campaign,³⁰⁴ which provides parents and caregivers of youth younger than age 21 with information and resources to discuss underage drinking and substance use. Although these programs may be effective at preventing use of the single substance of focus,^{300,301} they are not designed to influence both tobacco and alcohol use, and evaluations of these programs rarely include measures of both tobacco and alcohol use to explore cross-substance effects.

These mass media prevention campaigns are typically delivered to individuals who are also exposed to marketing and mass media campaigns from tobacco and alcohol companies. NCI Tobacco Control Monograph 19 evaluated the role of mass media advertising (e.g., television, billboards), other marketing communications (e.g., merchandising, sponsorship), consumer marketing (e.g., product design, pricing, distribution), and stakeholder marketing (e.g., youth prevention, health warnings, media training) on tobacco use.²⁴ Based on this evaluation, the monograph concluded that tobacco companies use multiple and complex strategies to make tobacco use appear attractive and normative, which in turn encourages adolescent and young adult tobacco use. Monograph 19²⁴ also reviewed the literature on the effectiveness of mass media tobacco prevention campaigns and concluded that:

Mass media campaigns designed to discourage tobacco use can change youth attitudes about tobacco use, curb smoking initiation, and encourage adult cessation. The initiation effect appears greater in controlled field experiments when mass media campaigns are combined with school- and/or community-based programming.^{24,p.12}

Furthermore, NCI Tobacco Control Monograph 21 concluded that “well-designed and -implemented anti-tobacco mass media campaigns are effective in improving understanding about the health consequences of tobacco use, building support for tobacco control policies, strengthening social norms against tobacco use, and reducing tobacco consumption among youth and adults.”^{291,p.303} Neither NCI Monographs 19 nor 21 addressed the effects of anti-tobacco media campaigns on alcohol use.

Several other reviews of the effectiveness of mass media tobacco prevention campaigns have concluded that they are generally effective in improving anti-tobacco attitudes and reducing tobacco use, especially when occurring in the context of other tobacco control programs and policies.³⁰⁵⁻³⁰⁷ This is consistent with a major conclusion of the 2012 Surgeon General’s report:

Coordinated, multicomponent interventions that combine mass media campaigns, price increases including those that result from tax increases, school-based policies and programs, and statewide or community-wide changes in smokefree policies and norms are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.^{20,p.8}

However, none of these reviews assessed the effectiveness of anti-tobacco media campaigns on alcohol use.

Reviews also have focused on the effectiveness of mass media alcohol prevention campaigns. A 2018 review of 24 studies³⁰⁸ concluded that mass media alcohol prevention programs are memorable and are effective in improving knowledge about alcohol, but there is insufficient evidence that the programs reduce alcohol use. This review did not assess the effects of alcohol prevention media campaigns on tobacco use. A cross-sectional analysis of Monitoring the Future data found that adolescents who self-reported exposure to anti-tobacco or antidrug media campaigns were more likely to report use of both substances.³⁰⁹ However, this finding may reflect confounding by overall media use if adolescents who spend more time using media (and are thus more likely to be exposed to anti-tobacco and antidrug campaigns) are also more likely to use tobacco and alcohol. It may also indicate that adolescents who use tobacco and alcohol are more likely to recall exposure to anti-tobacco or antidrug media campaigns. The cross-sectional analysis and use of self-reported media campaign exposure limit causal inferences. This study did not analyze exposure to anti-alcohol media campaigns.³⁰⁹

Unfortunately, these evaluations of mass media campaigns all focused on effects on a single substance. No evaluations assessed the effectiveness of tobacco prevention campaigns on alcohol use, and no evaluations assessed the effectiveness of alcohol prevention campaigns on tobacco use. A review of media campaigns to counter tobacco marketing concluded that tobacco countermarketing strategies may be adaptable to media campaigns to counter alcohol marketing,³¹⁰ but the review did not identify any studies that evaluated the effectiveness of tobacco-specific or alcohol-specific media campaigns in reducing the use of the other substance.

Other Population-Level Interventions

The NCI Tobacco Control Monograph 21²⁹¹ and the 2012 Surgeon General’s report²⁰ highlighted the effectiveness of many population-level interventions, including comprehensive smokefree policies, tobacco excise taxes, policies restricting adolescent and young adult access to tobacco, bans on tobacco advertising, pictorial warning labels on tobacco products, and support for tobacco cessation programs. A 2023 systematic review and meta-analysis of population-level tobacco control interventions evaluated 144 studies for their effects on tobacco-linked adverse health outcomes.³¹¹ The majority of these interventions were policy interventions, such as smokefree legislation (126 studies), tax or price increases (14 studies), multicomponent tobacco control programs (12 studies), and a minimum age law for sale of cigarettes (1 study). Some of these policy interventions are described in detail later in this chapter (e.g., Tobacco 21; see “Policy Influences on Tobacco and Alcohol Use” section), while others, such as tax-related policies, are addressed in chapter 9. Smokefree laws were associated with decreased rates of diseases caused by tobacco,³¹¹ which was likely mediated by decreases in smoking prevalence and decreased exposure to secondhand smoke.²⁰ This meta-analysis did not report effects of any of these interventions on alcohol use.

Summary of Population-Level Interventions

Mass media campaigns can be an effective population-level prevention strategy for tobacco and alcohol use, particularly when the campaigns are complemented by other school- or community-based programming and additional policy changes. However, these campaigns are generally evaluated for impact on the explicitly targeted substance, whether tobacco or alcohol, and cross-substance effects are not considered. Media literacy interventions for youth, which have been evaluated for impacts on behavioral antecedents such as attitudes or intentions, may reinforce or heighten the effects of mass media campaigns that are designed for public education and to counter tobacco and alcohol industry campaigns.

Policy Influences on Tobacco and Alcohol Use

As of 2026, the literature on whether tobacco control policies prevent alcohol use and/or whether alcohol control policies prevent tobacco use is limited. However, as this monograph describes, tobacco use and alcohol use often occur (or co-occur) within the individual or same social context. For this reason, it is possible that policies aimed at preventing the use of one substance could also decrease the likelihood of the use of the other substance. Notably, studies have applied this approach to understand how laws addressing cannabis use shape other risk behaviors, including tobacco and alcohol use among young people.³¹²⁻³¹⁵

The following sections address laws that set age restrictions for the sale or purchase of tobacco and/or alcohol and approaches to help enforce those laws. Both sale and purchase laws focus on restricting access to tobacco or alcohol in retail environments; however, minimum legal sales age laws set restrictions on the sale of these products to individuals under a certain age, placing the responsibility on the retailer to ensure a product is not provided to someone underage. By contrast, minimum legal purchase age laws set restrictions on the purchasing of these products by individuals under a certain age, placing the responsibility on those buying the product to not

break the law. For example, the National Minimum Drinking Age Act of 1984 is a purchase law because it requires all states to restrict the age of purchase or public possession of alcohol to age 21, whereas Tobacco 21 is a sale law because it sets the legal age for sale (but not purchase) of tobacco products to age 21. However, numerous states have laws that also penalize the purchase of tobacco by those younger than age 21.³¹⁶

Beyond the sale or purchase of a substance, laws may also address the possession or use of a substance. Possession laws restrict who can possess a substance or the conditions under which one can possess it. In addition to being a purchase law, the National Minimum Drinking Age Act is a possession law because it restricts possession of alcohol to people 21 years of age or older. The National Highway System Designation Act of 1995 is another example of a possession law; it requires that states implement policies categorizing individuals younger than age 21 who are operating a motor vehicle and have a blood alcohol content ≥ 0.02 (i.e., “internally possess” alcohol) as driving while intoxicated (versus the maximum blood alcohol content limit of 0.08 for those age 21 or older), or risk losing federal highway funds. States and localities may enact further restrictions regarding the sale, purchase, possession, or use of tobacco or alcohol.^{317,318}

In the following sections, the impacts of the National Minimum Drinking Age Act, Tobacco 21 legislation, and vertical identification card laws are reviewed. These laws explicitly target the purchase of alcohol by and sale of tobacco to adolescents and young adults younger than 21 years of age and may therefore play a particularly relevant role in prevention. Chapter 9 discusses the effects of other policy-level interventions that influence a broader age range of people who use tobacco and alcohol, such as taxation, restrictions on point of sale, smokefree policies, and policies regarding licensing and distribution (see chapter 9).

Minimum Legal Drinking Age and Tobacco 21 Laws

As of 2026, the minimum legal sales or purchase age for tobacco and alcohol, respectively, in the United States is age 21. This section describes how minimum age purchase laws may affect tobacco use among adolescents and young adults, further highlighting opportunities to coordinate compliance checks and identification policies. The MLDA of 21 was first established in 1984, when the National Minimum Drinking Age Act was signed into law. Prior to its enactment the legal age for purchase of alcoholic beverages varied across states, with some states having already established a minimum purchase age of 21.¹²⁴ Tobacco sales age policies have varied over the past 100 years.³¹⁹ By 1920, 14 U.S. states restricted tobacco sales to adults age 21 or older. However, in the 1950s and 1960s, laws in some states were changed to allow adolescents as young as 16 to legally purchase tobacco. The Synar Amendment (section 1926) of the 1992 Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act (Public Law 102-321) incentivized states to increase their tobacco sales age to 18 by restricting substance abuse prevention and treatment block grants to states with tobacco sales age of 18 or older. Consequently, all states increased their tobacco sales age to 18 or 19 by 1993. In 2019, Tobacco 21 (T21) provisions in the Further Consolidated Appropriations Act raised the federal minimum age for sale of tobacco products from 18 to 21; to enforce the T21 law, the FDA Center for Tobacco Products conducts compliance inspections of tobacco product retailers.³²⁰ Echoing the policy-making history of MLDA, 19 states and Washington, D.C., had already increased their minimum sales age for tobacco products to age 21 prior to the enactment of the federal T21 law.³¹⁶

The history of MLDA and T21 legislation provides unique contexts to understand the cross-substance effects of tobacco minimum sale age and alcohol minimum purchase age laws. It is important to note that the MLDA predated the federal T21 law by 35 years, so many evaluations of the alcohol policy occurred before the T21 law was implemented, and all evaluations of the T21 law occurred once the alcohol law had been in effect for a generation. Although the literature on cross-substance effects of these laws is generally sparse, several studies have used U.S. data to examine how MLDA laws affected adolescent and young adult smoking. One study using data from the 1977–1992 Monitoring the Future survey found that increasing the MLDA from age 18 to age 21 was associated with reduced smoking prevalence among 12th grade students by an estimated 3% to 5%.³²¹ In contrast, evaluations using the National Longitudinal Survey of Youth 1997 cohort suggested that reaching (versus being slightly younger than) the MLDA of 21 was not significantly associated with changes in smoking among 19- to 22-year-olds in the United States.^{322,323}

Research on the effect of T21 policies on alcohol use is also sparse. One assessment of a T21 policy implemented in a small town in Massachusetts showed a downward trend in cigarette smoking and purchasing among adolescents in the community that was significantly greater than in comparison communities, but it did not observe a comparable trend for alcohol use.³²⁴ A larger state-to-state examination revealed that young adult members (ages 18–20) of the U.S. military were less likely to consume alcohol if they were living in a T21 state.³²⁵ Because these results were derived from 2016–2018 data, opportunities to delve into more recent data may provide a better understanding of the impact of T21 laws on drinking outcomes.

Vertical Identification Card Laws

Although more research is needed to elucidate the cross-substance impact of MLDA and T21 laws, the effectiveness of both policies depend on retailer compliance, monitoring of compliance (often by governments), and enforcement penalties for noncompliance.³²⁶

To help retailers identify underage individuals who try to purchase tobacco or alcohol and to prevent the use of fake or altered identification cards, between 1994 and 2009, 43 U.S. states changed the design of their state driver's licenses and identification cards to indicate whether a person is a minor or an adult, such as using a horizontal (landscape) layout for adults and a vertical (portrait) layout for minors.¹⁰⁴ This strategy led to state-level reductions in both tobacco and alcohol use by 16-year-old adolescents in a study using 1991–2009 Youth Risk Behavior Surveillance System data.¹⁰⁴ However, reductions were largely confined to the first and second year following the design change. The authors noted that even with sales restrictions in place, underage individuals can still access tobacco and alcohol. Additionally, studies of adolescents and retailers indicate that many underage adolescents are successful at purchasing tobacco or alcohol, suggesting that identification card checks may not be effectively enforced.³²⁷⁻³³⁰ Indeed, adolescents often obtain tobacco and alcohol from social sources (e.g., older friends or relatives) rather than from retail sources,³³¹ and they may increasingly rely on social sources when vertical identification laws are in place.³³² False identification laws with scanner provisions (policies that

provides incentives to retailers and bar owners who use electronic scanners to ensure that customers are at least 21 years old) are shown to reduce underage drinking and traffic fatalities related to underage drinking and could potentially be adopted to reduce the underage purchase of cigarettes.³³³⁻³³⁶ The proximity of tobacco and alcohol outlets and the presence of shared online vendors provide an opportunity to coordinate enforcement of tobacco and alcohol regulations.³³⁷⁻³³⁹

Challenges in Pursuing Macro-Level Prevention Interventions and Efforts to Overcome Them

In the past decade, few RCTs of substance use prevention programs assessing tobacco and alcohol use have been conducted in the United States. This work has been less common for several possible reasons. First, there may be less perceived need for new programs because multiple evidence-based programs are already available. Second, many schools have already purchased existing prevention curricula.³⁴⁰ Third, schools could be less welcoming to researchers with programs and evaluations that will take up valuable required instructional time.^{341,342} Finally, large-scale RCTs are resource intensive to conduct, requiring a great deal of time, money, and sufficient participation. However, these programs can become outdated if research is discontinued, reducing their effectiveness. Additionally, the emergence of novel tobacco products (e.g., e-cigarettes) and the changing marketplace of alcohol products (e.g., the popularity of alcoholic seltzers) require testing to ensure that existing programs are effective interventions for these new products.

There are practical challenges to conducting RCTs of programs and policies that must be carefully considered when evaluating effectiveness. For example, it is often impossible to randomize individuals to receive a specific policy or program. Therefore, researchers design studies using rigorous methods to account for this challenge. For school-based, family-based, and community-based prevention programs, this limitation can be addressed to some extent by conducting group-randomized trials, in which entire schools, families, or communities are randomly assigned to the treatment or control condition; statistical techniques can then be used to control for the intraclass correlation caused by randomizing groups rather than individuals.^{343,344} However, this approach still requires that some schools or families be assigned to the control condition, whereby they provide data but do not receive an intervention. This can make it difficult to recruit schools, families, or communities because potential participants are aware that they may not receive an intervention. It can also be perceived as unethical to withhold interventions from groups that could benefit from them. Delayed intervention designs, in which the control group receives the intervention at the end of the study, can help to alleviate this problem. Additionally, group-randomized studies typically require extensive resources and staff.

Policy evaluations also face several challenges. Most important is that researchers do not control the timing of policy implementation, and consequently, sufficient capacity and timely resources are often needed to quickly conduct a baseline measurement before a new policy is implemented. Because policies are typically implemented at a large scale (e.g., entire countries, states, or cities), it is often difficult to identify an equivalent control group. To address these challenges, researchers may extrapolate from policy effects in another region to understand what may happen in their geographic context if the characteristics of the two regional entities are sufficiently similar. For example, data from Canada's ban on menthol cigarettes was used to model the potential effects of implementation of a similar policy in the United States.³⁴⁵

Lastly, much of the research reviewed in this chapter was conducted before 2010, and these studies have already been included in the meta-analyses cited in this chapter. Interestingly, very few RCTs of substance use prevention programs with measured outcomes of tobacco and alcohol use have been published since 2010. This work is continuing robustly outside the United States in countries such as Brazil,³⁴⁶⁻³⁴⁸ Mexico,³⁴⁹⁻³⁵¹ Peru,³⁵² Australia,³⁵³ and Israel.³⁵⁴ Many of these international studies are collaborations with U.S. researchers who previously conducted similar research in the United States. Some studies test culturally adapted versions of the interventions or strategies that have been implemented in the United States.³⁵⁵

Chapter Summary

Because tobacco and alcohol use among adolescents and young adults share many of the same risk and protective factors at the individual, community and structural levels, programs to prevent the use of both products simultaneously might seem like an obvious strategy. Tobacco and alcohol prevention programs have evolved substantially over time in response to better understanding of the drivers of tobacco and alcohol use and associated biological, psychological, and social risk factors. However, tobacco prevention and alcohol prevention programs and research have largely remained siloed.

Modern technologies permit cost-effective dissemination of individual-level prevention programs (e.g., via smartphones) and allow for real time tailoring to accommodate an intervention to an individual's needs and offer real time data collection. Adaptations of tobacco prevention programs also focus on preventing use of e-cigarettes, the most commonly used tobacco product among youth since 2014. To date, these interventions have not assessed the effects of alcohol intervention on tobacco use, or vice versa.

Research has identified effective school-based prevention programs for reducing tobacco use and for reducing alcohol use among adolescents, but studies of the efficacy for programs that target multiple substances are less conclusive about effects on the individual substances. However, examination of qualities that make for effective group-based prevention programs suggests that prevention programs that are theory driven, have more interactive rather than traditional didactic components, and are more extensive (e.g., spread across many sessions), and extend beyond classrooms to involve the broader community, such as parents or media-based messaging, may be more effective than traditional programs. The 2012 Surgeon General's report concludes that multicomponent interventions where school-based programs and policies are implemented alongside other tobacco control measures, such as smokefree laws and mass media educational campaigns, are effective for preventing tobacco use among young people.²⁰ The effects of addressing alcohol use in that context are understudied.

Many colleges have tobacco- and alcohol-specific policies and have prevention programs for these substances. College campuses represent an important setting for tobacco- and alcohol-prevention and preescalation (i.e., preventing escalation from experimentation to regular use) programs because the transition from smoking initiation to daily smoking is happening on average later in life, occurring more often in young adulthood than in adolescence, and because the minimum age for alcohol purchase or tobacco sale is 21 years. A review of interventions and

policies specific to college campuses, available through the NIAAA College Alcohol Intervention Matrix, identifies effective alcohol-related policies and programs. This approach and aggregation of policies and evidence for their effectiveness could be expanded to evaluate the cross-substance impacts of these policies and the effectiveness of these policies on tobacco use.

The evidence suggests that strategies that are effective in preventing the use of one substance are likely to be effective in preventing the use of the other substance, and that programs that address both substances are feasible and reasonably effective. Comprehensive prevention programs, which focus on countering social influences to use substances and establishing antisubstance use norms in communities, have effectively prevented tobacco use, alcohol use, or use of both substances. However, relatively few studies measure cross-substance prevention effects.

Given the intense competition for adolescents' and young adults' attention, both in school and in the media, prevention programs that target multiple substances can have an advantage over those that target a single substance. Programs that address multiple substances have the potential to influence use behaviors more efficiently. However, a potential drawback of programs that target multiple substances is that they could dilute the emphasis on each individual substance. In addition, programs that target multiple substances may have difficulty conveying the unique risks and importance of preventing use of both licit and illicit substances without encouraging comparisons of the levels of harm and legal consequences attributed to the different substances. The existing research is not sufficient to draw conclusions about whether a focus on multiple behaviors dilutes the effectiveness of prevention interventions.

Research Needs

Future research could measure the effects of tobacco prevention programs on alcohol use, and vice versa. In general, studies of interventions that focus on preventing tobacco use do not examine effects on alcohol use and vice versa. Even if a program focuses on one substance, researchers can include baseline and follow-up measures of use of other substances to identify cross-substance effects. For example, prevention programs that target use of e-cigarettes could assess effects of the program on alcohol use as well as use of other tobacco products. Further, measurement strategies such as ecological momentary assessment could bolster understanding of the situations in which prevention content is needed for one substance or multiple substances. This prevention content could then be provided with just-in-time adaptive interventions.

Future research studies could also directly compare single-substance prevention programs and multisubstance prevention programs. It is unclear whether a particular prevention program would be more effective or less effective if it focused on multiple substances versus one substance. Research is needed to understand how to achieve the optimal balance between preventing use of multiple substances (or promoting healthy behaviors in general) and preventing use of a single substance. No published studies have compared two programs that varied only on the substance(s) being addressed. Research is needed to test this question directly by comparing the effects of similar prevention strategies in similar populations, varying only the number of substances targeted.

Further efforts are needed to develop and test comprehensive approaches to prevent tobacco and alcohol co-use, such as approaches that address effects of prevention program components across multiple levels and communication channels, and common intrapersonal, interpersonal, community, and structural factors associated with both tobacco and alcohol use. Evidence-based programs for prevention of tobacco and alcohol use are most effective in the context of a comprehensive approach that involves parents and communities in the intervention strategy. In a broader context, comprehensive programs are more successful when embedded in an environment with strong tobacco control measures such as mass media campaigns to address tobacco use, policies to prevent minors' access to tobacco products, approaches to reduce marketing influences, and smokefree laws.

Additional research is needed to determine the extent of tailoring of prevention programs that is necessary to prevent tobacco and alcohol use across population subgroups and to address health disparities. Progress in preventing tobacco use has been uneven with some groups experiencing disproportionate risk of use (e.g., certain racial and/or ethnic groups, low-income individuals, and those with behavioral health conditions). For example, research is needed to understand how prevention programs should address common determinants for tobacco and alcohol use, such as depression, anxiety, or similar mental health conditions. There is some evidence that culturally tailored interventions are effective in preventing substance use, but few studies have compared the effectiveness of culturally tailored tobacco and alcohol prevention programs versus the effectiveness of more general (or non-tailored) programs. More research is needed to achieve an optimal balance between providing tailored prevention programs that address both tobacco and alcohol use for individual subgroups and providing general programs that are effective across the overall population.

Further monitoring of the effects of prevention programs and policies on tobacco and alcohol use would be beneficial. The impacts of both substance-specific and more general prevention programs on tobacco and alcohol use should be evaluated. Monitoring the use of multiple substances before and after prevention programs and policies are implemented can help researchers identify changes in product use over time; doing so requires study-specific surveys and broader surveillance research to assess use of alcohol, tobacco, and other substances. In addition, programs integrating tobacco and alcohol use prevention across both adolescence and young adulthood are needed.

Conclusions

1. **Interventions to prevent tobacco use and/or alcohol use employ approaches that are delivered at multiple levels including individual, group, community, mass media, and policy levels, as well as combinations of these levels.** Some large-scale interventions include prevention approaches at multiple levels (e.g., school and family, community, and media) and have been found effective for preventing tobacco and/or alcohol use. There is limited research to show whether multilevel interventions prevent tobacco and alcohol co-use because the outcomes are often aggregated and not reported separately.

2. **Studies of interventions that focus on preventing use of one substance have not typically examined effects on other substances.** Studies of single substance prevention programs may benefit from determining whether effects generalize to other substances.
3. **The evidence suggests that prevention programs that address tobacco and alcohol co-use are feasible, and some have shown effectiveness for preventing use of both substances.** However, many studies evaluating multisubstance or general substance use prevention programs have often only examined their effectiveness for preventing either tobacco or alcohol use, but not for preventing both tobacco and alcohol use.
4. **Prevention programs that specifically focus on tobacco or alcohol use have been implemented with different populations and with different goals, limiting the potential to assess their effectiveness for preventing co-use.** Tobacco prevention programs have been implemented mainly among children and adolescents and have focused on abstinence as a goal, whereas alcohol prevention programs are more frequently implemented among college student populations and have largely focused on reducing alcohol consumption to prevent or reduce binge drinking.
5. **It is unclear whether prevention programs that focus on a single substance are more effective or less effective than those that focus on multiple substances.** No studies have directly compared single-substance programs and multisubstance programs while holding all other factors constant.
6. **Policy interventions to restrict adolescent and young adult access to tobacco and alcohol, especially minimum legal sales or purchase age laws, have been effective in reducing adolescent and young adult use of these substances.** However, studies rarely assess the effect of alcohol access policies on tobacco use or the effect of tobacco access policies on alcohol use. As of 2026, the minimum legal age for alcohol purchase or tobacco sales is 21; policy evaluations and interventions to increase policy compliance and enforcement should measure their effects on both substances.

Appendix 8A Literature Search Strategy

The following searches were conducted in PubMed and Google Scholar from June to July 2023 to identify tobacco and alcohol prevention programs for adolescents and young adults: (tobacco OR nicotine OR smoking OR e-cigarette OR “electronic cigarette” OR alcohol) AND prevention AND (program OR intervention OR curriculum) AND (children OR adolescents OR “young adults” OR “college students”). Only RCTs, meta-analyses, systematic reviews, and reviews published in English were included. Additionally, studies had to include children (birth to age 18), adolescents (ages 13–18), or young adults (ages 19–24). The titles of these articles were downloaded into Excel and reviewed for relevance, defined as an evaluation of interventions to prevent tobacco and/or alcohol use. Additional studies published after 2023 were incorporated into the chapter based on their relevance.

The following searches were conducted in PubMed and Embase from August to September 2023 to identify empirical studies of policy evaluations of crossover impact of tobacco or alcohol policies on tobacco and alcohol use outcomes. The keyword strings used in PubMed were: “youth” AND “alcohol policy” AND “tobacco use” [all fields] AND “policy” [title/abstract] = 419 results; “youth” AND “tobacco policy” AND “alcohol use” [all fields] AND “policy” [title/abstract]. The keyword strings used in Embase were: (juvenile)/br AND (('alcohol policy')/br) AND (('tobacco use')/br) AND ((policy):ab,ti); (juvenile)/br AND (('tobacco policy')/br) AND (('alcohol consumption')/br) AND ((policy):ab,ti). Limitations on year of publication were not included in the searches. The following inclusion criteria were used to screen articles: 1) conducted in the United States, 2) published in English, 3) peer reviewed (i.e., not commentaries, editorials, conference abstracts, or dissertations), 4) measured exposures of substance-specific national policies, 5) measured outcomes of cross-use behavior (e.g., adolescent smoking comparisons pre- and post-alcohol policy), and 6) included participants who were underage to purchase the product (younger than age 21 for alcohol policies, younger than age 18 or age 21 for tobacco policies, depending on the law at the time of the study). This search was not limited to RCTs because it is rarely possible to evaluate policies using RCTs; policy evaluations typically involve natural experiments or quasi-experimental comparisons of locations where policies were and were not implemented.³⁵⁶ Ultimately, only six studies^{241,321-324,357} met all inclusion criteria in the initial search (see Table 8A). This small number of eligible studies provides a limited evidence base for evaluating policies that address both tobacco and alcohol use outcomes among adolescents and young adults beyond media-based exposure. Therefore, this chapter highlights additional studies that did not meet all inclusion criteria but were deemed relevant to better understand policies that prevent tobacco and alcohol use. Additional studies published after 2023 were incorporated into the chapter based on their relevance.

To further supplement this review of empirical research, individual tobacco and alcohol policies were identified from the [Alcohol Policy Information System \(APIS\)](#) maintained by the National Institute on Alcohol Abuse and Alcoholism (NIAAA),³⁵⁸ the 2020 State Performance & Best Practices for the Prevention and Reduction of Underage Drinking Report by the Substance Abuse and Mental Health Services Administration (SAMHSA),³⁵⁹ and the Tobacco Control Milestones maintained by the [American Lung Association \(ALA\)](#).³⁶⁰ Because a database tool for

tobacco policies comparable to the APIS was not identified, ALA's webpage tracking feature was used to identify events relevant to tobacco control, such as new initiatives, laws, or judicial rulings, and specifically, policies expected to affect adolescent and young adult behavior (e.g., tobacco 21 legislation). Using Google Scholar, identified policies were searched by name to increase coverage of the literature base for this chapter.

Table 8A Studies Meeting Initial Inclusion Criteria Regarding Cross-Substance Effects of Tobacco and Alcohol Policies

Study	Data source	Time period	Behavioral measures	Policy measures	Cross-substance effects
Dee 1999 ³²¹	Monitoring the Future; cross-sectional surveys of high school seniors in the United States	1977–1992	Tobacco: Cigarette smoking in past 30 days Alcohol: Drinking in past 30 days Heavy drinking (5+ drinks in a row), past 2 weeks	Tobacco: Cigarette tax (state and federal excise taxes) Alcohol: Beer tax (state and federal excise taxes); Minimum legal drinking age (18, 19, or 20)	A minimum legal drinking age of 18 (versus 21) was associated with increased cigarette smoking. A minimum legal drinking age of 19 (versus 21) or 20 (versus 21) generally did not predict cigarette smoking. Effects of beer taxes or cigarette taxes on tobacco or alcohol use varied depending on whether the models included state-fixed effects and the years evaluated (due to limited within-state variation on these taxes).
Kessel Schneider et al. 2016 ³²⁴	MetroWest Adolescent Health Survey; biennial survey of high school students in 25 communities west of Boston	2006–2012	Tobacco: Cigarette smoking in past 30 days; cigarette purchasing in a store, past 30 days Alcohol: Drinking in past 30 days	Tobacco: Minimum tobacco purchase age of 21	Changes in past-30-day alcohol use did not differ based on whether a community had a minimum tobacco purchase age in effect.
Weitzman et al. 2005 ²⁴¹	Harvard School of Public Health College Alcohol Study; U.S. college students from 120 universities	2001	Tobacco: Cigarette smoking in past 30 days Alcohol: Binge drinking (4+/5+ drinks in a row for women/men), once in the past 2 weeks	Alcohol: School-level perceived alcohol availability; school-level strength of alcohol policy enforcement; school-level expectations of parental notification for illegally obtaining alcohol	Students at colleges with greater alcohol availability had greater odds of cigarette smoking. Students at colleges with more strongly enforced alcohol policies and those at colleges with parental notification policies had lower odds of cigarette smoking.
Welsh et al. 2019 ³⁵⁷	National Survey of Drug Use and Health; cross-sectional survey of U.S. adolescents ages 14–17	2004–2012	Tobacco: Nicotine dependence in the past year (DSM-IV criteria) Alcohol: Alcohol abuse or dependence in the past year (DSM-IV criteria)	Tobacco and Alcohol: State-level policies mandating tobacco, alcohol, or illicit drug use prevention programs in high school	States with required prevention programs (versus those that recommended or had no policy on such programs) had significantly lower prevalence of abuse/dependence for alcohol ($p = .034$) but did not differ on prevalence of nicotine dependence.

Table 8A (continued)

Study	Data source	Time period	Behavioral measures	Policy measures	Cross-substance effects
Yoruk & Yoruk 2011 ³²²	National Longitudinal Survey of Youth, 1997 Cohort; longitudinal, nationally representative survey of youth ages 12–16 as of December 31, 1996; restricted to those ages 19–22 who had consumed alcohol, smoked cigarettes, or used cannabis since the date of the last interview	2000–2006	Tobacco: (past 30 days) • Cigarette smoking • Number of smoking days • Average number of cigarettes per day • Average number of cigarettes per smoking day Alcohol: (past 30 days) • Alcohol use • Binge drinking • Number of drinking days • Number of binge drinking days • Average number of drinks per day • Average number of drinks per drinking day	Alcohol: Minimum legal drinking age of 21	Discontinuity analyses, splitting over the age of 21, did not indicate statistically significant changes in tobacco use when an individual reaches age 21.
Yoruk & Yoruk 2013 ³²³	National Longitudinal Survey of Youth, 1997 Cohort; longitudinal, nationally representative survey of youth ages 12–16 as of December 31, 1996; restricted to those ages 19–22, any alcohol use status	2000–2006	Tobacco: (past 30 days) • Cigarette smoking • Number of smoking days • Average number of cigarettes per day • Average number of cigarettes per smoking day Alcohol: (past 30 days) • Alcohol use • Binge drinking • Number of drinking days • Number of binge drinking days • Average number of drinks per day • Average number of drinks per drinking day	Alcohol: Minimum legal drinking age of 21	Discontinuity analyses, splitting over the age of 21, did not indicate statistically significant changes in tobacco use when an individual reaches age 21.

Note. DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.

Appendix 8B Summary of Meta-Analyses and Systematic Reviews Described in This Chapter

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Multiple types of interventions				
Foxcroft & Tsertsvadze 2012¹⁸⁰ Systematic review 85 studies School-based programs: N = 142,738 Family-based programs: N = 14,595 Multicomponent programs: N = 57,545	Through July 2010	Language: Any Publication: Any Population: Adolescents ages 18 or younger Study design: RCTs Intervention: Universal alcohol prevention programs in school, family, or multiple settings Outcomes: Self-reported or objective measures of alcohol consumption	Outcomes: Studies that assessed only psychological perceptions/attitudes or awareness (not alcohol use)	Tobacco use: Tobacco use outcomes were not reported. Alcohol use: Studies could not be pooled due to heterogeneity. <i>School-based interventions:</i> Out of 11 studies of alcohol-specific interventions, 5 did not find statistically significant effects on alcohol use, and 6 found significant beneficial effects. Out of 39 studies of general substance use interventions, 25 did not find significant effects on alcohol use. <i>Family-based interventions:</i> Out of 12 studies, 9 found statistically significant short- and long-term beneficial effects on alcohol use. <i>Multicomponent interventions:</i> Out of 20 studies, 12 found statistically significant beneficial effects on alcohol use.

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
MacArthur et al.2018 ¹⁸⁵ Meta-analysis 70 studies Total N not available	Through November 14, 2016	Language: Any Publication type: Any including abstracts, conference proceedings, and grey literature Population: Children and adolescents up to age 18 and/or parents, guardians, or caregivers Study design: RCTs and cluster RCTs; combined intervention and follow-up period of 6 months or longer Intervention: Individual, family, and school-level interventions addressing at least 2 risk behaviors (alcohol use, tobacco use, cannabis or other drug use, risky sexual behaviors, antisocial behavior and offending, vehicle-related risk behaviors, self-harm, gambling, unhealthy diet, sedentary behavior, low levels of physical activity) Outcomes: Outcomes collected from those ages 8–25; combined intervention and follow-up period of 6 months or longer; primary outcomes in the risk behavior areas of interest	Intervention: Interventions in only 1 domain: healthy eating/physical activity or substance use (i.e., interventions in which the 2 risk behaviors addressed were only unhealthy diet, low levels of physical activity, and high levels of sedentary behavior, or only tobacco use, alcohol consumption, and/or drug use); community and population-level interventions. Interventions aimed at individuals with clinically diagnosed disorders or clinical interventions.	Compared with participants in comparator groups, participants in universal school-based interventions had significantly lower tobacco use and alcohol use. Tobacco use: <i>Universal school-based interventions:</i> OR: 0.77 (95% CI, 0.60–0.97) <i>Targeted individual-level interventions:</i> OR: 1.28 (95% CI, 0.75–2.19) <i>Universal individual-level interventions:</i> OR: 1.03 (95% CI, 0.32–3.27) <i>Targeted family-level interventions:</i> OR: 0.78 (95% CI, 0.40–1.53) Alcohol use: <i>Universal school-based interventions:</i> OR: 0.72 (95% CI, 0.56–0.92) <i>Targeted individual-level interventions:</i> OR: 1.02 (95% CI, 0.80–1.31) <i>Universal individual-level interventions:</i> OR: 0.80 (95% CI, 0.58–1.11) <i>Targeted family-level interventions:</i> OR: 0.83 (95% CI, 0.47–1.46)

Appendix 8B (continued)

Study Publication type Number of studies included Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Spoth 2008¹⁹¹ Literature review 25 reviews of 127 interventions Total N not available	Not specified	Language: Any Publication type: Systematic reviews; literature reviews; meta-analyses; summary reports of evidence-based, peer-reviewed journal articles; books and book chapters; internet sources Population: Children and youth up to age 20, including youth not in college. Study design: Any intervention; universal, selected, and indicated prevention interventions targeting drinking behavior among youth Outcomes: Alcohol use among youth ages 10 or older; risk factors for alcohol use among children younger than age 10; or policy, law, or environmental changes that measured actions due to alcohol use (e.g., alcohol-related traffic incidents among adolescents)	Population: College-attending populations; youth with alcohol use disorders Intervention: Interventions targeting drug use, smoking, sexuality, or general health promotion that did not include measures of alcohol use	Tobacco use: Tobacco use outcomes not reported Alcohol use: 12 interventions met criteria for “most promising” evidence of effectiveness against alcohol use, and 29 met criteria for “mixed or emerging” evidence.
Tinner et al. 2022¹³⁶ Systematic review and meta-analysis 66 studies Studies of tobacco use: studies of individual-level interventions: N = 1,024. studies of universal school-based interventions: N = 21,762. studies of universal, combined setting interventions: N = 2,202.	Through October 2019	Language: Any Publication type: Any Population: Children and youth ages 8–25, or interventions for parents, caregivers, peers, teachers, or others intending to address behaviors among children and young people up to age 18 at study baseline. Study design: RCTs, including cluster RCTs, with follow-up period of 6 months or more from intervention initiation Intervention: Interventions addressing at least 2 substance use behaviors (tobacco, smoking, alcohol, cannabis, other drugs)	Population: Studies of individuals with clinically diagnosed disorders; studies where the majority of participants were age 18 at baseline assessment Intervention: Interventions addressing behaviors other than substance use; community- or population-level interventions such as media campaigns or policy, regulatory, or legislative measures	Tobacco use: There were no significant short-term effects (up to 12 months) on tobacco use for universal school-based interventions (OR = 0.98, 95% CI = 0.83–1.15), individual-level interventions (OR = 0.82, 95% CI = 0.55–1.23), or combined setting interventions (OR = 0.85, 95% CI = 0.46–1.59). Alcohol use outcomes: Universal school-based interventions (OR = 0.94, 95% CI = 0.84–1.04) and targeted school-based interventions (OR = 0.90, 95% CI = 0.74–1.09) had no significant short-term effects (up to 12 months) on alcohol use. Universal family interventions (OR = 0.69, 95% CI = 0.54–0.89) and universal individual interventions (OR = 0.75, 95% CI = 0.59–0.95) had significant prevention effects.

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Individual-level interventions				
Champion et al. 2019 ¹³⁴ Qualitative synthesis and meta-analysis 22 studies (11 included in meta-analysis) Studies that assessed smoking prevalence: <i>N</i> = 2,891 intervention, <i>N</i> = 2,884 control Studies that assessed alcohol use prevalence: <i>N</i> = 2,069 intervention, <i>N</i> = 2,016 control	January 1, 2000–March 14, 2019	Language: Any Publication type: Any Population: Students ages 11–18 Study design: RCTs Intervention: Universal school-based prevention programs targeting 2 or more health behaviors (alcohol use, smoking, diet, physical activity, sedentary behavior, and sleep) and delivered via eHealth methods (internet, computer, tablets, mobile technology, telehealth)	11 studies were excluded from meta-analysis because data could not be pooled.	Tobacco use: 3 studies included in meta-analysis; no significant intervention effects on smoking prevalence (OR = 1.23, 95% CI = 0.95–1.59; <i>p</i> = .12) Alcohol use: 2 studies included in meta-analysis; no significant intervention effects on alcohol use prevalence (OR = 1.13, 95% CI = 0.95–1.36; <i>p</i> = .17)
Kazemi et al. 2017 ¹³² Systematic review 12 studies Total <i>N</i> not available	2005–2015	Language: English Publication type: Peer-reviewed original research Population: Adolescents or adults who reported using substances Study design: Studies with an intervention component Intervention: Interventions that used mobile communication (mHealth) and addressed substance use	Computer web-based interventions	Tobacco use: None of the included studies primarily addressed tobacco use. Alcohol use: There were mixed results in terms of intervention efficacy.

Appendix 8B (continued)

Study Publication type Number of studies included Total <i>N</i>	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Monarque et al. 2023 ¹³⁷ Rapid review 43 studies Total <i>N</i> not available	January 2015–December 2021	Language: English or French Publication type: Any except dissertations Population: Youth and young adults ages 12–29, or studies of samples with a mean age of 16–24 and standard deviation <4 Study design: Empirical studies using quantitative, qualitative, and mixed methodologies; review articles Intervention: Digital health interventions for substance use disorders in youth	Intervention: Studies of interventions addressing substance use in combination with nonmental health issues; studies in which participants were not exposed to interventions	The review identified a total of 6 prevention interventions (3 web-based, 1 game-based, 2 virtual reality-based). Only 1 prevention intervention (RealTeen) addressed both tobacco and alcohol use and reported behavioral outcomes. Tobacco use: The intervention group in RealTeen reported fewer cigarettes smoked than the control group. Alcohol use: The intervention group in RealTeen reported less binge drinking than the control group.
Mylocopos et al. 2024 ¹³³ Systematic review 39 studies Total <i>N</i> not available	2004–2022	Language: Any Publication type: Any Population: Children and youths younger than age 21 who did not currently use e-cigarettes (vape), never vaped, or did not report vaping in the past 30 days. Studies that included participants ages 21 or older were included if the mean sample age was under 21 or if subgroup analyses of children or youth were reported. Studies with more than 80% of participants not vaping at baseline or that reported a subgroup analysis of participants who did not vape at baseline. Study design: RCTs and nonrandomized studies of interventions with a comparison group Intervention: Vaping prevention interventions at the individual, school, or community level	Population: Studies of participants ages 21 or older; studies including only individuals who vaped in the past 30 days Intervention: Studies of vaping policy or regulations at the population level, cessation or reduction strategies, or nonvaping tobacco use interventions	Tobacco use: Of 39 included studies, 14 were studies of individual-level interventions, 19 were of school-based interventions, and 6 were of community-based interventions. Of 5 individual-level intervention studies that reported e-cigarette use prevalence, 4 studies were associated with decreased e-cigarette use and 1 had no effect. Of 7 individual-level intervention studies that reported initiation intentions, 3 studies were associated with decreased intentions and 4 had no effect. Of 10 individual-level intervention studies that reported e-cigarette risk knowledge and/or attitudes, 9 studies were associated with improved knowledge/attitudes. Study designs prevented causal inferences. Alcohol use: No outcomes reported

Appendix 8B (continued)

Study Publication type Number of studies included Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Perski et al. 2022 ¹³⁸ Systematic review 14 studies Studies of tobacco interventions: N = 187 Studies of alcohol interventions: N = 120,520	January 2000– January 2020	Language: English Publication type: Any except for conceptual or methodological papers with no empirical data Population: Participants who used tobacco, cannabis, alcohol, cocaine, or heroin Study design: Any study type using an intervention, with or without a comparison group Intervention: JITAls to address substance use that were delivered via websites, text messages, apps, or wearables and provided real-time, tailored support repeatedly over time	Intervention: Studies with a JIT reminder at time points prespecified by the user	The review identified 4 tobacco prevention studies and 7 alcohol prevention studies, but none that addressed both substances together. Tobacco: There were mixed results for smoking outcomes. Alcohol: There were mixed results for alcohol use outcomes.
Tzelepis et al. 2021 ¹³⁵ Systematic review and meta-analysis 11 studies Total N not available	Before November 18, 2019	Language: English Publication type: Peer-reviewed article Population: Adults ages 18 and older Study design: RCTs and cluster RCTs Intervention: Internet-based interventions that addressed 2 or more health behaviors (smoking, alcohol use, nutrition, or physical activity)	Population: Studies that included only people with chronic conditions or pregnant people; studies that included people under age 18 Study Design: No control arm (intervention as a comparison group) Intervention: Studies addressing only 1 health behavior; interventions in which the internet-based intervention was part of a multicomponent approach using other modes of support (e.g., face-to- face, telephone) Outcomes: Outcomes measures not related to a health behavior of interest; outcomes not measured 6 months or more post recruitment	Tobacco and alcohol use: A total of 3 studies addressed both tobacco and alcohol use. A study of undergraduates found no significant intervention effects on current smoking prevalence (11.2% intervention vs. 14.1% control) or mean units of alcohol in the past 7 days (10.4 intervention vs. 11.0 control). Another study of undergraduates found significant intervention effects on current smoking prevalence (8.7% intervention vs. 13.0% control) but not on mean units of alcohol in the past 7 days (13.0 intervention vs. 13.4 control). A community-based study found no effects on number of people who smoked (n = 3 intervention vs. n = 4 control) or mean units of alcohol per week (6.7 intervention vs. 7.2 control).

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
School-based interventions – General				
Rundall & Bruvold 1988 ¹⁵¹ Meta-analysis 76 studies Total N not available	1970–1988	Language: Not specified Publication type: Not specified Population: Not specified Study design: Evaluations of interventions with a comparison or control group Intervention: School-based interventions to reduce, prevent, or quit smoking and/or alcohol consumption Outcomes: Behavior, attitudes, and/or knowledge outcomes reported	Studies not meeting inclusion criteria	Tobacco use: Behavior change pooled ES: <3 months: 0.15; >3 months: 0.34 Knowledge change pooled ES: <3 months: 0.59; >3 months: 0.56 Attitude change pooled ES: <3 months: 0.05; >3 months: 0.13 Alcohol use: Behavior change pooled ES: <3 months: 0.11; >3 months: 0.12 Knowledge change pooled ES: <3 months: 0.52; >3 months: 0.38 Attitude change pooled ES: <3 months: 0.18; >3 months: –0.23
Tremblay et al. 2020 ¹⁸⁶ Systematic review 90 studies of 16 programs Total N not available	Through March 31, 2020	Language: English Publication type: Any Population: School-aged children and adolescents (Grades K–12; ages 5–18) Study design: Evaluations of program effectiveness that included a control group Intervention: Substance use prevention programs aimed at psychoactive substances and designed for and delivered to the general population (rather than specific groups)	Intervention: Programs solely aimed at nicotine prevention; programs designed for or delivered to only specific target groups (e.g., low-income children, clinical populations); programs that targeted parents, teachers, or systems surrounding children; programs for which only 1 study had been conducted	Tobacco use: None of the evaluations of alcohol-focused programs (4 total) reported tobacco use outcomes. Of the remaining 12 programs focused on multiple substances, 5 had significant effects on tobacco use in at least 1 study: Adolescent Alcohol Prevention Trial (2 studies), Here's Looking at You (1 study), Life Skills Training (9 studies), Project Alert (3 studies), and Unplugged (1 study). Alcohol use: The Life Skills Training program had the most published studies (17 studies); 10 of these studies found significant reductions in alcohol and/or drug use.

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
School-based interventions – Tobacco prevention				
Black et al. 1998 ¹⁵⁹ (based on Tobler and Stratton 1997 ³⁶¹) Meta-analysis 120 studies Total N not available	1978–1990	Language: Any Publication type: Any Population: Adolescents in Grades 5–12 Study design: Experimental or quasi-experimental Intervention: Universal, school-based adolescent drug prevention programs (addressing use of alcohol, cigarettes, cannabis, and other drugs) conducted in North America	Studies not meeting inclusion criteria	Tobacco use: <i>Interactive programs:</i> Weighted ES = 0.16 (high-quality studies), ES = 0.18 (all studies) <i>Noninteractive programs:</i> Weighted ES = –.02 (high-quality studies), ES = 0.13 (all studies) Alcohol use: <i>Interactive programs:</i> Weighted ES = 0.19 (high-quality studies), ES = 0.21 (all studies) <i>Noninteractive programs:</i> Weighted ES = 0.03 (high-quality studies), ES = 0.07 (all studies)
Bruvold 1993 ¹⁵⁸ Meta-analysis 84 studies of 94 interventions Total N not available	1970s–1980s	Language: Any Publication type: Any (published or unpublished) Population: School-age individuals Study design: Experimental design with a no-intervention control or comparison Intervention: School-based interventions designed to prevent adolescent smoking	Intervention: College-level interventions Study Design: Reviews or theoretical papers; surveys or curriculum reports that did not evaluate interventions; control or comparison group received an intervention; no comparison group was included	Tobacco use: Behavioral outcome ES were largest for social reinforcement orientation interventions; ES for higher quality studies are presented below. <i>Rational orientation interventions:</i> Post-test ES = –0.01; 1st follow-up ES = 0.13 ($p < .05$); 2nd follow-up ES = –0.03; 3rd follow-up ES = –0.1 <i>Social reinforcement orientation interventions:</i> Post-test ES = 0.32; 1st follow-up ES = 0.31; 2nd follow-up ES = 0.39; 3rd follow-up ES = 0.27 (all $ps < .05$) <i>Social norms orientation interventions:</i> Post-test ES = 0.29; 1st follow-up ES = 0.19 ($p < .05$); 2nd follow-up ES = 0.36 ($p < .05$) <i>Developmental orientation interventions:</i> Post-test ES = 0.36 ($p < .05$); 1st follow-up ES = 0.08; 2nd follow-up ES = –0.42 ($p < .05$) Alcohol use: Alcohol use outcomes not reported

Appendix 8B (continued)

Study Publication type Number of studies included Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Thomas et al. 2013 ¹⁶² Systematic review and meta-analysis 134 studies N = 428,293	1960–October 2012	Language: Any Publication type: Any Population: Children and adolescents ages 5–18 in school settings Study design: RCTs where students, classes, schools, or school districts were randomized to intervention group or control group, baseline tobacco use was measured, and participants were followed for at least 6 months Intervention: Any curricula used in a school setting to deter tobacco use Outcomes: Smoking status of individuals or cohorts who reported no tobacco use at baseline	Study Design: Nonrandomized allocation of individuals or groups to intervention and control groups	Tobacco use: All “Pure Prevention” cohorts (49 total), up to 1-year follow-up: OR: 0.94 (95% CI, 0.85–1.05, $p = .26$) All “Pure Prevention” cohorts (49 total), > longest follow-up: OR: 0.88 (95% CI, 0.82–0.96, $p = .002$) Alcohol use: Alcohol use outcomes not reported
Thomas et al. 2015 ¹⁶³ Systematic review and meta-analysis 50 studies N = 143,495	Through January 2014	Language: Any Publication type: Any Population: Students ages 5–18 who had never smoked at baseline Study design: RCTs (individual or cluster) Intervention: School-based smoking cessation programs Outcomes: Smoking status at 6-month follow-up or later	Study Design: No control group Outcomes: Baseline smoking status not assessed; only smoking attitudes and knowledge (not behavior) assessed	Tobacco use: All programs, ≤ 1-year follow-up: OR: 0.91 (95% CI, 0.92–1.01, $p = .06$) All programs, >1-year follow-up: OR: 0.88 (95% CI, 0.82–0.95, $p = .0007$) Alcohol use: Alcohol use outcomes not reported

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
School-based interventions – Alcohol prevention				
Hennessy et al. 2015 ¹⁸³ Meta-analysis 17 studies Total N not available	1980 to 2012	Language: Any Publication type: Any Population: Adolescents in middle, high, and secondary schools Study design: RCTs or quasi-experimental designs comparing interventions to a no-treatment or treatment-as-usual comparison group Intervention: BAI designed to reduce adolescent and young adult alcohol consumption, delivered individually or in groups, delivered in less than 5 hours contact time, and lasting no more than 4 weeks Outcomes: Sufficient information to allow estimation of post-intervention effect sizes between groups on at least 1 alcohol consumption-related outcome	Studies not meeting inclusion criteria	Tobacco use: Tobacco use outcomes not reported Alcohol use: <i>All interventions:</i> Compared to controls, participants in BAIs had significantly reduced alcohol consumption ($\bar{g}$ = 0.34, 95% CI = 0.11–0.56). <i>Individually-delivered interventions:</i> Significant intervention effects on reducing alcohol use ($\bar{g}$ = 0.58, 95% CI = 0.23–0.92) <i>Group-delivered interventions:</i> No significant intervention effects on reducing alcohol use ($\bar{g}$ = –0.02, 95% CI = –0.17–0.14)
Lee et al. 2016 ¹⁸² Systematic review 70 studies of 40 programs Total N not available	1998–2013	Language: English Publication type: Published articles Population: School-aged children Study design: Australian National Health and Medical Research Council criteria for level of evidence I (systematic reviews) to evidence IV (case series or pre-post designs) Intervention: School-based programs that target alcohol use Outcomes: At least 1 alcohol behavior or knowledge change outcome	Study Design: Qualitative studies or case studies focusing on acceptability of programs or process evaluations Intervention: School-based programs not focusing on alcohol use; community or family-based programs	Tobacco use: Tobacco use outcomes not reported Alcohol use: Interventions with the most evidence for effectiveness across multiple trials were CLIMATE Schools in Australia and Project ALERT and All Stars in the United States.

Appendix 8B (continued)

Study Publication type Number of studies included Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Lemstra et al. 2010 ¹⁸¹ Systematic review 6 studies N = 11,926	January 1, 1980– December 2, 2007	Language: English Publication: Any (published or unpublished) Population: Children ages 10–15; studies including children outside of this age range could be included as long children ages 10–15 were included in the study. Study design: RCTs, prospective cohort studies, longitudinal studies, systematic reviews, meta-analyses; studies with a sample size of at least 300; studies rating with a score of at least 10 out of 14 for methodological evaluation quality Intervention: School-based interventions to prevent cannabis and/or alcohol use in adolescents and implemented in Canada, United States, Western Europe, Australia, or New Zealand Outcomes: Follow-up period of at least 1 year	Study Design: Opinion papers, letters to the editor, case reports, case studies, natural experiments, cross-sectional studies Intervention: Comparisons of clinical settings versus schools Outcomes: Baseline data not presented or not available upon request	Tobacco use: Tobacco use outcomes not reported Alcohol use: <i>Comprehensive programs:</i> Compared to controls, adolescents who received interventions had a pooled MUR of 0.88 (95% CI, 0.87–0.89), equivalent to a reduction in 12 days of alcohol use per month. <i>Professional-led knowledge-only programs:</i> Compared to controls, adolescents who received interventions had a pooled MUR of 0.98 (95% CI, 0.92–1.04), equivalent to a reduction in 2 days of alcohol use per month.
College campus prevention programs				
Bennett et al. 2017 ²²⁷ Literature review 11 studies Total N not available	1990 to June 2016	Language: Any Publication type: Peer-reviewed Population: Young adults ages 18–25 at U.S. college campuses (2- and 4-year colleges and universities) Study design: Quantitative methods that directly (e.g., self-report) or indirectly (e.g., count of cigarette butts on premises) assessed young adults' cigarette smoking behaviors Intervention: College-level smoking policies	Study Design: Case studies, focus groups, interviews	Tobacco use: The cross-sectional studies (6 total) found mixed results on college student smoking behavior. Of the 2 longitudinal studies with self-reported smoking behavior identified, 1 found a reduction in proportions of high- and low-frequency smokers, pro-smoking attitudes, and exposure to secondhand smoke before and after the policy was implemented but did not find an effect on smoking prevalence. The other found overall decreased smoking prevalence on campus with smoking policy compared with control campus. Alcohol use: Alcohol use outcomes not reported

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Carey et al. 2007 ²²⁰ Meta-analysis 62 studies of 98 interventions N = 13,750	Through March 9, 2007	Language: Any Publication type: Published or in press Population: College or university students Study design: RCTs or quasi-experimental design with a control group Intervention: Educational, behavioral, or psychological alcohol interventions Outcomes: Drinking behavior outcomes with sufficient information to calculate between-group effect size estimates	Population: Noncollege students, or mix of college and noncollege students, and results not separated by college status Study Design: No control or comparison condition Intervention: Interventions that did not specifically focus on alcohol Outcomes: Insufficient statistical information to calculate effect sizes; did not measure any alcohol behavior	Tobacco use: Tobacco use outcomes not reported Alcohol use: <i>Quantity of alcohol consumed:</i> Significant intervention effects at immediate follow-up ($d = 0.19$, 95% CI = 0.07–0.32), short-term follow-up (4–13 weeks; $d = 0.13$, 95% CI = 0.06–0.19), and intermediate follow-up (14–26 weeks; $d = 0.11$, 95% CI = 0.02–0.20) <i>Frequency of heavy drinking:</i> Significant intervention effects at immediate follow-up ($d = 0.17$, 95% CI = 0.03–0.31), short-term follow-up ($d = 0.18$, 95% CI = 0.10–0.26), and intermediate follow-up ($d = 0.11$, 95% CI = 0.01–0.22). <i>Frequency of drinking days:</i> Significant intervention effects at long-term follow-up (27–195 weeks; $d = 0.16$, 95% CI = 0.03–0.30).
Carey et al. 2016 ²²³ Meta-analysis 31 studies of 68 interventions N = 8,621	Through 2012	Language: Any Publication type: Any Population: College students mandated to an alcohol intervention Study design: Single-group or independent groups pretest-posttest design Intervention: Individual or group-level interventions to reduce alcohol use Outcomes: Sufficient statistical information included to calculate effect sizes on alcohol use	Population: College students not mandated to an intervention Study Design: No intervention/waitlist control conditions Intervention: Interventions that did not focus on alcohol use; interventions that included a mass media or structural-level intervention component	Tobacco use: Tobacco use outcomes not reported. Alcohol use: <i>Between-group contrasts:</i> Intervention students reported significantly less drinking per week/month relative to controls ($d = 0.13$, 95% CI = 0.02–0.25) <i>Within-group contrasts:</i> Significant intervention effects for all quantity and frequency outcomes at short-term (≤ 13 weeks; $ds = 0.14$ –0.27); significant intervention effects on frequency of heavy drinking days ($d = 0.14$, 95% CI = 0.04–0.23) at intermediate-term follow-up (14–51 weeks); no significant intervention effects on quantity or frequency outcomes at long-term follow-up (≥ 52 weeks).

Appendix 8B (continued)

Study Publication type Number of studies included Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Carey et al. 2012 ²²¹ Meta-analysis 48 studies Face-to-face interventions: N = 5,237 Computer-delivered interventions: N = 32,243	Through December 2010	Language: Any Publication type: Any Population: College students Study design: RCTs or quasi-experimental designs with an assessment-only, waitlist, or no treatment control condition Intervention: Individual-level alcohol interventions Outcomes: Sufficient information to calculate effect sizes	Population: Noncollege students Study Design: Active control condition (e.g., education only) Intervention: Interventions that did not specifically focus on alcohol use; interventions that included a mass media or structural-level intervention component Outcomes: Insufficient statistical information to calculate effect sizes	Tobacco use: Tobacco use outcomes not reported Alcohol use: Participants in face-to-face interventions had reduced alcohol consumption, reduced peak blood alcohol content, and fewer alcohol-related problems than those in computer-delivered interventions (ds = 0.12–0.20).
Lupton & Townsend 2015 ²²⁴ Systematic review and meta-analysis 19 studies Total N not available	Through June 2013	Language: English Publication type: Any Population: College or university population Study design: Cross-sectional, cluster randomized interventions, or before and after interventions Intervention: Complete indoor and outdoor smokefree policies on campus Outcomes: Reporting of student and faculty support for smokefree policies, smokefree policy effectiveness at reducing secondhand smoke exposure, cigarette consumption, or smoking prevalence	Study Design: Survey methods or effectiveness measures that did not meet quality requirements (e.g., sampling strategy, response rate, or survey questions not reported) Other: Articles titles that did not address tobacco use at a university setting	Tobacco use: 2 studies reported cigarette smoking prevalence. 1 study reported a significant decrease in smoking, from 16.5% at baseline to 12.8% at follow-up ($p < .001$), while the control campus had a nonsignificant increase in smoking prevalence from 9.5% to 10.1%. Another study found that there was a significant decrease in smoking prevalence from 9.5% at 3 months before the smokefree policy to 7.6% at 1-year follow-up, 6.6% at 2-year follow-up, and 7.0% at 3-year follow-up ($p = .04$). Alcohol use: Alcohol outcomes not reported
Plotnikoff et al. 2019 ²¹³ Systematic review 88 studies Total N not available	January 1970 to October 2016	Language: English Publication type: Peer-reviewed publications Population: Students attending higher education institutions Study design: RCTs Intervention: Interventions aiming to improve 1 or more health behaviors (alcohol use, drug use, smoking) and implemented in a higher education setting (university, college)	Publication Type: Grey literature (e.g., dissertations, theses)	Tobacco use: Of 9 studies that reported comparable tobacco use measures, 1 study reported no effect, 4 reported reductions in tobacco use, and 4 reported increased tobacco use. Alcohol use: Of 46 studies that reported comparable alcohol consumption measures, 42 reported alcohol consumption decreases and 4 reported alcohol consumption increases.

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Toomey et al. 2007 ²⁴³	1999–2006	Language: Any Publication type: Peer-reviewed, published research Population: College students Study design: Any Intervention: Environmental policies and strategies to reduce drinking among college students	Studies not meeting inclusion criteria	Tobacco use: Tobacco use outcomes not reported Alcohol use: The authors concluded that environmental policies and strategies can reduce alcohol use and alcohol-related problems among college students, but not all approaches are effective. Many strategies have few or no evaluations.
Literature review				
36 studies				
Total N not available				
Family-based interventions – Tobacco				
Thomas et al. 2015 ²⁶⁸	Through April 3, 2014	Language: Any Publication type: Any Population: Children (ages 5–12) or adolescents (ages 13–18) and families Study design: RCTs Intervention: Interventions with children or adolescents and families to deter tobacco use initiation Outcomes: Smoking status of children who reported no use of tobacco at baseline, measured at least 6 months from the start of the intervention	Intervention: Interventions primarily focused on cessation Outcomes: Baseline smoking status not assessed; smoking behaviors not assessed; family-based intervention effects could not be separated from other co-interventions	Tobacco use: Compared to no intervention, standalone family interventions can reduce uptake or experimentation with smoking among children and adolescents by 16% to 32% (based on data from 9 trials). Compared to school interventions, combined family and school interventions can reduce uptake of smoking by 4% to 25%. However, effect estimates did not include data from all studies. Alcohol use: No alcohol use outcomes reported
Systematic review				
27 studies				
Total N not available				

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Family-based interventions – Alcohol				
Gilligan et al. 2019 ²⁷¹ Systematic review 46 studies N = 39,822	Through June 30, 2018	Language: Any Publication type: Any Population: Parents or guardians/carers of school-aged children (up to age 18) who were part of the general population Study design: RCTs and cluster RCTs of psychosocial or education interventions for parents compared with no intervention or an alternate intervention Intervention: Family-based prevention programs to prevent alcohol and problem drinking for children with no known risk factors, at elevated risk for alcohol use, or already consuming alcohol Outcomes: Alcohol use (yes/no, quantity, frequency), binge drinking, or incidence of drunkenness among children	Population: Adolescents transitioning to college	Tobacco use: No tobacco use outcomes reported. Alcohol use: Overall, family-based interventions had no significant effects on the prevalence (SMD = 0.00, 95% CI = -0.08–0.08), frequency (SMD = -0.31, 95% CI = -0.83–0.21), or volume of alcohol use (SMD = -0.14, 95% CI = -0.27–0.00) among children younger than age 18.
Smit et al. 2008 ²⁷⁰ Meta-analysis 18 studies of 9 trials Total N not available	January 1995–September 2006	Language: Dutch, English Publication type: Published articles and unpublished dissertations Population: Parents with children under age 16 Study design: RCTs Intervention: Family interventions (at least half of the intervention had to target parents directly) conducted in the general population Outcomes: Alcohol use behavior outcomes reported for adolescents or school age children	Intervention: Interventions conducted in at-risk groups (juvenile offenders, children of adults with alcohol use disorder) Outcomes: Interventions part of multicomponent interventions with no separate analyses for family interventions; alcohol use behavior not measured	Tobacco use: No tobacco use outcomes reported Alcohol use: <i>Alcohol initiation:</i> Family interventions reduced alcohol initiation at 18–30 months (OR = 0.71, 95% CI = 0.54–0.94) <i>Last month alcohol use:</i> Family interventions had no significant effect on past-month alcohol use (OR = 0.70, 95% CI = 0.46–1.05) <i>Frequency of alcohol use:</i> Family interventions significantly reduced frequency of alcohol use in the last month or last year at 36–48 months follow-up (<i>d</i> = -0.25, 95% CI = -0.37– -0.12).

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Family-based interventions – Tobacco and alcohol				
Champion et al. 2022 ²⁷³ Meta-analysis 46 studies of 36 RCTs N = 28,322 youth; N = 7,385 parents	January 2010–May 2021	Language: Any Publication type: Any including grey literature (dissertations, clinical trial registries, conference proceedings) Population: Parents and adolescents (mean age between 11 and 18 years) Study design: RCTs using comparators of no intervention, waitlist control, or an alternate intervention Intervention: Parent-based preventive interventions to address 2 or more risk behaviors (alcohol use, tobacco use, diet, physical activity, sedentary behaviors, sleep) Outcomes: Outcomes reported for adolescents	Intervention: Weight loss interventions targeting overweight or obese youth; interventions with only indirect parental involvement (e.g., receiving a newsletter)	Tobacco use: <i>Ever use:</i> OR: 1.36 (95% CI, 1.06–1.74) <i>Past-month tobacco use, short-term (<6 months) follow-up:</i> OR: 1.21 (95% CI, 0.57–2.54) <i>Past-month tobacco use, medium-term (6–12 months) follow-up:</i> OR: 1.27 (95% CI, 0.78–2.08) <i>Past-month tobacco use, long-term (>12 months) follow-up:</i> OR: 1.46 (95% CI, 1.12–1.90) Alcohol use: No significant intervention effects <i>Ever use:</i> OR: 1.01 (95% CI, 0.82–1.24) <i>Past-month alcohol use, short-term (<6 months) follow-up:</i> OR: 1.06 (95% CI, 0.36–3.07) <i>Past-month alcohol use, medium-term (6–12 months) follow-up:</i> OR: 1.06 (95% CI, 0.66–1.71) <i>Past-month alcohol use, long-term (>12 months) follow-up:</i> OR: 0.94 (95% CI, 0.69–1.28)

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Van Ryzin et al. 2016 ²⁷² Meta-analysis 116 studies Total N not available	Through September 2012	Language: Any Publication type: Peer-reviewed studies in journals, books, dissertations, theses, and technical reports Population: Adolescents and youth ages 11–21 Study design: Designs that support inferences about the relative effectiveness of a family-based prevention program compared to a control group or baseline Intervention: Family-based universal or selective programs aimed at preventing adolescent substance use that included face-to-face, telephone, or email communication with families Outcomes: Adolescent substance use (tobacco, alcohol, cannabis, or other drugs); sufficient information to calculate an effect size	Intervention: Interventions targeting those already using substances	Programs that included positive family relations or future orientation had significant effects (overall mean ES $d = 0.31$) on adolescent tobacco and alcohol use. There were no statistically significant differences in effect sizes by type of substance (tobacco, alcohol, and other drugs). Tobacco use: Overall ES: $d = 0.25$ Alcohol use: Overall ES: $d = 0.31$

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Population-level interventions				
Akter et al. 2023 ³¹¹ Systematic review and meta-analysis 144 studies Total N not available	Through March 2022	Language: Any Publication type: Peer-reviewed journal articles and grey literature Population: No restriction Study design: Observational studies (any design including cross-sectional, case-control, cohort studies), quasi-experimental studies (including interrupted time series, before and after studies, controlled before and after studies) Intervention: Population-level policies aimed at reducing tobacco use, including policies such as smokefree policies, taxation, and minimum cigarette sales age Outcomes: Respiratory symptom disease, cardiovascular disease, cancer, mortality, health care utilization	Publication Type: Letters, case studies, systematic or scoping reviews, commentaries, editorials without original research findings Study Design: RCTs, simulation or modeling studies	Tobacco use: Smokefree legislation (126 studies) was associated with decreased risk of cardiovascular disease events (incidence, prevalence, or mortality; OR = 0.90, 95% CI = 0.86–0.94), respiratory symptom disease events (incidence, prevalence, or mortality; OR = 0.83, 95% CI = 0.72–0.96), and hospitalization due to cardiovascular disease or respiratory symptom disease (OR = 0.91, 95% CI = 0.87–0.95). Effects on tobacco use prevalence were not reported. Alcohol use: No alcohol use outcomes reported

Appendix 8B (continued)

Study Publication type Number of studies included Total <i>N</i>	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Vahedi et al. 2018 ²⁸⁹ Meta-analysis 20 studies Total <i>N</i> not available	Through May 2018	Language: English Publication type: Any Population: Participants with a mean age between 11 and 19 Study design: Evaluation using pre- and post-measures or a control group Intervention: Media literacy interventions (including media skepticism or media deconstruction skills interventions that identified the meaning, source, and intended audience of media images depicting smoking/tobacco use, alcohol use, other substance use, or risky sexual behavior) Outcomes: Attitudes, behavioral intentions, and/or behavior toward smoking/using tobacco, drinking alcohol, or using other substances, or engaging in unsafe sexual behavior before and after the intervention	Study Design: Cross-sectional studies or surveys	Tobacco use: No tobacco use behavioral outcomes reported Alcohol use: No alcohol use behavioral outcomes reported
Population-level interventions – Mass media campaigns				
Allen et al. 2015 ³⁰⁵ Systematic review 34 studies Total <i>N</i> not available	Through March 2014	Language: Any Publication type: Articles indexed in PubMed and PsycInfo Population: Adolescents ages 18 and younger Study design: Experimental studies that examined the efficacy of anti-tobacco messages or studies that examine the effectiveness of anti-tobacco mass media campaigns Intervention: Mass media campaigns to address youth smoking/tobacco use in terms of cognitions or behavior	Studies that were not quantitative, or did not include results for youth ages 18 or younger	Tobacco use: The authors concluded that mass media campaigns can be effective in reducing youth tobacco use behavior, although the size of campaign effects might differ by race and/or ethnicity and by sex. Alcohol use: Alcohol use outcomes not reported

Appendix 8B (continued)

Study Publication type Number of studies included Total <i>N</i>	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Palmedo et al. 2017 ³¹⁰ Systematic review 14 studies Total <i>N</i> not available	January 1998–June 2016	Language: English Publication Type: Any Population: United States and other English-speaking countries Study design: Empirical studies of the design, planning, implementation, or evaluation of countermarketing initiatives Intervention: Countermarketing initiatives on tobacco, alcohol, or unhealthy food	Studies not meeting inclusion criteria	Tobacco use: Aggregated effects on tobacco use behavioral outcomes were not reported. Alcohol use: Aggregated effects on alcohol use behavioral outcomes were not reported.
Young et al. 2018 ³⁰⁸ Systematic review 24 studies Total <i>N</i> not available	Through July 2016	Language: English Publication Type: Any Population: Any Study design: Any Intervention: Mass media interventions (using channels such as television, radio, cinema, online broadcasting, newspapers, magazines, leaflets/booklets, direct mail, outdoor advertising, email, digital media) targeting alcohol consumption or related behavioral, social cognitive, or clinical outcomes; multicomponent interventions that included assessment of the effects of the mass media component were permitted Outcomes: Alcohol consumption; alcohol-related social-cognitive variables (e.g., knowledge, intentions, social norms); exposure outcomes (e.g., campaign awareness); alcohol-related harm; health service usage	Intervention: Drunk driving interventions; college campus campaigns	Tobacco use: Tobacco use outcomes not reported Alcohol use: 13 studies assessed the effects of campaigns on alcohol consumption; however, reducing alcohol consumption was a stated aim of only 6 of the campaigns (the other 7 aimed to address outcomes such as knowledge, attitudes, or beliefs). Of the 6 studies that sought to address alcohol consumption, 5 reported no statistically significant differences in alcohol consumption between the exposed and nonexposed groups. One study of weak quality found significant effects of a TV and mailed letter campaign.

Appendix 8B (continued)

Study				
Publication type				
Number of studies included				
Total N	Dates of studies included	Inclusion criteria	Exclusion criteria	Main findings
Culturally adapted interventions				
Bo et al. 2023 ²⁸⁸ Systematic review and meta-analysis 30 studies Total N not available	Through September 2022	Language: Any Publication Type: Any Population: U.S. Black, Hispanic, American Indian, Asian American, Native Hawaiian or Pacific Islander, and multiracial adolescents ages 11–18 Study design: RCTs (individual or cluster) Intervention: Culturally sensitive universal, selective, or indicated individual-, family-, school-, or community-based substance use prevention programs or positive youth development programs conducted in the United States; culturally sensitive components included culturally appropriate language or contents that address cultural values, racial and/or ethnic identity, pride, acculturation, discrimination, or racial and/or ethnic socialization Outcomes: Behavioral substance use outcomes and substance use-related consequences or problems; all kinds of substances were eligible for inclusion.	Population: Adolescents with a substance or alcohol abuse and dependence diagnosis; adolescents who had graduated from high school; studies with mainly White participants Intervention: Studies that were only surface structure adapted (e.g., only used culturally relevant language) or that had only passive intervention messages	Tobacco use: Culturally sensitive interventions had a significant effect on tobacco use outcomes, $g = -0.21$ (95% CI, -0.32 to -0.10). Alcohol use: Culturally sensitive interventions had a significant effect on alcohol use outcomes, $g = -0.14$ (95% CI, -0.20 to -0.09).

Note. BAI = brief alcohol interventions; CI = confidence interval; ES = effect size; JIT = just-in-time; JITAI = just-in-time adaptive intervention; MUR = mean usage reduction; OR = odds ratio; RCT = randomized controlled trial; SMD = standardized mean difference.

References

1. Jamal A, Park-Lee E, Birdsey J, et al. tobacco product use among middle and high school students - National Youth Tobacco Survey, United States, 2024. *MMWR Morb Mortal Wkly Rep.* 2024;73(41):917-924. doi:10.15585/mmwr.mm7341a2.
2. Arrazola RA, Husten CG, Cornelius ME, Armour BS. Notes from the field: tobacco product use among adults - United States, 2017-2023. *MMWR Morb Mortal Wkly Rep.* 2025;74(7):118-121. doi:10.15585/mmwr.mm7407a3.
3. Vahratian A, Briones EM, Jamal A, Marynak KL. Electronic cigarette use among adults in the United States, 2019–2023. [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/nchs/data/databriefs/db524.pdf>.
4. McCabe SE, West BT, McCabe VV. Associations between early onset of e-cigarette use and cigarette smoking and other substance use among U.S. adolescents: a national study. *Nicotine Tob Res.* 2018;20(8):923-930. doi:10.1093/ntr/ntx231.
5. Lau L, Conti AA, Hemmati Z, Baldacchino A. The prospective association between the use of E-cigarettes and other psychoactive substances in young people: a systematic review and meta-analysis. *Neurosci Biobehav Rev.* 2023;153:105392. doi:10.1016/j.neubiorev.2023.105392.
6. Banks DE, Rowe AT, Mpofu P, Zapolski TCB. Trends in typologies of concurrent alcohol, marijuana, and cigarette use among U.S. adolescents: an ecological examination by sex and race/ethnicity. *Drug Alcohol Depend.* 2017;179:71-77. doi:10.1016/j.drugalcdep.2017.06.026.
7. Substance Abuse and Mental Health Services Administration. Table 2.44B – Alcohol Use in Lifetime, Past Year, and Past Month and Binge Alcohol and Heavy Alcohol Use in Past Month: Among People Aged 12 to 20; by Demographic Characteristics, Percentages, 2023 and 2024. 2025. [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/data/sites/default/files/reports/rpt42728/NSDUHDetailedTabs2022/NSDUHDetailedTabs2022/NSDUHDetTabs2-44and2-45pe2022.pdf>.
8. Yuan M, Cross SJ, Loughlin SE, Leslie FM. Nicotine and the adolescent brain. *J Physiol.* 2015;593(16):3397-412. doi:10.1113/JP270492.
9. Jaworska N, MacQueen G. Adolescence as a unique developmental period. *J Psychiatry Neurosci.* 2015;40(5):291-3. doi:10.1503/jpn.150268.
10. Sawyer SM, Azzopardi PS, Wickremarathne D, Patton GC. The age of adolescence. *Lancet Child Adolesc Health.* 2018;2(3):223-228. doi:10.1016/S2352-4642(18)30022-1.
11. Conrod PJ, Nikolaou K. Annual research review: on the developmental neuropsychology of substance use disorders. *J Child Psychol Psychiatry.* 2016;57(3):371-94. doi:10.1111/jcpp.12516.
12. Phillips RD, De Bellis MD, Brumback T, Clausen AN, Clarke-Rubright EK, Haswell CC, Morey RA. Volumetric trajectories of hippocampal subfields and amygdala nuclei influenced by adolescent alcohol use and lifetime trauma. *Transl Psychiatry.* 2021;11(1):154. doi:10.1038/s41398-021-01275-0.
13. Marshall EJ. Adolescent alcohol use: Risks and consequences. *Alcohol Alcohol.* 2014;49(2):160-4. doi:10.1093/alcac/agt180.
14. Mathers M, Toumbourou JW, Catalano RF, Williams J, Patton GC. Consequences of youth tobacco use: A review of prospective behavioural studies. *Addiction.* 2006;101(7):948-58. doi:10.1111/j.1360-0443.2006.01438.x.
15. U.S. Department of Health and Human Services. Facing addiction in America: the Surgeon General's report on alcohol, drugs, and health. 2016 [cited 2026 Mar 27]. Available from: <https://www.hhs.gov/sites/default/files/facing-addiction-in-america-surgeon-generals-report.pdf>.
16. Bobo JK, Husten C. Sociocultural Influences on Smoking and Drinking. 2000. *Alcohol Research & Health.* 2000;24(4):225-32.
17. Das JK, Salam RA, Arshad A, Finkelstein Y, Bhutta ZA. Interventions for adolescent substance abuse: an overview of systematic reviews. *J Adolesc Health.* 2016;59(4S):S61-S75. doi:10.1016/j.jadohealth.2016.06.021.
18. Gottfredson DC, Wilson DB. Characteristics of effective school-based substance abuse prevention. *Prev Sci.* 2003;4(1):27-38. doi:10.1023/a:1021782710278.
19. Stockings E, Hall WD, Lynskey M, et al. Prevention, early intervention, harm reduction, and treatment of substance use in young people. *Lancet Psychiatry.* 2016;3(3):280-96. doi:10.1016/S2215-0366(16)00002-X.
20. U.S. Department of Health and Human Services. *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012.

21. Villanti AC, Niaura RS, Abrams DB, Mermelstein R. Preventing smoking progression in young adults: the concept of prevescalation. *Prev Sci.* 2019;20(3):377-384. doi:10.1007/s1121-018-0880-y.
22. Timberlake DS, Nguyen BD, Nguyen AT. Did the United States smokeless tobacco industry use cigarette industry strategies to sponsor and manipulate research? *Addiction.* 2025;120(7):1475-1483. doi:10.1111/add.70039.
23. Bero LA. Tobacco industry manipulation of research. *Public Health Rep.* 2005;120(2):200-8. doi:10.1177/003335490512000215.
24. National Cancer Institute. *The Role of the Media in Promoting and Reducing Tobacco Use.* Tobacco Control Monograph No. 19. NIH Publication No. 07-6242. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; June 2008.
25. Anderson P, de Bruijn A, Angus K, Gordon R, Hastings G. Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol Alcohol.* 2009;44(3):229-43. doi:10.1093/alcalc/agn115.
26. Jernigan D, Noel J, Landon J, Thornton N, Lobstein T. Alcohol marketing and youth alcohol consumption: a systematic review of longitudinal studies published since 2008. *Addiction.* 2017;112 Suppl 1:7-20. doi:10.1111/add.13591.
27. Sargent JD, Babor TF. The relationship between exposure to alcohol marketing and underage drinking is causal. *J Stud Alcohol Drugs Suppl.* 2020;(19):113-124. doi:10.15288/jsads.2020.s19.113.
28. U.S. Department of Health and Human Services. *Smoking Cessation. A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2020.
29. Biglan A, Van Ryzin MJ. Behavioral science and the prevention of adolescent substance abuse. *Perspect Behav Sci.* 2019;42(3):547-563. doi:10.1007/s40614-019-00217-y.
30. Reid AE, Carey KB. Interventions to reduce college student drinking: State of the evidence for mechanisms of behavior change. *Clin Psychol Rev.* 2015;40:213-24. doi:10.1016/j.cpr.2015.06.006.
31. Nation M, Crusto C, Wandersman A, Kumpfer KL, Seybolt D, Morrissey-Kane E, Davino K. What works in prevention. Principles of effective prevention programs. *Am Psychol.* 2003;58(6-7):449-56. doi:10.1037/0003-066x.58.6-7.449.
32. Glanz K, Rimer BK, Viswanath K, editors. *Health behavior and health education: theory, research, and practice.* 4th ed. San Francisco (CA): Jossey-Bass; 2008.
33. Clinical and Translational Science Awards Consortium Community Engagement Key Function Committee Task Force. Principles of community engagement, second edition. 2015 [cited 2026 Mar 27]. Available from: <https://ictr.johnshopkins.edu/wp-content/uploads/2015/10/CTSAPrinciplesofCommunityEngagement.pdf>.
34. National Cancer Institute. Theory at a glance: a guide for health promotion practice. 2020 [cited 2026 Mar 27]. Available from: <https://cancercontrol.cancer.gov/sites/default/files/2020-06/theory.pdf>.
35. National Center for Injury Prevention and Control Division of Violence Prevention. The social-ecological model: a framework for violence prevention. [cited 2026 Mar 27]. Available from: <https://files.eric.ed.gov/fulltext/ED556109.pdf>.
36. Garrett BE, Dube SR, Babb S, McAfee T. Addressing the social determinants of health to reduce tobacco-related disparities. *Nicotine Tob Res.* 2015;17(8):892-7. doi:10.1093/ntr/ntu266.
37. Nawi AM, Ismail R, Ibrahim F, et al. Risk and protective factors of drug abuse among adolescents: a systematic review. *BMC Public Health.* 2021;21(1):2088. doi:10.1186/s12889-021-11906-2.
38. MacKillop J, Agabio R, Feldstein Ewing SW, et al. Hazardous drinking and alcohol use disorders. *Nat Rev Dis Primers.* 2022;8(1):80. doi:10.1038/s41572-022-00406-1.
39. Solmi M, Civardi S, Corti R, et al. Risk and protective factors for alcohol and tobacco related disorders: an umbrella review of observational studies. *Neurosci Biobehav Rev.* 2021;121:20-28. doi:10.1016/j.neubiorev.2020.11.010.
40. Deeken F, Banaschewski T, Kluge U, Rapp MA. Risk and protective factors for alcohol use disorders across the lifespan. *Current Addiction Reports.* 2020;7(3):245-251. doi:10.1007/s40429-020-00313-z.
41. Hawkins JD, Catalano RF, Miller JY. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: implications for substance abuse prevention. *Psychol Bull.* 1992;112(1):64-105. doi:10.1037/0033-2909.112.1.64.
42. Flay BR, Petraitis J, Hu FB. Psychosocial risk and protective factors for adolescent tobacco use. *Nicotine Tob Res.* 1999;1 Suppl 1:S59-65. doi:10.1080/14622299050011611.
43. Stone AL, Becker LG, Huber AM, Catalano RF. Review of risk and protective factors of substance use and problem use in emerging adulthood. *Addict Behav.* 2012;37(7):747-75. doi:10.1016/j.addbeh.2012.02.014.

44. Donovan JE. Adolescent alcohol initiation: a review of psychosocial risk factors. *J Adolesc Health*. 2004;35(6):529 e7-18. doi:10.1016/j.jadohealth.2004.02.003.
45. Pinquart M, Scheurle K. Associations of outcome expectancies with smoking: a meta-analysis. *Drug Alcohol Depend*. 2025;273:112727. doi:10.1016/j.drugalcdep.2025.112727.
46. Jones SC, Gordon CS. A systematic review of children's alcohol-related knowledge, attitudes and expectancies. *Prev Med*. 2017;105:19-31. doi:10.1016/j.ypmed.2017.08.005.
47. Hershberger AR, Um M, Cyders MA. The relationship between the UPPS-P impulsive personality traits and substance use psychotherapy outcomes: a meta-analysis. *Drug Alcohol Depend*. 2017;178:408-416. doi:10.1016/j.drugalcdep.2017.05.032.
48. Marginean V, Sheth P, Varma A, Vessie A. A short review of acculturation and addiction among immigrant and refugee communities in the United States and abroad. *J Nurs Scholarsh*. 2023;55(3):584-589. doi:10.1111/jnu.12873.
49. Groenman AP, Janssen TWP, Oosterlaan J. Childhood psychiatric disorders as risk factor for subsequent substance abuse: a meta-analysis. *J Am Acad Child Adolesc Psychiatry*. 2017;56(7):556-569. doi:10.1016/j.jaac.2017.05.004.
50. Leonardi-Bee J, Jere ML, Britton J. Exposure to parental and sibling smoking and the risk of smoking uptake in childhood and adolescence: a systematic review and meta-analysis. *Thorax*. 2011;66(10):847-55. doi:10.1136/thx.2010.153379.
51. Yap MBH, Cheong TWK, Zaravinos-Tsakos F, Lubman DI, Jorm AF. Modifiable parenting factors associated with adolescent alcohol misuse: a systematic review and meta-analysis of longitudinal studies. *Addiction*. 2017;112(7):1142-1162. doi:10.1111/add.13785.
52. Carver H, Elliott L, Kennedy C, Hanley J. Parent-child connectedness and communication in relation to alcohol, tobacco and drug use in adolescence: an integrative review of the literature. *Drug-Educ Prev Polic*. 2017;24(2):119-133. doi:10.1080/09687637.2016.1221060.
53. Ryan SM, Jorm AF, Lubman DI. Parenting factors associated with reduced adolescent alcohol use: a systematic review of longitudinal studies. *Aust N Z J Psychiatry*. 2010;44(9):774-83. doi:10.1080/00048674.2010.501759.
54. Leung RK, Toumbourou JW, Hemphill SA. The effect of peer influence and selection processes on adolescent alcohol use: a systematic review of longitudinal studies. *Health Psychol Rev*. 2014;8(4):426-57. doi:10.1080/17437199.2011.587961.
55. Henneberger AK, Mushonga DR, Preston AM. Peer influence and adolescent substance use: a systematic review of dynamic social network research. *Adolesc Res Rev*. 2020;6(1):57-73. doi:10.1007/s40894-019-00130-0.
56. Liu J, Zhao S, Chen X, Falk E, Albarracin D. The influence of peer behavior as a function of social and cultural closeness: a meta-analysis of normative influence on adolescent smoking initiation and continuation. *Psychol Bull*. 2017;143(10):1082-1115. doi:10.1037/bul0000113.
57. Mason MJ, Zaharakis NM, Rusby JC, Westling E, Light JM, Mennis J, et al. A longitudinal study predicting adolescent tobacco, alcohol, and cannabis use by behavioral characteristics of close friends. *Psychol Addict Behav*. 2017;31(6):712-720. doi:10.1037/adb0000299.
58. Lahiri S, Bingenheimer JB, Evans WD, Wang Y, Cislighi B, Dubey P, Snowden B. Understanding the mechanisms of change in social norms around tobacco use: a systematic review and meta-analysis of interventions. *Addiction*. 2025;120(2):215-235. doi:10.1111/add.16685.
59. Eisenberg ME, Toumbourou JW, Catalano RF, Hemphill SA. Social norms in the development of adolescent substance use: a longitudinal analysis of the International Youth Development Study. *J Youth Adolesc*. 2014;43(9):1486-97. doi:10.1007/s10964-014-0111-1.
60. East K, McNeill A, Thrasher JF, Hitchman SC. Social norms as a predictor of smoking uptake among youth: a systematic review, meta-analysis and meta-regression of prospective cohort studies. *Addiction*. 2021;116(11):2953-2967. doi:10.1111/add.15427.
61. Bandura A. Personal and collective efficacy in human adaptation and change. In: JG Adair DB, KL Dion editors. *Advances in Psychological Science, Vol 1 Social, Personal, and Cultural Aspects*. Taylor & Francis; 1988:51-71.
62. Hawkins JD, Van Horn ML, Arthur MW. Community variation in risk and protective factors and substance use outcomes. *Prev Sci*. 2004;5(4):213-20. doi:10.1023/b:prev.0000045355.53137.45.
63. Weitzman M, Lee L. Similarities between alcohol and tobacco advertising exposure and adolescent use of each of these substances. *J Stud Alcohol Drugs Suppl*. 2020;Sup 19(19):97-105. doi:10.15288/jsads.2020.s19.97.

64. Jackson KM, Janssen T, Gabrielli J. Media/marketing influences on adolescent and young adult substance abuse. *Curr Addict Rep*. 2018;5(2):146-157. doi:10.1007/s40429-018-0199-6.
65. Yang XY, Yang F. Acculturation versus cultural retention: the interactive impact of acculturation and co-ethnic ties on substance use among Chinese students in the United States. *J Immigr Minor Health*. 2018;20(3):546-560. doi:10.1007/s10903-017-0598-0.
66. Lorenzo-Blanco EI, Unger JB, Ritt-Olson A, Soto D, Baezconde-Garbanati L. A longitudinal analysis of Hispanic youth acculturation and cigarette smoking: the roles of gender, culture, family, and discrimination. *Nicotine Tob Res*. 2013;15(5):957-68. doi:10.1093/ntr/nts204.
67. Castro Y. Determinants of smoking and cessation Among Latinos: challenges and implications for research. *Soc Personal Psychol Compass*. 2016;10(7):390-404. doi:10.1111/spc3.12256.
68. Zamboanga BL, Lui PP, Pham S. Acculturation, enculturation, and bicultural orientations: Conceptualizations and links to alcohol use. In: Hall GCN, editor. *Mental and Behavioral Health of Immigrants in the United States*. 2020:45-69.
69. Unger JB, Ritt-Olson A, Wagner KD, Soto DW, Baezconde-Garbanati L. Parent-child acculturation patterns and substance use among Hispanic adolescents: a longitudinal analysis. *J Prim Prev*. 2009;30(3-4):293-313. doi:10.1007/s10935-009-0178-8.
70. Cano MA, Schwartz SJ, Castillo LG, et al. Health risk behaviors and depressive symptoms among Hispanic adolescents: Examining acculturation discrepancies and family functioning. *J Fam Psychol*. 2016;30(2):254-265. doi:10.1037/fam0000142.
71. Schwartz SJ, Unger JB, Baezconde-Garbanati L, et al. Trajectories of cultural stressors and effects on mental health and substance use among Hispanic immigrant adolescents. *J Adolesc Health*. 2015;56(4):433-9. doi:10.1016/j.jadohealth.2014.12.011.
72. Zapolski TCB, Clifton RL. Cultural socialization and alcohol use: the mediating role of alcohol expectancies among racial/ethnic minority youth. *Addict Behav Rep*. 2019;9:100145. doi:10.1016/j.abrep.2018.100145.
73. Espinosa A, Ruglass LM, Conway FN. The relative contribution of ethnic identity and ethnic discrimination on alcohol, tobacco, and other drug use disorders among Hispanic/Latin American individuals. *J Subst Use Addict Treat*. 2023;153:208963. doi:10.1016/j.josat.2023.208963.
74. U.S. Department of Health and Human Services. *The Health Consequences of Smoking: 50 Years of Progress. A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Printed with corrections, January 2014.
75. U.S. Department of Health and Human Services. *Eliminating Tobacco-Related Disease and Death: Addressing Disparities—A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2024.
76. Food and Drug Administration. Next Legends: research overview. [cited 2026 Mar 27]. Available from: <https://www.fda.gov/media/159055/download>.
77. Food and Drug Administration. Next Legends: campaign overview. [cited 2026 Mar 27]. Available from: <https://www.fda.gov/media/159054/download>.
78. Rubin R. Campaign against e-cigarette use targets "Next Legends". *JAMA*. 2022;328(3):235. doi:10.1001/jama.2022.11297.
79. Brown LS, Jr. Substance abuse and America: historical perspective on the federal response to a social phenomenon. *J Natl Med Assoc*. 1981;73(6):497-506.
80. Rorabaugh WJ. *Prohibition: a concise history*. Oxford University Press; 2018.
81. U.S. Department of Health and Human Services. *Smoking and Health: Report of the Advisory Committee of the Surgeon General of the Public Health Service*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1964.
82. Istvan J, Matarazzo JD. Tobacco, alcohol, and caffeine use: a review of their interrelationships. *Psychol Bull*. 1984;95(2):301-26.
83. Flay BR, d'Avernas JR, Best JA, Kersell MW, Ryan KB. Cigarette smoking: why young people do it and ways of preventing it. In: McGrath P and Firestone P, editors. *Pediatric and Adolescent Behavioral Medicine*. Springer, 1983;10:132-183.
84. Harmon-Jones E, Harmon-Jones C. Cognitive dissonance theory after 50 years of development. *Z Sozialpsychol*. 2007;38(1):7-16. doi:10.1024/0044-3514.38.1.7.

85. Vanyukov MM, Tarter RE, Kirillova GP, et al. Common liability to addiction and "gateway hypothesis": theoretical, empirical and evolutionary perspective. *Drug Alcohol Depend.* 2012;123 Suppl 1(Suppl 1):S3-17. doi:10.1016/j.drugalcdep.2011.12.018.
86. Petty RE, Cacioppo JT. The elaboration likelihood model of persuasion. In: *Advances in Experimental Social Psychology*; 1986:123-205.
87. Jessor R. Problem behavior theory: A half-century of research on adolescent behavior and development. In: Lerner RM, Petersen AC, Silbereisen RK, Brooks-Gunn J, editors. *The developmental science of adolescence: history through autobiography*. Psychology Press; 2014.
88. Prevention and cessation of tobacco use research-based programs. In: Lynch BS, Bonnie RJ, editors. *Growing up tobacco free: preventing nicotine addiction in children and youth*. National Academy Press; 1994: 143-176:chap 5.
89. Bukoski W. A history of drug abuse prevention science. In: Scheier LM, ed. *Handbook of adolescent drug use prevention: Research, intervention strategies, and practice*. American Psychological Association; 2015:31-48:chap 003.
90. Fishbein M, Ajzen I. Predicting and changing behavior: the reasoned action approach. Psychology Press; 2010.
91. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol.* 2000;55(1):68-78. doi:10.1037//0003-066x.55.1.68.
92. Bronfenbrenner U. Toward an experimental ecology of human development. *Am Psychol.* 1977;32(7):513.
93. Bronfenbrenner U. Ecology of the family as a context for human development: research perspectives. *Dev Psychol.* 22 (6), 723. 1986.
94. Bronfenbrenner U. Ecological systems theory. In: Kazdin AE, editor. *Encyclopedia of psychology*. American Psychological Association; 2000. p. 129-33.
95. Kelman HC. Compliance, identification, and internalization three processes of attitude change. *J Conflict Resolut.* 1958;2(1):51-60. doi:10.1177/002200275800200106.
96. Deutsch M, Gerard HB. A study of normative and informational social influences upon individual judgement. *J Abnorm Psychol.* 1955;51(3):629-36. doi:10.1037/h0046408.
97. Banas JA, Rains SA. A meta-analysis of research on inoculation theory. *Commun Monogr.* 2010;77(3): 281-311. doi:10.1080/03637751003758193.
98. McGuire WJ. Resistance to persuasion conferred by active and passive prior refutation of the same and alternative counterarguments. *The Journal of Abnormal and Social Psychology.* 1961;63(2):326.
99. Koski WJ, Evans R, and National Institute on Drug Abuse. Division of Epidemiology and Prevention Research. Cost-Benefit/Cost-Effectiveness Research of Drug Abuse Prevention: Implications for Programming and Policy. Rockville, MD: U.S. Dept. of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse, Division of Epidemiology and Prevention Research, 1998.
100. Flay BR. Adolescent smoking: onset and prevention. *Ann Behav Med.* 1985;7(2):9-13. doi:10.1207/s15324796abm0702_2.
101. Perkins HW. The social norms approach to preventing school and college age substance abuse: a handbook for educators, counselors, and clinicians. John Wiley & Sons; 2003.
102. Cuijpers P. Effective ingredients of school-based drug prevention programs. a systematic review. *Addict Behav.* 2002;27(6):1009-23. doi:10.1016/s0306-4603(02)00295-2.
103. American Lung Association. Tobacco control milestones [Internet]. [cited 2026 Mar 27]. Available from: <https://www.lung.org/research/sotc/tobacco-timeline>.
104. Bellou A, Bhatt R. Reducing underage alcohol and tobacco use: evidence from the introduction of vertical identification cards. *J Health Econ.* 2013;32(2):353-66. doi:10.1016/j.jhealeco.2012.12.001.
105. Campaign for Tobacco-Free Kids. Increasing the federal tobacco tax reduces tobacco use (and the tobacco companies know it). [cited 2026 Mar 27]. Available from: <https://assets.tobaccofreekids.org/factsheets/0021.pdf>.
106. Farrelly MC, Duke JC, Nonnemaker J, et al. Association between the real cost media campaign and smoking initiation among youths - United States, 2014-2016. *MMWR Morb Mortal Wkly Rep.* 2017;66(2):47-50. doi:10.15585/mmwr.mm6602a2.
107. Griffin JT. Legislative history of drunk driving in America. [cited 2026 Mar 27]. Available from: <https://www.centerforalcoholpolicy.org/wp-content/uploads/2021/08/JT-Griffin-DUI-Report-2021.pdf>.
108. U.S. Congress. Public Health Cigarette Smoking Act of 1969. Public Law No. 91-222. [cited 2026 Mar 27]. Available from: <https://www.congress.gov/bill/91st-congress/house-bill/6543/text>.
109. Mothers Against Drunk Driving. MADD history [Internet]. [cited 2026 Mar 27]. Available from: <https://madd.org/our-history>.

110. National Institute on Alcohol Abuse and Alcoholism. The 1984 National Minimum Drinking Age Act. [cited 2026 Mar 27]. Available from: <https://alcoholpolicy.niaaa.nih.gov/the-1984-national-minimum-drinking-age-act>.
111. PACE Recovery Center. This is your brain on drugs - 20 Years Later. [cited 2026 Mar 27]. Available from: <https://www.pacerecoverycenter.com/your-brain-on-drugs-20-years-later>.
112. U.S. Department of Health and Human Services. *E-Cigarette Use Among Youth and Young Adults. A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2016.
113. Truth Initiative. Our history [Internet]. [cited 2026 Mar 27]. Available from: <https://truthinitiative.org/who-we-are/our-history>.
114. White MC. 'This is your brain on drugs,' tweaked for today's parents. 2016 [cited 2026 Mar 27]. Available from: <https://www.nytimes.com/2016/08/08/business/media/this-is-your-brain-on-drugs-tweaked-for-todays-parents.html>.
115. Cummings KM, Proctor RN. The changing public image of smoking in the United States: 1964-2014. *Cancer Epidemiol Biomarkers Prev*. 2014;23(1):32-6. doi:10.1158/1055-9965.EPI-13-0798.
116. Keyes KM. Age, period, and cohort effects in alcohol use in the United States in the 20th and 21st centuries: implications for the coming decades. *Alcohol Res*. 2022;42(1):02. doi:10.35946/arc.v42.1.02.
117. Room R. Long waves of alcohol consumption and the sustainable development goals. *Int J Drug Policy*. 2025;136:104703. doi:10.1016/j.drugpo.2025.104703.
118. Toomey TL, Rosenfeld C, Wagenaar AC. The minimum legal drinking age: history, effectiveness, and ongoing debate. *Alcohol Health Res World*. 1996;20(4):213-218.
119. IARC Working Group on the Evaluation of Carcinogenic Risks to Humans. *Alcohol Drinking*. Lyon (FR): International Agency for Research on Cancer; 1988. (IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, No. 44). Available from: <https://publications.iarc.fr/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Alcohol-Drinking-1988>.
120. Stolberg VB. A review of perspectives on alcohol and alcoholism in the history of American health and medicine. *J Ethn Subst Abuse*. 2006;5(4):39-106. doi:10.1300/J233v05n04_02.
121. Mann K, Hermann D, Heinz A. One hundred years of alcoholism: the twentieth century. *Alcohol Alcohol*. 2000;35(1):10-5. doi:10.1093/alcalc/35.1.10.
122. Reinerman C. The social construction of an alcohol problem - the case of Mothers Against Drunk Drivers and social-control in the 1980s. *Theor Soc*. 1988;17(1):91-120. doi:10.1007/Bf00163727.
123. Hyland A, Barnoya J, Corral JE. Smoke-free air policies: past, present and future. *Tob Control*. 2012;21(2):154-61. doi:10.1136/tobaccocontrol-2011-050389.
124. National Institute on Alcohol Abuse and Alcoholism. Underage purchase of alcohol [Internet]. [cited 2026 Mar 27]. Available from: <https://alcoholpolicy.niaaa.nih.gov/apis-policy-topics/underage-purchase-of-alcohol/43/about-this-policy>.
125. Mann RE, Macdonald S, Stoduto LG, Bondy S, Jonah B, Shaikh A. The effects of introducing or lowering legal per se blood alcohol limits for driving: an international review. *Accid Anal Prev*. 2001;33(5):569-83. doi:10.1016/s0001-4575(00)00077-4.
126. Pennock P. Televising sin: efforts to restrict the televised advertisement of cigarettes and alcohol in the United States, 1950s to 1980s. *Historical Journal of Film, Radio and Television*. 2005;25(4):619-636. doi:10.1080/01439680500263023.
127. Centers for Disease Control. The surgeon general's 1989 report on reducing the health consequences of smoking: 25 years of progress. *MMWR Suppl*. 1989;38(2):1-32. PMID: 2494426
128. Katzper M, Ryback R, Hertzman M. Alcohol beverage advertisement and consumption. *J Drug Issues*. 1978;8(4):339-353. doi:10.1177/002204267800800401.
129. National Association of Attorneys General. Master Settlement Agreement. 1998. [cited 2026 Mar 27]. Available from: <https://attorneysgeneral.org/wp-content/uploads/2019/09/1998.11.23-Master-Settlement-Agreement.pdf>.
130. Hamilton WL, Turner-Bowker DM, Celebucki CC, Connolly GN. Cigarette advertising in magazines: the tobacco industry response to the Master Settlement Agreement and to public pressure. *Tob Control*. 2002;11 Suppl 2(Suppl 2):ii54-8. doi:10.1136/tc.11.suppl_2.ii54.
131. Duncan LR, Pearson ES, Maddison R. Smoking prevention in children and adolescents: a systematic review of individualized interventions. *Patient Educ Couns*. 2018;101(3):375-388. doi:10.1016/j.pec.2017.09.011.

132. Kazemi DM, Borsari B, Levine MJ, Li S, Lamberson KA, Matta LA. A systematic review of the mHealth interventions to prevent alcohol and substance abuse. *J Health Commun.* 2017;22(5):413-432. doi:10.1080/10810730.2017.1303556.
133. Mylocopos G, Wennberg E, Reiter A, et al. Interventions for preventing e-cigarette use among children and youth: A systematic review. *Am J Prev Med.* 2024;66(2):351-370. doi:10.1016/j.amepre.2023.09.028.
134. Champion KE, Parmenter B, McGowan C, et al. Effectiveness of school-based eHealth interventions to prevent multiple lifestyle risk behaviours among adolescents: a systematic review and meta-analysis. *Lancet Digit Health.* 2019;1(5):e206-e221. doi:10.1016/S2589-7500(19)30088-3.
135. Tzelepis F, Mitchell A, Wilson L, Byrnes E, Haschek A, Leigh L, Oldmeadow C. The long-term effectiveness of internet-based interventions on multiple health risk behaviors: systematic review and robust variance estimation meta-analysis. *J Med Internet Res.* 21 2021;23(12):e23513. doi:10.2196/23513.
136. Tinner L, Palmer JC, Lloyd EC, et al. Individual-, family- and school-based interventions to prevent multiple risk behaviours relating to alcohol, tobacco and drug use in young people aged 8-25 years: a systematic review and meta-analysis. *BMC Public Health.* 2022;22(1):1111. doi:10.1186/s12889-022-13072-5.
137. Monarque M, Sabetti J, Ferrari M. Digital interventions for substance use disorders in young people: rapid review. *Subst Abuse Treat Prev Policy.* 2023;18(1):13. doi:10.1186/s13011-023-00518-1.
138. Perski O, Hebert ET, Naughton F, Hekler EB, Brown J, Businelle MS. Technology-mediated just-in-time adaptive interventions (JITAIs) to reduce harmful substance use: a systematic review. *Addiction.* 2022;117(5):1220-1241. doi:10.1111/add.15687.
139. Cullen KA, Ambrose BK, Gentzke AS, Apelberg BJ, Jamal A, King BA. Notes from the field: use of electronic cigarettes and any tobacco product among middle and high school students - United States, 2011-2018. *MMWR Morb Mortal Wkly Rep.* 2018;67(45):1276-1277. doi:10.15585/mmwr.mm6745a5.
140. Cameron D, Epton T, Norman P, et al. A theory-based online health behaviour intervention for new university students (U@Uni:LifeGuide): results from a repeat randomized controlled trial. *Trials.* 2015;16:555. doi:10.1186/s13063-015-1092-4.
141. Epton T, Norman P, Dadzie AS, et al. A theory-based online health behaviour intervention for new university students (U@Uni): results from a randomised controlled trial. *BMC Public Health.* 2014;14:563. doi:10.1186/1471-2458-14-563.
142. Tapper K, Jiga-Boy G, Maio GR, Haddock G, Lewis M. Development and preliminary evaluation of an internet-based healthy eating program: randomized controlled trial. *J Med Internet Res.* 2014;16(10):e231. doi:10.2196/jmir.3534.
143. Schwinn TM, Schinke SP, Hopkins J, Keller B, Liu X. An online drug abuse prevention program for adolescent girls: posttest and 1-year outcomes. *J Youth Adolesc.* 2018;47(3):490-500. doi:10.1007/s10964-017-0714-4.
144. Schwinn TM, Schinke SP, Di Noia J. Preventing drug abuse among adolescent girls: outcome data from an internet-based intervention. *Prev Sci.* 2010;11(1):24-32. doi:10.1007/s11121-009-0146-9.
145. Schwinn TM, Schinke SP, Keller B, Hopkins J. Two- and three-year follow-up from a gender-specific, web-based drug abuse prevention program for adolescent girls. *Addict Behav.* 2019;93:86-92. doi:10.1016/j.addbeh.2019.01.010.
146. Zainal NH, Liu X, Leong U, Yan X, Chakraborty B. Bridging innovation and equity: advancing public health through just-in-time adaptive interventions. *Annu Rev Public Health.* 2025;46(1):43-68. doi:10.1146/annurev-publhealth-071723-103909.
147. Barrington-Trimis JL, Braymiller JL, Unger JB, et al. Trends in the age of cigarette smoking initiation among young adults in the U.S. from 2002 to 2018. *JAMA Netw Open.* 2020;3(10):e2019022. doi:10.1001/jamanetworkopen.2020.19022.
148. Barrington-Trimis JL, Urman R, Leventhal AM, et al. E-cigarettes, cigarettes, and the prevalence of adolescent tobacco use. *Pediatrics.* 2016;138(2). doi:10.1542/peds.2015-3983.
149. Gentzke AS, Creamer M, Cullen KA, Ambrose BK, Willis G, Jamal A, King BA. Vital signs: tobacco product use among middle and high school students - United States, 2011-2018. *MMWR Morb Mortal Wkly Rep.* 2019;68(6):157-164. doi:10.15585/mmwr.mm6806e1.
150. National Academies of Sciences, Engineering, and Medicine. Public health consequences of e-cigarettes. Washington, DC: The National Academies Press; 2018. doi:10.17226/24952.
151. Rundall TG, Bruvold WH. A meta-analysis of school-based smoking and alcohol use prevention programs. *Health Educ Q.* 1988;15(3):317-34. doi:10.1177/109019818801500306.

152. Federal Trade Commission. Self-regulation in the alcohol industry: a report to Congress. [cited 2026 Mar 27]. Available from: <https://www.ftc.gov/reports/self-regulation-alcohol-industry-federal-trade-commission-report-congress>.
153. Federal Trade Commission. Alcohol marketing and advertising: a report to Congress. 2003 [cited 2026 Mar 27]. Available from: <https://www.ftc.gov/sites/default/files/documents/reports/alcohol-marketing-and-advertising-federal-trade-commission-report-congress-september-2003/alcohol08report.pdf>.
154. Federal Trade Commission. Self-regulation in the alcohol industry: report of the Federal Trade Commission. 2008 [cited 2026 Mar 27]. Available from: <https://www.ftc.gov/reports/self-regulation-alcohol-industry-report-federal-trade-commission>.
155. Federal Trade Commission. Alcohol advertising. [cited 2026 Mar 27]. Available from: <https://consumer.ftc.gov/articles/0391-alcohol-advertising>.
156. Federal Trade Commission. Self-regulation in the alcohol industry: report of the Federal Trade Commission. 2014 [cited 2026 Mar 27]. Available from: <https://www.ftc.gov/system/files/documents/reports/self-regulation-alcohol-industry-report-federal-trade-commission/140320alcoholreport.pdf>.
157. Breed W, De Foe JR. Themes in magazine alcohol advertisements: a critique. *J Drug Issues*. 1979;9(4): 511-522. doi:10.1177/002204267900900404.
158. Bruvold WH. A meta-analysis of adolescent smoking prevention programs. *Am J Public Health*. Jun 1993;83(6):872-80. doi:10.2105/ajph.83.6.872.
159. Black DR, Tobler NS, Sciacca JP. Peer helping/involvement: an efficacious way to meet the challenge of reducing alcohol, tobacco, and other drug use among youth? *J Sch Health*. 1998;68(3):87-93. doi:10.1111/j.1746-1561.1998.tb03488.x.
160. Thomas R. School-based programmes for preventing smoking. *Cochrane Database Syst Rev*. 2002;(4):CD001293. doi:10.1002/14651858.CD001293.
161. Thomas R, Perera R. School-based programmes for preventing smoking. *Cochrane Database Syst Rev*. 2006;(3):CD001293. doi:10.1002/14651858.CD001293.pub2.
162. Thomas RE, McLellan J, Perera R. School-based programmes for preventing smoking. *Cochrane Database Syst Rev*. 2013;2013(4):CD001293. doi:10.1002/14651858.CD001293.pub3.
163. Thomas RE, McLellan J, Perera R. Effectiveness of school-based smoking prevention curricula: Systematic review and meta-analysis. *BMJ Open*. 2015;5(3):e006976. doi:10.1136/bmjopen-2014-006976.
164. Kelder SH, Mantey DS, Van Dusen D, Case K, Haas A, Springer AE. A middle school program to prevent e-cigarette use: a pilot study of "CATCH My Breath". *Public Health Rep*. 2020;135(2):220-229. doi:10.1177/0033354919900887.
165. Asdigian NL, Riggs NR, Valverde PA, Crane LA. Reducing youth vaping: a pilot test of the peer-led "Youth Engaged Strategies for Changing Adolescent Norms!" (YES-CAN!) program. *Health Promot Pract*. 2023;24(5):956-962. doi:10.1177/15248399221100793.
166. Baker KA, Campbell NJ, Noonan D, Thompson JA, Derouin A. Vaping prevention in a middle school population using CATCH My Breath. *J Pediatr Health Care*. 2022;36(2):90-98. doi:10.1016/j.pedhc.2021.07.013.
167. Bteddini DS, LeLaurin JH, Chi X, et al. Mixed methods evaluation of vaping and tobacco product use prevention interventions among youth in the Florida 4-H program. *Addict Behav*. 2023;141:107637. doi:10.1016/j.addbeh.2023.107637.
168. Burchfield K, Doyle D, Mantey D, Bennett T, Baus A. The CATCH My Breath vaping prevention curriculum: an evaluation of impacts in central Appalachian middle and high schools, 2019-2023. *J Prim Care Community Health*. 2024;15:21501319241277393. doi:10.1177/21501319241277393.
169. Cole AG, Fairs L, Mantey D, Philipneri A, Degano C, Bianco M, Kelder SH. The impact of the 'CATCH My Breath' vaping prevention curriculum among high school students in Ontario, Canada: results of a pilot test. *Prev Med Rep*. 2024;48:102919. doi:10.1016/j.pmedr.2024.102919.
170. Gardner LA, Rowe AL, Newton NC, et al. A systematic review and meta-analysis of school-based preventive interventions targeting e-cigarette use among adolescents. *Prev Sci*. 2024;25(7):1104-1121. doi:10.1007/s11121-024-01730-6.
171. Beeres D, Arno E, Pulkki-Brannstrom AM, Nilsson M, Galanti MR. Evaluation of the Swedish school-based program "tobacco-free DUO" in a cluster randomized controlled trial (TOPAS study). Results at 2-year follow-up. *Prev Med*. 2022;155:106944. doi:10.1016/j.ypmed.2021.106944.
172. Bonell C, Dodd M, Allen E, et al. Broader impacts of an intervention to transform school environments on student behaviour and school functioning: Post hoc analyses from the INCLUSIVE cluster randomised controlled trial. *BMJ Open*. 2020;10(5):e031589. doi:10.1136/bmjopen-2019-031589.

173. REACH Lab. Tobacco prevention toolkit. Stanford University. Available from: <https://med.stanford.edu/tobaccopreventiontoolkit.html>.
174. Gaiha SM, Zorrilla M, Sachnoff I, et al. Development and reach of the Stanford Tobacco Prevention Toolkit: implementation of a community-based participatory approach. *J Sch Health*. 2021;91(10):813-824. doi:10.1111/josh.13074.
175. McCauley DM, Baiocchi M, Cruse S, Halpern-Felsher B. Effects of a short school-based vaping prevention program for high school students. *Prev Med Rep*. 2023;33:102184. doi:10.1016/j.pmedr.2023.102184.
176. Gaiha SM, Kile S, Brake K, Halpern-Felsher B, Walley SC. Assessment of a five-session school-based e-cigarette prevention curriculum on student knowledge, perceptions, and intent to try e-cigarettes. *J Prev Health Promot*. 2024;5(4):634-657.
177. Hansen WB. School-based alcohol prevention programs. *Alcohol Health Res World*. 1993;17(1):54.
178. Donaldson SI, Graham JW, Hansen WB. Testing the generalizability of intervening mechanism theories: Understanding the effects of adolescent drug use prevention interventions. *J Behav Med*. 1994;17(2):195-216. doi:10.1007/BF01858105.
179. Dielman TE, Shope JT, Butchart AT, Campanelli PC. Prevention of adolescent alcohol misuse: an elementary school program. *J Pediatr Psychol*. 1986;11(2):259-82. doi:10.1093/jpepsy/11.2.259.
180. Foxcroft DR, Tsertsvadze A. Universal alcohol misuse prevention programmes for children and adolescents: Cochrane systematic reviews. *Perspect Public Health*. 2012;132(3):128-34. doi:10.1177/1757913912443487.
181. Lemstra M, Bennett N, Nannapaneni U, Neudorf C, Warren L, Kershaw T, Scott C. A systematic review of school-based marijuana and alcohol prevention programs targeting adolescents aged 10-15. *Addict Res Theory*. 2010;18(1):84-96. doi:10.3109/16066350802673224.
182. Lee NK, Cameron J, Battams S, Roche A. What works in school-based alcohol education: a systematic review. *Health Educ J*. 2016;75(7):780-798. doi:10.1177/0017896915612227.
183. Hennessy EA, Tanner-Smith EE. Effectiveness of brief school-based interventions for adolescents: a meta-analysis of alcohol use prevention programs. *Prev Sci*. 2015;16(3):463-74. doi:10.1007/s11121-014-0512-0.
184. Stigler MH, Neusel E, Perry CL. School-based programs to prevent and reduce alcohol use among youth. *Alcohol Res Health*. 2011;34(2):157-62.
185. MacArthur G, Caldwell DM, Redmore J, et al. Individual-, family-, and school-level interventions targeting multiple risk behaviours in young people. *Cochrane Database Syst Rev*. 2018;10(10):CD009927. doi:10.1002/14651858.CD009927.pub2.
186. Tremblay M, Baydala L, Khan M, et al. Primary substance use prevention programs for children and youth: A systematic review. *Pediatrics*. 2020;146(3). doi:10.1542/peds.2019-2747.
187. Donaldson SI, Hansen WB, Graham JW. Combating negative social influences: lessons from the adolescent alcohol prevention trial. *Improving Prevention Effectiveness*. 2000:103-111.
188. Taylor BJ, Graham JW, Cumsille P, Hansen WB. Modeling prevention program effects on growth in substance use: Analysis of five years of data from the Adolescent Alcohol Prevention Trial. *Prev Sci*. 2000;1(4):183-97. doi:10.1023/a:1026547128209.
189. Botvin GJ, Griffin KW, Paul E, Macaulay AP. Preventing tobacco and alcohol use among elementary school students through life skills training. *J Child Adoles Subst*. 2003;12(4):1-17. doi:10.1300/J029v12n04_01.
190. Smith EA, Swisher JD, Vicary JR, Bechtel LJ, Minner D, Henry KL, Palmer R. Evaluation of life skills training and infused-life skills training in a rural setting: outcomes at two years. *J Alcohol Drug Educ*. 2004;48:51-70.
191. Spoth R, Greenberg M, Turrissi R. Preventive interventions addressing underage drinking: state of the evidence and steps toward public health impact. *Pediatrics*. 2008;121 Suppl 4(Suppl 4):S311-36. doi:10.1542/peds.2007-2243E.
192. Spoth R, Trudeau L, Redmond C, Shin C. Replication RCT of early universal prevention effects on young adult substance misuse. *J Consult Clin Psychol*. 2014;82(6):949-63. doi:10.1037/a0036840.
193. Spoth R, Trudeau L, Redmond C, Shin C. Replicating and extending a model of effects of universal preventive intervention during early adolescence on young adult substance misuse. *J Consult Clin Psychol*. 2016;84(10):913-21. doi:10.1037/ccp0000131.
194. Trudeau L, Spoth R, Lillehoj C, Redmond C, Wickrama KA. Effects of a preventive intervention on adolescent substance use initiation, expectancies, and refusal intentions. *Prev Sci*. 2003;4(2):109-22. doi:10.1023/a:1022926332514.
195. Ellickson PL, Bell RM, Harrison ER. Changing adolescent propensities to use drugs: results from Project ALERT. *Health Educ Q*. Summer 1993;20(2):227-42. doi:10.1177/109019819302000214.

196. Ellickson PL, McCaffrey DF, Ghosh-Dastidar B, Longshore DL. New inroads in preventing adolescent drug use: Results from a large-scale trial of project ALERT in middle schools. *Am J Public Health*. 2003;93(11):1830-6. doi:10.2105/ajph.93.11.1830.
197. Dent CW, Sussman S, Stacy AW, Craig S, Burton D, Flay BR. Two-year behavior outcomes of project towards no tobacco use. *J Consult Clin Psychol*. 1995;63(4):676-7. doi:10.1037//0022-006x.63.4.676.
198. Sussman S, Dent CW, Stacy AW, Craig S. One-year outcomes of Project Towards No Drug Abuse. *Prev Med*. 1998;27(4):632-42. doi:10.1006/pmed.1998.0338.
199. Sussman S, Dent CW, Stacy AW, et al. Project Towards No Tobacco Use: 1-year behavior outcomes. *Am J Public Health*. 1993;83(9):1245-50. doi:10.2105/ajph.83.9.1245.
200. Sussman S. Development of a school-based drug abuse prevention curriculum for high-risk youths. *J Psychoactive Drugs*. 1996;28(2):169-82. doi:10.1080/02791072.1996.10524389.
201. Sun W, Skara S, Sun P, Dent CW, Sussman S. Project Towards No Drug Abuse: long-term substance use outcomes evaluation. *Prev Med*. 2006;42(3):188-92. doi:10.1016/j.ypmed.2005.11.011.
202. Sussman S, Dent CW, Stacy AW. Project Towards No Drug Abuse: a review of the findings and future directions. *Am J Health Behav*. 2002;26(5):354-65. doi:10.5993/ajhb.26.5.4.
203. UCLA Kaiser Permanente Center for Health Equity. Adapting Project Towards No Nicotine for virtual delivery in ethnically-diverse afterschool settings [Internet]. [cited 2026 Mar 27]. Available from: <https://healthequity.ucla.edu/research/adapting-project-towards-no-nicotine-for-virtual-delivery-in-ethnically-diverse-afterschool-settings>.
204. Ellickson PL, Bell RM. Drug prevention in junior high: a multi-site longitudinal test. *Science*. 1990;247(4948):1299-305. doi:10.1126/science.2180065.
205. Pan W, Bai H. A multivariate approach to a meta-analytic review of the effectiveness of the D.A.R.E. program. *Int J Environ Res Public Health*. 2009;6(1):267-77. doi:10.3390/ijerph6010267.
206. Ringwalt CL, Greene JM, Ennett ST, et al. Past and future directions of the D.A.R.E program: an evaluation review. *NIJ Research Report*. 1994 [cited 2026 Mar 27]. Available from: <https://www.ojp.gov/pdffiles1/Digitization/152055NCJRS.pdf>.
207. Felker-Kantor M. DARE to say no: police and the cultural politics of prevention in the war on drugs. *Modern American History*. 2022;5(3):313-337.
208. Ennett ST, Tobler NS, Ringwalt CL, Flewelling RL. How effective is drug abuse resistance education? A meta-analysis of Project DARE outcome evaluations. *Am J Public Health*. 1994;84(9):1394-401. doi:10.2105/ajph.84.9.1394.
209. Hansen WB, Beamon ER, Saldana S, Kelly S, Wyrick DL. D.A.R.E./keepin' it REAL elementary curriculum: substance use outcomes. *PLoS One*. 2023;18(4):e0284457. doi:10.1371/journal.pone.0284457.
210. National Center for Education Statistics. College enrollment rates. 2024 [cited 2026 Mar 27]. Available from: <https://nces.ed.gov/programs/coe/indicator/cpb>.
211. Skidmore CR, Kaufman EA, Crowell SE. Substance use among college students. *Child Adolesc Psychiatr Clin N Am*. 2016;25(4):735-53. doi:10.1016/j.chc.2016.06.004.
212. Buu A, Hu YH, Wong SW, Lin HC. Comparing American college and noncollege young adults on e-cigarette use patterns including polysubstance use and reasons for using e-cigarettes. *J Am Coll Health*. 2020;68(6):610-616. doi:10.1080/07448481.2019.1583662.
213. Plotnikoff RC, Costigan SA, Kennedy SG, Robards SL, Germov J, Wild C. Efficacy of interventions targeting alcohol, drug and smoking behaviors in university and college students: a review of randomized controlled trials. *J Am Coll Health*. 2019;67(1):68-84. doi:10.1080/07448481.2018.1462821.
214. Fallin-Bennett A, Roditis M, Glantz SA. The carrot and the stick? Strategies to improve compliance with college campus tobacco policies. *J Am Coll Health*. 2017;65(2):122-130. doi:10.1080/07448481.2016.1262380.
215. Wynne O, Guillaumier A, Twyman L, et al. Signs, fines and compliance officers: a systematic review of strategies for enforcing smoke-free policy. *Int J Environ Res Public Health*. 2018;15(7). doi:10.3390/ijerph15071386.
216. White A, Hingson R. The burden of alcohol use: excessive alcohol consumption and related consequences among college students. *Alcohol Res*. 2013;35(2):201-18.
217. National Institute on Alcohol Abuse and Alcoholism. Planning alcohol interventions using NIAAA's College AIM Alcohol Intervention Matrix. 2019 [cited 2026 Mar 27]. Available from: https://www.niaaa.nih.gov/sites/default/files/publications/NIAAA_College_Matrix_Booklet.pdf.
218. Nelson TF, Toomey TL, Lenk KM, Erickson DJ, Winters KC. Implementation of NIAAA College Drinking Task Force recommendations: how are colleges doing 6 years later? *Alcohol Clin Exp Res*. 2010;34(10):1687-93. doi:10.1111/j.1530-0277.2010.01268.

219. Toomey TL, Nelson TF, Lenk KM. The age-21 minimum legal drinking age: a case study linking past and current debates. *Addiction*. 2009;104(12):1958-65. doi:10.1111/j.1360-0443.2009.02742.x.
220. Carey KB, Scott-Sheldon LA, Carey MP, DeMartini KS. Individual-level interventions to reduce college student drinking: a meta-analytic review. *Addict Behav*. 2007;32(11):2469-94. doi:10.1016/j.addbeh.2007.05.004.
221. Carey KB, Scott-Sheldon LA, Elliott JC, Garey L, Carey MP. Face-to-face versus computer-delivered alcohol interventions for college drinkers: a meta-analytic review, 1998 to 2010. *Clin Psychol Rev*. 2012;32(8):690-703. doi:10.1016/j.cpr.2012.08.001.
222. Anderson DS, Gadaletto AF. Results of the 2006 College Alcohol Survey. [cited 2026 Mar 27]. Available from: <https://web.archive.org/web/20100611214104/http://www.caph.gmu.edu/files/CAS/2006%20College%20Alcohol%20Survey%20Results.pdf>.
223. Carey KB, Scott-Sheldon LA, Garey L, Elliott JC, Carey MP. Alcohol interventions for mandated college students: a meta-analytic review. *J Consult Clin Psychol*. 2016;84(7):619-32. doi:10.1037/a0040275.
224. Lupton JR, Townsend JL. A systematic review and meta-analysis of the acceptability and effectiveness of university smoke-free policies. *J Am Coll Health*. 2015;63(4):238-47. doi:10.1080/07448481.2015.1015029.
225. Lechner WV, Meier E, Miller MB, Wiener JL, Fils-Aime Y. Changes in smoking prevalence, attitudes, and beliefs over 4 years following a campus-wide anti-tobacco intervention. *J Am Coll Health*. 2012;60(7):505-11. doi:10.1080/07448481.2012.681816.
226. Seo DC, Macy JT, Torabi MR, Middlestadt SE. The effect of a smoke-free campus policy on college students' smoking behaviors and attitudes. *Prev Med*. 2011;53(4-5):347-52. doi:10.1016/j.ypmed.2011.07.015.
227. Bennett BL, Deiner M, Pokhrel P. College anti-smoking policies and student smoking behavior: a review of the literature. *Tob Induc Dis*. 2017;15:11. doi:10.1186/s12971-017-0117-z.
228. Harris KJ, Stearns JN, Kovach RG, Harrar SW. Enforcing an outdoor smoking ban on a college campus: effects of a multicomponent approach. *J Am Coll Health*. 2009;58(2):121-6. doi:10.1080/07448480903221285.
229. Gnonlonfin E, Geindreau D, Gallopel-Morvan K. What are the effects of smoke-free and tobacco-free university campus policies, and how can they be assessed? a systematic review. *J Epidemiol Popul Health*. 2024;72(2):202520. doi:10.1016/j.jep.2024.202520.
230. Braverman MT, Ceraso M, Sporrer F, Rockler BE. Five-year changes in support for tobacco control policy options among students, faculty and staff at a public university. *Prev Med*. 2021;142:106359. doi:10.1016/j.ypmed.2020.106359.
231. Allen B, Stuart GL. Decreased cigarette smoking but no change in use of electronic cigarettes following a university-wide smoking ban. *Subst Abuse*. 2019;13:1178221819874351. doi:10.1177/1178221819874351.
232. Garcia GM, Mapaye JC, Lopez VD, Roxbury E, Tabatabai-Yazdi N. Impact of Campus Tobacco-Free Policy on Tobacco and Electronic Nicotine Delivery Systems Initiation and Cessation among Students, Faculty, and Staff. *Journal of Public Health Issues and Practices*. 2020;4(1). doi:10.33790/jphip1100159.
233. Llanes K, Cabriaes JA, Hernandez N, Cooper TV. Electronic cigarette use after the adoption of a tobacco-free campus policy. *Addict Behav*. 2019;90:324-328. doi:10.1016/j.addbeh.2018.11.037.
234. Nyman AL, Jivani S, Jazwa A, et al. Student tobacco use, secondhand smoke exposure, and policy beliefs before and after implementation of a tobacco-free campus policy: analysis of five U.S. college and university campuses. *Prev Med*. 2022;163:107238. doi:10.1016/j.ypmed.2022.107238.
235. Mattingly DT, Hart JL. Trends in current electronic cigarette use among youths by age, sex, and race and ethnicity. *JAMA Netw Open*. 2024;7(2):e2354872. doi:10.1001/jamanetworkopen.2023.54872.
236. Ramachandran S, Bentley S, Casey E, Bentley JP. Prevalence of and factors associated with violations of a campus smoke-free policy: a cross-sectional survey of undergraduate students on a university campus in the USA. *BMJ Open*. Mar 19 2020;10(3):e030504. doi:10.1136/bmjopen-2019-030504.
237. Hahn EJ, Rayens MK, Ridner SL, Butler KM, Zhang M, Staten RR. Smoke-free laws and smoking and drinking among college students. *J Community Health*. 2010;35(5):503-11. doi:10.1007/s10900-010-9220-2.
238. Butler KM, Rayens MK, Hahn EJ, Adkins SM, Staten RR. Smoke-free policy and alcohol use among undergraduate college students. *Public Health Nurs*. 2012;29(3):256-65. doi:10.1111/j.1525-1446.2011.01000.x.
239. Walter G, Kowalczyk J. The effectiveness of alcohol policies in 4-year public universities. *J Community Health*. 2012;37(2):520-8. doi:10.1007/s10900-011-9474-3.
240. Wechsler H, Lee JE, Gledhill-Hoyt J, Nelson TF. Alcohol use and problems at colleges banning alcohol: Results of a national survey. *J Stud Alcohol*. 2001;62(2):133-41. doi:10.15288/jsa.2001.62.133.

241. Weitzman ER, Chen YY, Subramanian SV. Youth smoking risk and community patterns of alcohol availability and control: A national multilevel study. *J Epidemiol Community Health*. 2005;59(12):1065-71. doi:10.1136/jech.2005.033183.
242. Lenk KM, Erickson DJ, Nelson TF, Winters KC, Toomey TL. Alcohol policies and practices among four-year colleges in the United States: prevalence and patterns. *J Stud Alcohol Drugs*. 2012;73(3):361-7. doi:10.15288/jsad.2012.73.361.
243. Toomey TL, Lenk KM, Wagenaar AC. Environmental policies to reduce college drinking: an update of research findings. *J Stud Alcohol Drugs*. 2007;68(2):208-19. doi:10.15288/jsad.2007.68.208.
244. National Institute on Alcohol Abuse and Alcoholism. College AIM [Internet]. Available from: <https://www.collegedrinkingprevention.gov/collegeaim>.
245. Bry BH, Catalano RF, Kumpfer KL, Lochman JE, Szapocznik J. Scientific findings from family prevention intervention research. Vol. 177. 1998:103-129. Family focused prevention of drug abuse: Research and interventions. doi:10.1037/e495502006-006
246. Community Preventive Services Task Force. Substance use: family-based interventions to prevent substance use among youth [Internet]. 2023 [cited 2026 Mar 27]. Available from: <https://www.thecommunityguide.org/media/2023/pdf/substance-use-family-based-interventions-508.pdf>.
247. Jacob V, Reynolds JA, Chattopadhyay SK, et al. Family-based interventions to prevent substance use among youth: community guide systematic economic review. *Am J Prev Med*. 2025;69(1):107639. doi:10.1016/j.amepre.2025.04.009.
248. Dishion TJ, Nelson SE, Kavanagh K. The family check-up with high-risk young adolescents: preventing early-onset substance use by parent monitoring. *Behav Ther*. 2003;34(4):553-571. doi:10.1016/S0005-7894(03)80035-7.
249. Galan CA, Shaw DS, O'Rourke F, Reynolds MD, Gill A, et al. substance use screening and prevention for adolescents in pediatric primary care: a randomized clinical trial using the family check-up. *Res Child Adolesc Psychopathol*. 2023;51(2):151-163. doi:10.1007/s10802-022-00978-2.
250. Stormshak EA, Dishion TJ. A school-based, family-centered intervention to prevent substance use: the family check-up. *Am J Drug Alcohol Abuse*. 2009;35(4):227-32. doi:10.1080/00952990903005908.
251. Veronneau MH, Dishion TJ, Connell AM, Kavanagh K. A randomized, controlled trial of the family check-up model in public secondary schools: examining links between parent engagement and substance use progressions from early adolescence to adulthood. *J Consult Clin Psychol*. 2016;84(6):526-43. doi:10.1037/a0040248.
252. Becker SJ, Marceau K, Hernandez L, Spirito A. Is it selection or socialization? disentangling peer influences on heavy drinking and marijuana use among adolescents whose parents received brief interventions. *Subst Abuse*. 2019;13:1178221819852644. doi:10.1177/1178221819852644.
253. Spirito A, Hernandez L, Marceau K, et al. Effects of a brief, parent-focused intervention for substance using adolescents and their sibling. *J Subst Abuse Treat*. 2017;77:156-165. doi:10.1016/j.jsat.2017.02.002.
254. Guilamo-Ramos V, Jaccard J, Dittus P, Gonzalez B, Bouris A, Banspach S. The linking lives health education program: a randomized clinical trial of a parent-based tobacco use prevention program for African American and Latino youths. *Am J Public Health*. 2010;100(9):1641-7. doi:10.2105/AJPH.2009.171637.
255. Haggerty KP, Skinner ML, MacKenzie EP, Catalano RF. A randomized trial of parents who care: effects on key outcomes at 24-month follow-up. *Prev Sci*. 2007;8(4):249-60. doi:10.1007/s11121-007-0077-2.
256. Gottfredson D, Kumpfer K, Polizzi-Fox D, Wilson D, Puryear V, Beatty P, Vilmenay M. The Strengthening Washington D.C. Families Project: a randomized effectiveness trial of family-based prevention. *Prev Sci*. 2006;7(1):57-74. doi:10.1007/s11121-005-0017-y.
257. Spoth R, Redmond C, Lepper H. Alcohol initiation outcomes of universal family-focused preventive interventions: one- and two-year follow-ups of a controlled study. *J Stud Alcohol Suppl*. 1999;13:103-11. doi:10.15288/jsas.1999.s13.103.
258. Kumpfer KL, Magalhães C. Strengthening Families Program: an evidence-based family intervention for parents of high-risk children and adolescents. *J Child Adolesc Subst*. 2018;27(3):174-179. doi:10.1080/1067828x.2018.1443048.
259. Riesch SK, Brown RL, Anderson LS, Wang K, Canty-Mitchell J, Johnson DL. Strengthening families program (10-14): effects on the family environment. *West J Nurs Res*. 2012;34(3):340-76. doi:10.1177/0193945911399108.
260. Spoth R, Trudeau L, Shin C, Randall GK, Mason WA. Testing a model of universal prevention effects on adolescent relationships and marijuana use as pathways to young adult outcomes. *J Youth Adolesc*. 2019;48(3):444-458. doi:10.1007/s10964-018-0946-y.

261. Pantin H, Coatsworth JD, Feaster DJ, et al. Familias Unidas: the efficacy of an intervention to promote parental investment in Hispanic immigrant families. *Prev Sci*. 2003;4(3):189-201. doi:10.1023/a:1024601906942.
262. Pantin H, Prado G, Lopez B, et al. A randomized controlled trial of Familias Unidas for Hispanic adolescents with behavior problems. *Psychosom Med*. 2009;71(9):987-95. doi:10.1097/PSY.0b013e3181bb2913.
263. Estrada Y, Lee TK, Huang S, et al. Parent-centered prevention of risky behaviors among Hispanic youths in Florida. *Am J Public Health*. 2017;107(4):607-613. doi:10.2105/ajph.2017.303653.
264. Estrada Y, Lee TK, Wagstaff R, et al. eHealth Familias Unidas: efficacy trial of an evidence-based intervention adapted for use on the internet with hispanic families. *Prev Sci*. 2019;20(1):68-77. doi:10.1007/s11121-018-0905-6.
265. Estrada Y, Rosen A, Huang S, et al. Efficacy of a brief intervention to reduce substance use and human immunodeficiency virus infection risk among Latino youth. *J Adolesc Health*. 2015;S1054-139X(15)00285-2. doi:10.1016/j.jadohealth.2015.07.006.
266. Fernandez A, Lozano A, Lee TK, Estrada Y, Messiah SE, Prado G. A family-based healthy lifestyle intervention: crossover effects on substance use and sexual risk behaviors. *Prev Sci*. 2021;22(5):602-608. doi:10.1007/s11121-021-01220-z.
267. Kumpfer KL, Alvarado R, Whiteside HO. Family-based interventions for substance use and misuse prevention. *Subst Use Misuse*. 2003;38(11-13):1759-87. doi:10.1081/ja-120024240.
268. Thomas RE, Baker PR, Thomas BC, Lorenzetti DL. Family-based programmes for preventing smoking by children and adolescents. *Cochrane Database Syst Rev*. 2015;2015(2):CD004493. doi:10.1002/14651858.CD004493.pub3.
269. Baumrind D. Authoritative parenting revisited: History and current status. In: Larzelere RE, Morris AS, Harrist AW, eds. *Authoritative parenting: Synthesizing nurturance and discipline for optimal child development*. American Psychological Association; 2013:11-34.
270. Smit E, Verdurmen J, Monshouwer K, Smit F. Family interventions and their effect on adolescent alcohol use in general populations: a meta-analysis of randomized controlled trials. *Drug Alcohol Depend*. 2008;97(3):195-206. doi:10.1016/j.drugalcdep.2008.03.032.
271. Gilligan C, Wolfenden L, Foxcroft DR, et al. Family-based prevention programmes for alcohol use in young people. *Cochrane Database Syst Rev*. 2019;3(3):CD012287. doi:10.1002/14651858.CD012287.pub2.
272. Van Ryzin MJ, Roseth CJ, Fosco GM, Lee YK, Chen IC. A component-centered meta-analysis of family-based prevention programs for adolescent substance use. *Clin Psychol Rev*. 2016;45:72-80. doi:10.1016/j.cpr.2016.03.007.
273. Champion KE, Gardner LA, McCann K, et al. Parent-based interventions to improve multiple lifestyle risk behaviors among adolescents: A systematic review and meta-analysis. *Prev Med*. 2022;164:107247. doi:10.1016/j.ypmed.2022.107247.
274. Perry CL, Williams CL, Komro KA, et al. Project Northland: Long-term outcomes of community action to reduce adolescent alcohol use. *Health Educ Res*. 2002;17(1):117-32. doi:10.1093/her/17.1.117.
275. Komro KA, Perry CL, Veblen-Mortenson S, et al. Outcomes from a randomized controlled trial of a multi-component alcohol use preventive intervention for urban youth: Project Northland Chicago. *Addiction*. 2008;103(4):606-18. doi:10.1111/j.1360-0443.2007.02110.x.
276. Perry CL, Williams CL, Veblen-Mortenson S, et al. Project Northland: outcomes of a communitywide alcohol use prevention program during early adolescence. *Am J Public Health*. 1996;86(7):956-65. doi:10.2105/ajph.86.7.956.
277. Pentz MA, Dwyer JH, MacKinnon DP, Flay BR, Hansen WB, Wang EY, Johnson CA. A multicomunity trial for primary prevention of adolescent drug abuse. Effects on drug use prevalence. *JAMA*. 1989;261(22):3259-66. doi:10.1001/jama.1989.03420220073030.
278. Fagan AA, Hawkins JD. Enacting preventive interventions at the community level: the Communities that Care Prevention System. In: Scheier LM, editor. *Handbook of adolescent drug use prevention: research, intervention strategies, and practice*. American Psychological Association; 2015:343-360:chap 020.
279. Hawkins JD, Brown EC, Oesterle S, Arthur MW, Abbott RD, Catalano RF. Early effects of Communities That Care on targeted risks and initiation of delinquent behavior and substance use. *J Adolesc Health*. 2008;43(1):15-22. doi:10.1016/j.jadohealth.2008.01.022.
280. Hawkins JD, Oesterle S, Brown EC, Arthur MW, Abbott RD, Fagan AA, Catalano RF. Results of a type 2 translational research trial to prevent adolescent drug use and delinquency: a test of Communities That Care. *Arch Pediatr Adolesc Med*. 2009;163(9):789-98. doi:10.1001/archpediatrics.2009.141.

281. Hawkins JD, Oesterle S, Brown EC, Abbott RD, Catalano RF. Youth problem behaviors 8 years after implementing the Communities That Care prevention system: a community-randomized trial. *JAMA Pediatr.* 2014;168(2):122-9. doi:10.1001/jamapediatrics.2013.4009.
282. Oesterle S, Kuklinski MR, Hawkins JD, Skinner ML, Guttmanova K, Rhew IC. Long-term effects of the Communities That Care trial on substance use, antisocial behavior, and violence through age 21 years. *Am J Public Health.* 2018;108(5):659-665. doi:10.2105/AJPH.2018.304320.
283. Spoth RL, Redmond C, Shin C. Randomized trial of brief family interventions for general populations: adolescent substance use outcomes 4 years following baseline. *J Consult Clin Psychol.* 2001;69(4):627-42. doi:10.1037//0022-006x.69.4.627.
284. Office of Juvenile Justice and Delinquency Prevention. Model programs guide [Internet]. [cited 2026 Mar 27]. Available from: <https://ojjdp.ojp.gov/model-programs-guide/about-mpg>.
285. Blueprints for Healthy Youth Development. Blueprints standards [Internet]. [cited 2026 Mar 27]. Available from: <https://www.blueprintsprograms.org/blueprints-standards>.
286. Blume AW. Advances in substance abuse prevention and treatment interventions among racial, ethnic, and sexual minority populations. *Alcohol Res.* 2016;38(1):47-54.
287. Unger JB. Cultural influences on substance use among Hispanic adolescents and young adults: findings from Project RED. *Child Dev Perspect.* 2014;8(1):48-53. doi:10.1111/cdep.12060.
288. Bo A, Goings TC, Evans CBR, et al. Culturally sensitive prevention programs for substance use among adolescents of color: A systematic review and meta-analysis of randomized controlled trials. *Clin Psychol Rev.* 2023;99:102233. doi:10.1016/j.cpr.2022.102233.
289. Vahedi Z, Sibalis A, Sutherland JE. Are media literacy interventions effective at changing attitudes and intentions towards risky health behaviors in adolescents? A meta-analytic review. *J Adolesc.* 2018;67:140-152. doi:10.1016/j.adolescence.2018.06.007.
290. Mandel LL, Bialous SA, Glantz SA. Avoiding "truth": tobacco industry promotion of life skills training. *J Adolesc Health.* 2006;39(6):868-79. doi:10.1016/j.jadohealth.2006.06.010.
291. U.S. National Cancer Institute and World Health Organization. *The Economics of Tobacco and Tobacco Control*. National Cancer Institute Tobacco Control Monograph 21. NIH Publication No. 16-CA-8029A. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; and Geneva, CH: World Health Organization; 2016.
292. World Health Organization. Tobacco industry interference with tobacco control [Internet]. 2008 [cited 2026 Mar 27]. Available from: https://iris.who.int/bitstream/handle/10665/83128/9789241597340_eng.pdf.
293. van Schalkwyk MCI, Petticrew M, Maani N, Hawkins B, Bonell C, Katikireddi SV, et al. Distilling the curriculum: an analysis of alcohol industry-funded school-based youth education programmes. *PLoS One.* 2022;17(1):e0259560. doi:10.1371/journal.pone.0259560.
294. Jiang N, Ling P. Vested interests in addiction research and policy. Alliance between tobacco and alcohol industries to shape public policy. *Addiction.* 2013;108(5):852-64. doi:10.1111/add.12134.
295. Wakefield MA, Loken B, Hornik RC. Use of mass media campaigns to change health behaviour. *Lancet.* 2010;376(9748):1261-71. doi:10.1016/s0140-6736(10)60809-4.
296. Brubach AL. The case and context for "The Real Cost" campaign. *Am J Prev Med.* 2019;56(2 Suppl 1):S5-S8. doi:10.1016/j.amepre.2018.07.042.
297. Crosby K, Santiago S, Talbert EC, Roditis ML, Resch G. Bringing "The Real Cost" to life through breakthrough, evidence-based advertising. *Am J Prev Med.* 2019;56(2 Suppl 1):S16-S23. doi:10.1016/j.amepre.2018.08.024.
298. Food and Drug Administration. The Real Cost Campaign [Internet]. 2024 [cited 2026 Mar 27]. Available from: <https://www.fda.gov/tobacco-products/public-health-education-campaigns/real-cost-campaign>.
299. Truthinitiative.org. Truth® campaign successful in saving lives and preventing youth smoking [Internet]. 2017 [cited 2026 Mar 27]. Available from: <https://truthinitiative.org/press/press-release/truthr-campaign-successful-saving-lives-and-preventing-youth-smoking>.
300. Vallone D, Cantrell J, Bennett M, et al. Evidence of the impact of the Truth FinishIt campaign. *Nicotine Tob Res.* 2018;20(5):543-551. doi:10.1093/ntr/ntx119.
301. Crankshaw E, Gaber J, Guillory J, et al. Final evaluation findings for This Free Life, a 3-year, multi-market tobacco public education campaign for gender and sexual minority young adults in the United States. *Nicotine Tob Res.* 2022;24(1):109-117. doi:10.1093/ntr/ntab146.
302. National Highway Traffic Safety Administration. Drive sober or get pulled over [Internet]. [cited 2026 Mar 27]. Available from: <https://www.nhtsa.gov/campaign/drive-sober-or-get-pulled-over>.

303. Centers for Disease Control and Prevention. About the Drink Less, Be Your Best campaign [Internet]. 2023 [cited 2026 Mar 27]. Available from: <https://www.cdc.gov/drink-less-be-your-best/about/index.html>.
304. Substance Abuse and Mental Health Services Administration. "Talk. They Hear You." Campaign [Internet]. 2024 [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/talk-they-hear-you>.
305. Allen JA, Duke JC, Davis KC, Kim AE, Nonnemaker JM, Farrelly MC. Using mass media campaigns to reduce youth tobacco use: a review. *Am J Health Promot*. 2015;30(2):e71-82. doi:10.4278/ajhp.130510-LIT-237.
306. Wakefield MA, Durkin S, Spittal MJ, et al. Impact of tobacco control policies and mass media campaigns on monthly adult smoking prevalence. *Am J Public Health*. 2008;98(8):1443-50. doi:10.2105/AJPH.2007.128991.
307. Siegel M. Mass media antismoking campaigns: a powerful tool for health promotion. *Ann Intern Med*. 1998;129(2):128-32. doi:10.7326/0003-4819-129-2-199807150-00013.
308. Young B, Lewis S, Katikireddi SV, et al. Effectiveness of mass media campaigns to reduce alcohol consumption and harm: a systematic review. *Alcohol Alcohol*. 2018;53(3):302-316. doi:10.1093/alcalc/agx094.
309. Moon SS, Rao U. Social activity, school-related activity, and anti-substance use media messages on adolescent tobacco and alcohol use. *J Hum Behav Soc Environ*. 2011;21(5):475-489. doi:10.1080/10911359.2011.566456.
310. Palmedo PC, Dorfman L, Garza S, Murphy E, Freudenberg N. Countermarketing alcohol and unhealthy food: An effective strategy for preventing noncommunicable diseases? Lessons from tobacco. *Annu Rev Public Health*. 2017;38:119-144. doi:10.1146/annurev-publhealth-031816-044303.
311. Akter S, Islam MR, Rahman MM, Rouyard T, Nsashiyi RS, Hossain F, Nakamura R. Evaluation of population-level tobacco control interventions and health outcomes: a systematic review and meta-analysis. *JAMA Netw Open*. 2023;6(7):e2322341. doi:10.1001/jamanetworkopen.2023.22341.
312. De PK, Sun R. The effects of recreational cannabis laws on alcohol and tobacco use among U.S. adults, 2012-2022. *Am J Prev Med*. 2025;68(5):1032-1040. doi:10.1016/j.amepre.2025.01.024.
313. Gonçalves PD, Bruzelius E, Levy NS, et al. Recreational cannabis legislation and binge drinking in U.S. adolescents and adults. *Int J Drug Policy*. 2023;118:104085. doi:10.1016/j.drugpo.2023.104085.
314. Macha V, Abouk R, Drake C. Association of recreational cannabis legalization with alcohol use among adults in the U.S., 2010 to 2019. *JAMA Health Forum*. 2022;3(11):e224069. doi:10.1001/jamahealthforum.2022.4069.
315. Veligati S, Howdeshell S, Beeler-Stinn S, Lingam D, Allen PC, et al. Changes in alcohol and cigarette consumption in response to medical and recreational cannabis legalization: evidence from U.S. state tax receipt data. *Int J Drug Policy*. 2020;75:102585. doi:10.1016/j.drugpo.2019.10.011.
316. Marynak K, Mahoney M, Williams KS, Tynan MA, Reimels E, King BA. State and territorial laws prohibiting sales of tobacco products to persons aged <21 Years - United States, December 20, 2019. *MMWR Morb Mortal Wkly Rep*. 2020;69(7):189-192. doi:10.15585/mmwr.mm6907a3.
317. National Institute on Alcohol Abuse and Alcoholism. Alcohol policy information system - about alcohol policy [Internet]. [cited 2026 Mar 27]. Available from: <https://alcoholpolicy.niaaa.nih.gov/about/about-alcohol-policy>.
318. Public Health Law Center. Youth Purchase, Use, or Possession (PUP) - commercial tobacco laws and penalties. 2024 [cited 2026 Mar 27]. Available from: <https://www.publichealthlawcenter.org/sites/default/files/resources/Anti-Youth-PUP-Laws.pdf>.
319. Apollonio DE, Glantz SA. Minimum ages of legal access for tobacco in the United States from 1863 to 2015. *Am J Public Health*. 2016;106(7):1200-7. doi:10.2105/AJPH.2016.303172.
320. Food and Drug Administration. Tobacco 21 [Internet]. 2025 [cited 2026 Mar 27]. Available from: <https://www.fda.gov/tobacco-products/retail-sales-tobacco-products/tobacco-21>.
321. Dee TS. The complementarity of teen smoking and drinking. *J Health Econ*. 1999;18(6):769-93. doi:10.1016/S0167-6296(99)00018-1.
322. Yoruk BK, Yoruk CE. The impact of minimum legal drinking age laws on alcohol consumption, smoking, and marijuana use: evidence from a regression discontinuity design using exact date of birth. *J Health Econ*. 2011;30(4):740-52. doi:10.1016/j.jhealeco.2011.05.010.
323. Yoruk BK, Yoruk CE. The impact of minimum legal drinking age laws on alcohol consumption, smoking, and marijuana use revisited. *J Health Econ*. 2013;32(2):477-9. doi:10.1016/j.jhealeco.2012.09.007.
324. Kessel Schneider S, Buka SL, Dash K, Winickoff JP, O'Donnell L. Community reductions in youth smoking after raising the minimum tobacco sales age to 21. *Tob Control*. 2016;25(3):355-9. doi:10.1136/tobaccocontrol-2014-052207.
325. McDaniel JT, Albright DL, Null D, McIntosh S. Alcohol use in Tobacco 21 (T21) states from 2016 to 2018: differences by military service status. *J Mil Veteran Fam Hl*. 2021;7(1):35-45. doi:10.3138/jmvfh-2020-0013.

326. Committee on the Public Health Implications of Raising the Minimum Age for Purchasing Tobacco Products, Board on Population Health and Public Health Practice, Institute of Medicine. Public Health Implications of Raising the Minimum Age of Legal Access to Tobacco Products. Washington, DC: National Academies Press; 2015.
327. Agaku IT, Nkosi L, Agaku QD, Gwar J, Tsafa T. A rapid evaluation of the U.S. federal tobacco 21 (T21) law and lessons from statewide T21 policies: findings from population-level surveys. *Prev Chronic Dis*. 2022;19:E29. doi:10.5888/pcd19.210430.
328. Levinson AH, Ma M, Jason LA, Lee JGL, Landrine H, Glueck DH, DiFranza JR. Assessment of the U.S. federal retailer violation rate as an estimate of the proportion of retailers that illegally sell tobacco to adolescents. *JAMA Pediatr*. 2018;172(10):966-972. doi:10.1001/jamapediatrics.2018.2038.
329. Paschall MJ, Grube JW, Black C, Flewelling RL, Ringwalt CL, Biglan A. Alcohol outlet characteristics and alcohol sales to youth: results of alcohol purchase surveys in 45 Oregon communities. *Prev Sci*. 2007;8(2):153-9. doi:10.1007/s11121-006-0063-0.
330. Tanski S, Emond J, Stanton C, et al. Youth access to tobacco products in the United States: findings from wave 1 (2013-2014) of the Population Assessment of Tobacco and Health Study. *Nicotine Tob Res*. 2019;21(12):1695-99. doi:10.1093/ntr/nty238.
331. Harrison PA, Fulkerson JA, Park E. The relative importance of social versus commercial sources in youth access to tobacco, alcohol, and other drugs. *Prev Med*. 2000;31(1):39-48. doi:10.1006/pmed.2000.0691.
332. Mtenga EL, Pesko MF. The effect of vertical identification card laws on teenage tobacco and alcohol use. *Health Econ*. 2024. doi:10.1002/hec.4881.
333. Nesson E, Shrestha V. The effects of false identification laws on underage alcohol-related traffic fatalities. *Health Econ*. 2021;30(9):2264-83. doi:10.1002/hec.4376.
334. Yoruk BK. Can technology help to reduce underage drinking? Evidence from the false ID laws with scanner provision. *J Health Econ*. 2014;36:33-46. doi:10.1016/j.jhealeco.2014.03.004.
335. Yoruk BK. The impact of the false ID laws on alcohol consumption among young adults: new results from the NLSY97. *J Health Econ*. 2018;57:191-94. doi:10.1016/j.jhealeco.2017.11.005.
336. Zheng EY. Can technology really help to reduce underage drinking? New evidence on the effects of false ID laws with scanner provisions. *J Health Econ*. 2018;57:102-12. doi:10.1016/j.jhealeco.2017.10.009.
337. Kong AY, Herbert L, Feldman JM, Trangenstein PJ, Fakunle DO, Lee JGL. Tobacco and alcohol retailer availability and neighborhood racialized, economic, and racialized economic segregation in North Carolina. *J Racial Ethn Health Disparities*. 2023;10(6):2861-71. doi:10.1007/s40615-022-01463-8.
338. Williams RS, Derrick JC. Internet little cigar and cigarillo vendors: surveillance of sales and marketing practices via website content analysis. *Prev Med*. 2018;109:51-57. doi:10.1016/j.ypmed.2018.01.017.
339. Williams RS, Schmidt A. The sales and marketing practices of English-language internet alcohol vendors. *Addiction*. 2014;109(3):432-9. doi:10.1111/add.12411.
340. Hanley SM, Ringwalt C, Ennett ST, Vincus AA, Bowling JM, Haws SW, Rohrbach LA. The prevalence of evidence-based substance use prevention curricula in the nation's elementary schools. *J Drug Educ*. 2010;40(1):51-60. doi:10.2190/DE.40.1.d.
341. Befort C, Lynch R, James RL, Carroll SL, Nollen N, Davis A. Perceived barriers and benefits to research participation among school administrators. *J Sch Health*. 2008;78(11):581-6; quiz 615-7. doi:10.1111/j.1746-1561.2008.00349.x.
342. Powers JD. Successful entry and collaboration in school-based research: tips from a school administrator. *Child Sch*. 2007;29(4):247-250. doi:10.1093/cs/29.4.247.
343. Higgins JPT, Eldridge S, Li T. Cochrane Training - Chapter 23: Including variants on randomized trials. [cited 2026 Mar 27]. Available from: <https://training.cochrane.org/handbook/current/chapter-23>.
344. Murray DM, Varnell SP, Blitstein JL. Design and analysis of group-randomized trials: a review of recent methodological developments. *Am J Public Health*. 2004;94(3):423-32. doi:10.2105/ajph.94.3.423.
345. Fong GT, Chung-Hall J, Meng G, et al. Impact of Canada's menthol cigarette ban on quitting among menthol smokers: pooled analysis of pre-post evaluation from the ITC Project and the Ontario Menthol Ban Study and projections of impact in the USA. *Tob Control*. 2023;32(6):734-738. doi:10.1136/tobaccocontrol-2021-057227.
346. Sanchez ZM, Valente JY, Galvao PP, et al. A cluster randomized controlled trial evaluating the effectiveness of the school-based drug prevention program #Tamojunto2.0. *Addiction*. 2021;116(6):1580-92. doi:10.1111/add.15358.

347. Valente JY, Franciosi B, Garcia-Cerde R, Pietrobon T, Sanchez ZM. Addressing the needs for cultural adaptation of DARE-keepin' it REAL among Brazilian students: strategies to improve implementation. *Subst Abuse Treat Prev Policy*. 2024;19(1):48. doi:10.1186/s13011-024-00630-w.
348. Valente JY, Galvão PPO, Gusmoes J, Sanchez ZM. A systematic review of the effect of the school-based drug prevention program Keepin' it REAL: translated and implemented in Brazil by PROERD. *Cien Saude Colet*. 2022;27(11):4175-4189.
349. Ayers SL, Kulis SS, Marsiglia FF, Campos AP, Medina-Mora ME. Keepin' It REAL-Mantente REAL in Mexico: longitudinal examination of youth drug resistance strategies and substance use among early adolescents. *J Adolesc Health*. 2023;73(3):412-420. doi:10.1016/j.jadohealth.2023.05.009.
350. Kulis SS, Marsiglia FF, Medina-Mora ME, Nuño-Gutiérrez BL, Corona MD, Ayers SL. Keepin' It REAL-Mantente REAL in Mexico: a cluster randomized controlled trial of a culturally adapted substance use prevention curriculum for early adolescents. *Prev Sci*. 2021;22(5):645-657. doi:10.1007/s11121-021-01217-8.
351. Marsiglia FF, Medina-Mora ME, Gonzalvez A, et al. Binational cultural adaptation of the Keepin' it REAL substance use prevention program for adolescents in Mexico. *Prev Sci*. 2019;20(7):1125-1135. doi:10.1007/s11121-019-01034-0.
352. Paschall MJ, Salazar Silva F, Sloboda Z, Ringwalt CL, Grube JW. Effects of the Universal Prevention Curriculum for schools on substance use among Peruvian adolescents: a randomized trial. *J Drug Educ*. 2022;51(3-4):82-100. doi:10.1177/00472379231185130.
353. Champion KE, Newton NC, Gardner LA, et al. Health4Life eHealth intervention to modify multiple lifestyle risk behaviours among adolescent students in Australia: a cluster-randomised controlled trial. *Lancet Digit Health*. 2023;5(5):e276-e287. doi:10.1016/S2589-7500(23)00028-6.
354. Kor A, Shoshani A. Moderating the impact of the COVID-19 pandemic on children's and adolescents' substance use, digital media use, and mental health: a randomized positive psychology addiction prevention program. *Addict Behav*. 2023;141:107660. doi:10.1016/j.addbeh.2023.107660.
355. Corpus-Espinosa C, Mac Fadden I, Del Carmen Torrejón-Guirado M, Lima-Serrano M. Exploring cultural adaptations: a scoping review on adolescent mental health and substance use prevention programs. *Prev Sci*. 2025;26(2):204-221. doi:10.1007/s11121-025-01779-x.
356. Huber M. An introduction to flexible methods for policy evaluation. In: Hashimzade N and Thornton M, editors. *Handbook of research methods and applications in empirical microeconomics*. 2021.
357. Welsh JW, Hou SS, Shentu Y, Le Cook B. Assessing the association between the strength of state policies on school drug prevention and substance use disorders. *Subst Use Misuse*. 2019;54(5):811-817. doi:10.1080/10826084.2018.1544644.
358. National Institute on Alcohol Abuse and Alcoholism. Alcohol policy information system [Internet]. [cited 2026 Mar 27]. Available from: <https://alcoholpolicy.niaaa.nih.gov>.
359. Substance Abuse and Mental Health Services Administration. State performance & best practices for the prevention and reduction of underage drinking. 2020 [cited 2026 Mar 27]. Available from: <https://www.samhsa.gov/resource/ebp/state-performance-best-practices-prevention-reduction-underage-drinking>.
360. American Lung Association. Tobacco control milestones. 2026 [cited 2026 Mar 27]. Available from: <https://www.lung.org/research/sotc/tobacco-timeline>.
361. Tobler NS, Stratton HH. Effectiveness of school-based drug prevention programs: a meta-analysis of the research. *Journal of primary prevention*. 1997;18(1):71-128.