Evidence Synthesis

Number 249

Screening and Behavioral Counseling Interventions to Reduce Unhealthy Alcohol Use in Adolescents and Adults: A Draft Updated Systematic Review for the U.S. Preventive Services Task Force

Prepared for:
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Contract No. [To be included in the final version of the report.]

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AHRQ Publication No. 25-05323-EF-1
August 2025

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Acknowledgments

[To be included in the final version of the report.]

Structured Abstract

Objective: To examine the evidence on benefits and harms of screening and interventions to identify and reduce unhealthy alcohol use.

Data Sources: MEDLINE, PsycInfo, and Cochrane Central Register of Controlled Clinical Trials through December 4, 2024; previous review on this topic; ongoing surveillance through XX.

Study Selection: English-language clinical trials of benefit or harm of screening for unhealthy alcohol use or interventions to reduce unhealthy alcohol use in adolescents or adults were included. Because evidence on the accuracy of multiple screening tools was considered previously established among adults, the accuracy of only the U.S. Alcohol Use Disorders Identification Test (USAUDIT) and the USAUDIT-Concise (USAUDIT-C) was examined for adults; additional tools were examined for adolescents.

Data Analysis: Among intervention trials, outcomes with sufficient evidence for meta-analysis were pooled using random-effects models.

Results: One stepped-wedge randomized controlled trial (RCT) on the benefits of screening for unhealthy alcohol use among pregnant women (N=3,849), 15 diagnostic accuracy studies (N=174,312), and 84 RCTs of interventions to reduce unhealthy alcohol use (N=43,450) were included. The trial of screening found no group differences in alcohol consumption; for example, abstinence was 89.7% in the pre-implementation group and. 90.7% in the post-implementation group (OR, 1.13 [95% CI, 0.90 to 1.41]). The diagnostic accuracy studies found that, among adolescents, the most robust evidence supported the use of several brief screeners to identify youth with alcohol use disorder (AUD), with sensitivities and specificities typically above 0.70. For example, the NIAAA Youth Screen had sensitivities ranging from 0.87 to 1.0 (95% CIs range, 0.68 to 1.0, collectively) and specificities ranging from 0.84 to 0.94 (95% CIs range, 0.82 to 0.97, collectively) across three studies. Only two studies of the USAUDIT were identified, both among college students. One of these found adequate performance in detecting individuals with heavy episodic drinking, but poorer performance for identifying AUD. The other reported only the accuracy for identifying AUD and found optimal performance at the cut-off of 8 (sensitivity, 0.72 [95% CI, 0.64 to 0.78]; specificity, 0.80 [95% CI, 0.74 to 0.84]). Among trials of interventions to reduce unhealthy alcohol use, five RCTs of adolescents (N=2,964) were included, and every trial reported a different alcohol use outcome. Four were conducted in the U.S.; one showed reduced risk of an alcohol-related diagnosis in the medical record after 7 years, and the other three did not demonstrate a statistically significant benefit, although findings generally trended in the direction of benefit. The other study among Swiss 16- to 19-years olds (of legal age to purchase beer and wine) reduced alcohol use among high-risk, but not medium-risk, high school students. Among adults, 79 RCTs (N=40,486) were included that tested interventions to reduce unhealthy alcohol use. In pooled analyses, participants in the intervention groups reduced alcohol consumption by an average of 1.6 drinks per week more than those in the control groups (mean difference [MD], -1.6 [95% CI, -2.2 to -1.0]; 38 studies [41 groups analyzed], N=17,816; I^2=62%). Among these studies, the median reduction in drinks per week

was 3.6 drinks among the intervention groups and 2.3 drinks among the control groups. There were also statistically significant reductions in the percent of participants exceeding recommended limits, engaging in heavy episodic drinking, and, among pregnant women, remaining abstinent in the trials of adults. For young adults, there was as very small but statistically significant reduction in alcohol-related negative consequences when pooled (standardized mean difference [SMD], -0.07 [95% CI, -0.13 to -0.01] 14 RCTs, N=6,305, I^2=0%). Other health, social, and legal outcomes were very sparsely reported, and few between-group differences were statistically significant. There were no adverse events in the 7 trials among adults reporting on harms.

Limitations: The major limitations include self-reported alcohol use outcomes, which are subject to underreporting; lack of consistency in outcomes reported, particularly among trials of adolescents; unmeasured changes in usual care over time that may impact effect sizes.

Conclusions: Behavioral counseling interventions to reduce unhealthy alcohol use are effective in reducing alcohol consumption among adults. The evidence is limited among adolescents, although some individual study findings were promising. Existing screening tools are likely adequate to identify adolescents with AUD, however evidence is weaker on identification of the full spectrum of unhealthy alcohol use.

Table of Contents

Appendixes

Chapter 1. Introduction

Purpose

This report will be used by the United States Preventive Services Task Force (USPSTF) to update its previous recommendation on Screening and Behavioral Counseling Interventions to Reduce Unhealthy Alcohol Use in Adolescents and Adults.[1]

Condition Background

Condition Definition

While the World Health Organization has stated that no level of alcohol use is known to be safe,[2, 3] the focus of the current review is on screening for unhealthy alcohol use and reducing alcohol use below levels defined by U.S. guidelines as likely to be hazardous, ranging from heavy alcohol use to severe alcohol use disorder (see **Table 1**). The National Institute on Alcohol Abuse and Alcoholism (NIAAA) defines heavy alcohol use for healthy men up to age 65 as more than four drinks on any day or more than 14 drinks per week,[4] based on the standard drink amount of a 12 ounce beer (5% alcohol), 5 ounces of wine (12% alcohol), and 1.5 ounces of distilled spirits (40% alcohol), or 14 grams of alcohol.[5] For women of any age and men aged 65 years and older, heavy drinking is defined as more than three drinks on any day or more than seven drinks per week. A person meets Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for Alcohol Use Disorder (AUD) if they experience at least two of the 11 criteria listed in **Table 1**; severity of the disorder is specified (mild, moderate, severe) and based on the number of criteria met.

According to the 2020–2025 Dietary Guidelines for Americans, drinking less is better for health than drinking more, and note that "emerging evidence suggests that even drinking within the recommended limits may increase the overall risk of death".[4] These guidelines further state that some people should be advised not to drink any alcohol, including those who are: 1) taking medications that can interact with alcohol; 2) managing a medical condition that can be exacerbated by consumption of alcohol; 3) <21 years, the minimum legal drinking age in the U.S.; 4) recovering from AUD or unable to moderate their drinking; and 5) pregnant or might be pregnant. Further, some individuals – especially older adults, those planning to drive a vehicle or operate heavy machinery, and those who are participating in activities requiring skill, coordination, and alertness – should avoid alcohol completely.[6, 7]

Prevalence

Unhealthy alcohol use is relatively common and is increasing in adults.[8] Based on the 2023 Behavioral Risk Factor Surveillance System (BRFSS), 6.1 percent of adults reported drinking above recommended levels (≥7/14 drinks per week for women/men) and 15.1 percent reported binge drinking (≥4/5 drinks on a single occasion for women/men) within the past 30 days.[10] Additionally, 2023 NSDUH data indicate an estimated 28.1 million adults met the criteria for having AUD, representing 13.2 percent of men and 8.7 percent of women.[11] Similarly, around 14.4 percent of full-time college students (13.4% of men and 15.2% of women) met criteria for

AUD in the NSDUH 2023 survey.[12] Among people ages 12 to 17 years, 7 percent reported any alcohol use in the past month, including 6 percent of boys and 8 percent of girls[11] More detailed prevalence data, sourced from the 2023 NSDUH survey, is provided in **Table 2**.

Among adults ages 18 and older, just over half reported any past-month alcohol use (51.6%), with reported use slightly higher in males compared to females (54.8% vs. 48.6%, respectively); across all patterns of use in this age group, reported use was slightly higher or higher in males compared with females.[9] Past-month use was similarly high among college-aged young adults (18 to 25 years, 49.6%), and this age group had the highest prevalence of past-month binge drinking (28.7%), heavy use (6.9%), and meeting AUD criteria (16.4%) compared to any other age group. Self-reported use patterns among college-aged young adults are very similar in males and females.[13] Among adolescents aged 12 to 17 years, nearly one quarter reported any lifetime alcohol use (21.6%), with female adolescents reporting slightly higher use than male adolescents in all categories.[9] The prevalence of AUD in adolescents is nearly twice as high in females (3.8%) compared to males (2.0%), with overall prevalence of 2.9 percent in this age group.[9] Per the 2022 Monitoring the Future Survey, 2.4 percent of 12th grade students reported high-intensity drinking.[14]

Alcohol consumption per capita has increased steadily since the mid-1990s,[15] and this trend was exacerbated during the COVID-19 pandemic.[16] In the first several weeks of mandated lockdowns during the COVID-19 pandemic, online liquor sales rose over 250 percent, liquor store sales increased more than 50 percent, and by April 2020, alcohol sales increased by 234 percent compared to the year prior.[16] These figures represent the highest increases in alcohol purchase and consumption observed in the past 50 years.[16] A smaller survey of U.S. adults (N=832) conducted in May 2020 found that 60.1 percent reported an increase in their usual alcohol consumption.[17] Another nationwide survey (N=1,982) found drinking patterns increased overall from mid-March 2019 to mid-April 2020, but the effect was greater for those who already engaged in prior binge drinking (especially those with comorbid depressive disorders) and was significantly compounded for every week spent at home during the pandemic.[18] Further, compared with February 2020, the average number of drinks consumed per month increased by 36 percent in April 2020 and 38 percent in November 2020. Increases for proportion of people exceeding drinking guidelines were 27 and 39 percent higher in April and November 2020, respectively, compared to February 2020, and increases for binge drinking were 26 and 30 percent, respectively.[19]

However, alcohol consumption has declined among younger populations. A meta-analysis of 32 studies found that mean scores on the Alcohol Use Disorders Identification Test (AUDIT) among young adults aged 18–24 decreased by 0.63 standard deviations between 1989 and 2015.[22] Among underage populations (ages 12 to 20), NSDUH data indicate that the prevalence of past-month drinking has declined steadily from 33.4 percent in 1991 to 18.7 percent in 2019.[23] During the same time period, the median age of initiation of drinking alcohol increased from 13.65 years to 14.87 years. Although rates of binge drinking increased from 12.1 to 18.6 percent between 1993 and 2001, they then declined to 10.6 percent by 2019.[23] Moreover, unlike in the general adult population, alcohol consumption among adolescents declined during the COVID-19 pandemic. According to the 2021 Youth Risk Behavior Survey, current use of alcohol decreased from 29.2 percent of high school students in 2019 to 22.7 percent in 2021; this decline

was consistent among both males and females and among Black, White, and Hispanic populations.[24]

Disparities. Though alcohol use is relatively common among people of many backgrounds and across all age groups, disparities exist among racial and ethnic minorities and underserved populations in terms of the prevalence of AUD and overall drinking patterns, as well as adverse health effects and consequences related to heavy alcohol use. For example, rates of AUD are higher among those with family incomes less than $20,000 per year (16.2%) versus rates among those of higher socioeconomic status (12.7 to 14.0%).[25] Drivers of these differences likely are multifactorial and could be related to stressful life circumstances, neighborhood characteristics, and differences in employment, as unemployed adults have higher rates of AUD compared with those who are employed.[26] Although White populations report higher rates of any level of alcohol use compared to people of other racial or ethnic backgrounds, the negative effects of alcohol use are disproportionately higher in non-White populations, and treatment may be less accessible or successful.[9, 27, 28] Additionally, there are sex-based disparities in alcohol use and alcohol-related complications.[29, 30] For example, men are more likely to die from alcohol-related causes than women; the age-adjusted death rate was 2.9 times higher in men than women in 2020.[30] Recent research suggests this gap is narrowing, however.[29, 30]

Regarding race- and ethnicity-related differences in prevalence of AUD and other negative effects of alcohol use, there is an established literature base suggesting that Black and Hispanic individuals are more likely than White individuals to have an AUD diagnosis, even with similar levels of alcohol use.[31-33] The rates of alcohol-related death are markedly higher among American Indian and Alaska Native populations (113.2/100,000 for men, 58.8/100,000 for women) than other race and ethnic groups, including Latino (21.9/100,000 for men, 4.7/100,000 for women), non-Latino White (18.2/100,100 for men, 7.6/100,000 for women) and non-Latino Black (13.8/100,100 for men, 4.6/100,000 for women), and Asian and Pacific Islander (4.4/100,000 for men, 1.0/100,000 for women) populations in 2016.[34] The death rate is higher for Latino than White men, despite the fact that the overall rate of any alcohol use is generally lower among Latino populations than White populations.[35]

According to 2023 NSDUH data, rates of AUD among those 12 years and older were highest in multiracial populations (13.6%), followed by American Indian or Alaska Native populations (11.6%), and White populations (11.0%); rates of AUD were lower in Black (9.6%), Hispanic (9.2%), Native Hawaiian and Pacific Islander (7.9%), and Asian populations (5.7%).[11] Drinking patterns have also been found to vary by race and ethnicity, with Hispanic populations reporting highest levels of past-month binge drinking (22.9%), followed by White (22.4%), multiracial (22.2%), and Black populations (21.6%); rates of past-month binge drinking are lowest among Asian populations (10.7%).[9] Additionally, Hispanic men are reported to have a higher drink maximum in a day (7.4) compared with White (7.0) and Black (4.9) men.[36]

There is some intersection of race and sex-related disparities as well. The prevalence of AUD is higher among Black women than White women, despite the former group reporting generally lower levels of alcohol use, and AUD is associated with poorer physical and functional health in Black women but not White women.[37] A 2020 meta-analysis including 414,477 individuals suggests that sex modifies the association between alcohol and hypertension, and Black individuals have elevated risk compared to Asian and White individuals, even at the same level

of consumption. Across all racial and ethnic groups, men have a higher risk of alcohol-related hypertension than women.[38]

Burden

Excessive alcohol use is one of the leading causes of premature mortality; an estimated 1 in 8 deaths among working-age adults aged 20 to 64 years in the U.S. are attributable to excessive alcohol use.[39] Annually, more than 178,000 Americans die from excessive alcohol use, representing about 4 million years of potential life lost.[40] In 2020–2021, there were more than 4.1 million emergency department visits related to alcohol.[41] Alcohol-related death rates have been steadily rising since the early 2000s across all sex, age, and race or ethnicity strata.[30] The COVID-19 pandemic may have further fueled an increase in alcohol-related deaths. A 2022 NIAAA study found that although alcohol use increased by approximately 2.2 percent per year since 2002, alcohol-related deaths spiked by over 25 percent between 2019–2020, accounting for nearly 100,000 deaths.[42] During the same period, alcohol-associated liver disease and alcohol-related traffic deaths increased by 22.4 percent and 14 percent, respectively.[42] Similarly, a separate study using data from the National Vital Statistics System (NVSS) found that rates of AUD-related deaths surged above the rising linear trend in 2020 and 2021, and that younger adults (aged 25-44) experienced the largest increase in AUD-related mortality (40.5% in 2020 and 34.0% in 2021).[43]

In general, most alcohol-related deaths are estimated to be due to health effects of chronic excessive use (e.g., various cancers, liver disease, heart disease), with the remaining mortality due to acute causes (e.g., motor vehicle crashes, alcohol poisoning, suicides). Nevertheless, because acute alcohol-related deaths often occur at younger ages than those due to chronic excessive use, acute deaths account for more than half of the annual 3.6 million potential life years lost.[44] In 2022, alcohol-impaired driving fatalities accounted for more than 13,500 deaths, or 32 percent of all driving fatalities.[41] Alcohol-related injuries are a significant cause of loss of life among young adults, with an estimated 1,519 college students aged 18–24 dying annually from alcohol-related unintentional injuries, including motor-vehicle crashes.[45]

A systematic review of causes of fatal nontraffic injuries reports that just over one-fifth (21%) of suicide decedents have a blood alcohol content of 0.1 percent or more, and among people who die by suicide, AUD is the second most common mental disorder and is involved in one-quarter of suicide deaths.[46] Similarly, 2021 statistics from the National Violent Death Reporting System indicates that,40.2% of suicide decedents with toxicology results were positive for alcohol, and 65 percent of these had a BAC ≥0.08 g/dL.[47] A meta-analysis of 33 longitudinal studies found the strongest associations between unhealthy alcohol use and suicide risk among studies with higher percentages of women, younger mean age, military samples, higher mean frequencies and quantities of alcohol use, and longer followup.[48]

According to the American Cancer Society, alcohol use accounts for 6 percent of all cancers and is the underlying cause of 4 percent of all cancer deaths in the U.S.[49] More specifically, alcohol use has been associated with increased risk of mouth, throat, larynx, esophageal, liver, colorectal, and breast cancers; it is also hypothesized that alcohol use may increase the risk of stomach cancer. In general, higher alcohol use is positively associated with higher cancer risk, but notably, for breast cancer, even a small amount of alcohol consumption has been found to increase risk.[49]

Consuming alcohol while pregnant can result in fetal alcohol spectrum disorders, as well as additional adverse birth outcomes, making alcohol use throughout pregnancy a major preventable cause of birth defects and developmental disabilities.[50] Prenatal exposure to alcohol can affect the developing brain, heart, kidney, liver, gastrointestinal tract, and endocrine systems.[51] Alcohol use during pregnancy is also associated with adverse pregnancy outcomes such as miscarriage, stillbirth, preterm delivery and Sudden Infant Death Syndrome.[52] According to 2023 NSDUH data, 8.4 percent of pregnant women ages 15 to 44 in the U.S. used alcohol in the past month and 4.8 percent reported binge drinking in the past month.[53] Further, a NIAAA-funded study of more than 6,000 children in first grade across four U.S.-based communities estimated that 1 to 5 percent had fetal alcohol spectrum disorders.[54] Beyond the harmful effect of alcohol use during pregnancy, evidence shows that women who engage in unhealthy alcohol use are more susceptible to the associated deleterious health effects than men with unhealthy alcohol use, including liver and cognitive effects.[54] These effects may be mediated by the effects of alcohol on sex hormones and in the effect of alcohol pharmacokinetics on the brain.[54]

In 2010, excessive alcohol use was estimated to cost the United States $249 billion, with state and federal governments paying $100.7 billion, or more than 40 percent of these costs.[55] The majority of the cost of excessive alcohol use was due to binge drinking (76.7%), while underage drinking accounted for 9.7 percent, and drinking while pregnant was 2.2 percent ($5.5 billion) of the total cost. The majority of the estimated economic cost of excessive alcohol use is due to losses in workplace productivity (72%), followed by healthcare expenses (11%), law enforcement and criminal justice expenses (10%), and losses from motor vehicle crashes (5%).[55] These estimates are thought to be underestimates, however, due to the fact that information on alcohol is typically underreported or unavailable.[55] Additional costs including pain and suffering due to alcohol-related injuries and alcohol-related morbidities were not included.[55]

U.S. national drinking guidelines are generally consistent with the evidence on risk levels reported in meta-analyses of observational literature. An older (2006) meta-analysis found that the average daily volume (ADV) at which an increased risk of all-cause mortality is observed occurs with approximately 38 grams of ethanol (2.7 drinks, according to the U.S. standard), though this threshold appears to be lower for women than for men. Similarly, a more recent (2023) meta-analysis found that daily low or moderate alcohol intake (defined as 1.3–24.9 grams of ethanol/day [up to 1.79 standard drinks] and 25–44 grams of ethanol/day [1.8-3.1 drinks], respectively) was not significantly associated with increased all-cause mortality risk, but increased risk was evident at higher consumption levels (45–64 g/day [3.2-4.6 drinks] or ≥65 g/day [4.7 drinks]). Elevated risk was observed at lower thresholds in women than in men. In addition, the risk of liver disease and a number of cancers (primarily of the gastrointestinal tract, liver, and breast) are increased at an ADV of approximately 25 grams (1.8 drinks per day).[56, 57] Among women, consuming more than 5 drinks per day is associated with a substantially increased risk of developing liver cirrhosis; men also have increased risk with increased consumption, but risk thresholds remain lower for women in comparison.[58]

Risk Factors

Excessive alcohol consumption can lead to the development of alcohol use disorders because it affects neurobiological functioning, leading to greater alcohol tolerance, diminution of pleasure from everyday human activities, increased release of neurotransmitters associated with stress when alcohol is absent from the body, and ultimately addiction. Initiation of drinking at younger

ages, when the brain is rapidly developing and changing, may contribute to an increased risk of excessive and unhealthy alcohol use.[59, 60] An analysis of 2010 NSDUH data found that younger age at first use of alcohol was associated with increased likelihood of reporting a heavy use episode in the past month. Similarly, a New Zealand birth cohort study found that younger age of first alcohol intoxication was associated with increased likelihood of developing an AUD.[59]

Parental history of an alcohol use disorder also increases the risk of alcohol use disorders in their children. The Copenhagen Perinatal Cohort study (N=9,125) found that offspring of parents with AUD have approximately twice the odds of developing AUD compared with offspring of parents without AUD.[61] Another population-based cohort study (N=398,881) found the risk for offspring developing AUD increased when one or both parents had the disorder (AdjHR 1.44 [95% CI, 1.29 to 1.61] and 2.29 [95% CI, 1.64 to 3.20] for those with one or both parents with AUD, respectively).[62]

An analysis of twin studies estimated the heritability of AUD to be approximately 50 percent. An increasing body of research suggests certain genes influence a person's response to alcohol, alcohol metabolism, and susceptibility to addiction.[63-65] Social and environmental factors likely play a role as well. Childhood maltreatment, specifically sexual and/or physical abuse, increases the risk of alcohol use disorders.[66-70] For example, a 2016 study of young adults (N=300) found that physical abuse during childhood (age ≤18) more than doubled the odds of alcohol use disorders in young adulthood (adjusted OR 2.41 [95% CI, 1.31 to 4.45]; $p<0.01$). Living in a rural or remote community also is associated with an increased risk of unhealthy alcohol use and alcohol-related harm compared with living in an urban community.[71] In addition, unhealthy alcohol use commonly co-occurs with personality and mood disorders; however, the directionality of this relationship is unclear and likely variable.[72-77]

Risk factors for unhealthy alcohol use may differ between men and women. A 2015 study of twins found that, for women, family history of AUD, early-onset anxiety disorders, and nicotine dependence were strong risk factors for AUD.[78] In men, important risk factors include novelty seeking, conduct disorder, childhood sexual abuse, parental loss, neuroticism, low self-esteem, and low marital satisfaction.[78] Additionally, women who have a preference for same-sex partners have a higher likelihood of binge drinking compared with heterosexual women; however, men who have a preference for same-sex partners do not have a higher likelihood of binge drinking compared with heterosexual men.[77, 79] A 2018 systematic review stated that the prevalence of hazardous drinking is high among transgender individuals but added that more research is needed to better understand alcohol use among people with varied gender identities.[80]

Rationale for Screening in Primary Care Setting

People with severe AUD may be identified through the health and social impacts of their alcohol use, but those with lower levels of unhealthy alcohol use are not easily identifiable without direct questioning. Yet any amount of unhealthy alcohol use affects a wide range of medical conditions that are commonly encountered in the primary care setting, including gastrointestinal, cardiopulmonary, dermatologic, reproductive, and neurological conditions. Further, alcohol interacts dangerously with many commonly used prescription and over-the-counter medications. Because of these factors, patients' alcohol use can have a substantial impact on their treatment for and recovery from many conditions that are addressed in primary care, and efforts to reduce unhealthy alcohol use have substantial potential to improve the health of primary care patients. If

screening and counseling can reduce alcohol use to within recommended limits, such health effects could possibly be avoided. Even in the absence of treatment to reduce consumption, information on alcohol consumption could provide important information to help the clinician determine best treatment approaches for other health issues. Further, screening and intervention for lower levels of unhealthy alcohol use in adolescents and younger adults, before their neurochemistry has been affected by chronic or heavy use, offer an important opportunity to avoid progression to more serious and likely difficult-to-treat levels of use. Of note, screening and counseling for unhealthy alcohol use presents an opportunity for primary care clinicians to address one of the leading causes of preventable mortality, reducing the risk of acute events as well as chronic conditions that can lead to death.

The 2016 U.S. Surgeon General's Report on Alcohol, Drugs, and Health identified screening in health care settings as an important vehicle for identifying people with unhealthy alcohol and substance use. In addition, a study exploring the health impact and cost-effectiveness of preventive clinical services identified primary care-based alcohol screening and counseling among the highest-rated preventive services in terms of clinically preventable burden. To further support screening and interventions in primary care settings, patients have expressed a preference for treatment in primary and collaborative care settings, rather than in specialty settings.[81]

Primary care practitioners have limited time to interact with their patients; therefore, brief or self-administered screening tests that identify the full spectrum of alcohol use are preferred. Numerous brief instruments have been developed (**Appendix E, Table 1**); however, only a few have gained widespread use in clinical or research settings. For patients screening positive on a brief screener, followup questions are needed to confirm the presence of unhealthy alcohol use, assess the extent of unhealthy alcohol use (e.g., whether AUD is present or not), and help the patient and clinician determine appropriate next steps. Several clinician guides have been developed that lay out next steps after the initial assessment, which may include brief counseling, followup visits with the primary care clinician, a thorough assessment by an addiction medicine or mental health specialist, referral to community and specialty services, and medication.

Screening Strategies

The previous review to support the 2018 USPSTF recommendation identified several brief screening instruments that adequately detect unhealthy alcohol use in adults 18 years or older.[82] These include the NIAAA-recommended Single Item Alcohol Screening Questionnaire (SASQ), the Alcohol Use Disorders Identification Test (AUDIT), and the AUDIT-Consumption (AUDIT-C). The SASQ asks, "*How many times in the past year have you had 5 [for men]/4 [for women] or more drinks in a day?*" where one or more occasions in the previous year constitutes a positive screen. The AUDIT-C includes three items covering frequency of alcohol use, typical amount, and occasions of heavy use. The full AUDIT includes these three items, plus seven questions regarding signs of alcohol dependence and common problems associated with alcohol use (e.g., being unable to stop once you start drinking, needing a drink first thing in the morning). While the AUDIT and AUDIT-C are accepted internationally as ideal screeners to identify unhealthy alcohol use, the drink size used in the screener does not align with the typical larger drink size in the U.S. (14 grams versus 10 grams internationally). Therefore, the AUDIT and AUDIT-C were modified to account for typical drink sizes in the U.S. and are referred to as

the USAUDIT and USAUDIT-C. These modified screening instruments may be more relevant for primary care screening in the United States.

Screening instruments also have been developed specifically for adolescents. NIAAA recommends two items, asking about the patient's alcohol use and their friends' use. NIDA also developed the related Brief Screener for Tobacco, Alcohol, and other Drugs (BSTAD) to use this approach to assess alcohol, tobacco, and drug use. The Screening to Brief Intervention (S2BI)—based on the National Institute on Drug Abuse quick screen—also was created for adolescents.[83] It is a 7-question screen that asks adolescents about their use of alcohol and other substances. Both the S2BI and the BSTAD are designed to generate risk levels for alcohol, tobacco, and cannabis use disorders. NIAAA and the American Academy of Pediatrics (AAP) both name the Car, Relax, Alone, Forget, Family, Friends, Trouble (CRAFFT) screener as a useful screening tool for identifying risky substance use in adolescents, which assesses riding in or driving a car while intoxicated, use of alcohol or drugs to relax, use when alone, forgetting what you've done while intoxicated, having friends or family suggest you cut down, and getting into trouble while using alcohol or drugs. Specifically, AAP's Bright Futures Periodicity Schedule highlights the CRAFFT as a recommended tool to conduct risk-based assessments for tobacco, alcohol, and substance use in adolescents.

Treatment Approaches

For individuals with unhealthy drinking behavior who do not have AUD, a brief intervention to increase the awareness of alcohol use and increase motivation to make behavioral changes in primary care may be sufficient, while those with AUD may need referral to more extensive treatment, possibly including pharmacotherapy. Medications approved by the Food and Drug Administration (FDA) for the treatment of unhealthy alcohol use are intended for those diagnosed with AUD and are generally used after abstinence has been achieved. These medications include acamprosate, disulfiram, and naltrexone, which aim to reduce symptoms of abstinence, create a physical reaction if alcohol is consumed, or block the rewarding effects of drinking. A recent review found the strongest support for oral naltrexone and acamprosate as first-line pharmacotherapies for alcohol use disorder.[84]

Several health organizations have developed clinician guides for primary care-based interventions to reduce unhealthy alcohol use, some of which also provide implementation advice and planning documents.[85-89] Their approaches fall under the Screening, Brief Intervention, Referral, and Treatment (SBIRT) framework, and typically use the Ask, Advise, Assess, Assist, Arrange (5 A's) mnemonic, either explicitly or implicitly. Organizations generally recommend a very brief 1- to 3-item screener, followed by more in-depth risk assessment among those who screen positive (**Appendix B, Table 1**). Once unhealthy alcohol use is identified, guides typically suggest providing feedback to the patient on their alcohol use; advising the patient to reduce their alcohol use; having a discussion with the patient to understand their readiness to change; developing goals and an action plan; and arranging for followup. Guides typically suggest motivational interviewing tools to increase patients' readiness to change, such as open-ended questions, affirmation, reflective listening, and summarizing what has been discussed, as well as standard motivational techniques such as expressing empathy, supporting self-efficacy, pointing out previous successes, "rolling with resistance" (recognizing when someone is resistant to change and avoiding unhelpful attempts at persuasion), and helping

patients see the discrepancy between where they are and where they want to be. If treatment is proposed, common first-line treatment options include behavioral health treatments, FDA-approved AUD medications, mutual support groups, and any combination of these. Beyond these clinician guides, counseling interventions have been developed that include a wide range of approaches (e.g., motivational enhancement therapy, cognitive behavioral therapy, 12-step programs); specific strategies (e.g., action plans, drinking diaries); delivery methods (e.g., face-to-face, Web-based, individual, group-based); length of contact (e.g., brief, extended); and number of contacts (single, multiple). NIAAA has developed an online resource to help individuals understand treatment options, find practitioners, and recognize signs of higher-quality care for AUD.[90] This is a comprehensive and easy-to-use tool to help patients and their families navigate the often complicated process of finding and choosing a treatment option.

Current Clinical Practice in the United States and Recent Recommendations

Although current clinical recommendations state that physicians should screen patients for unhealthy alcohol use and provide brief counseling for those engaging in unhealthy drinking behaviors, not all physicians report following these recommendations in their practices. According to the 2015-2016 National Ambulatory Medical Care Survey, 72 percent of office-based primary care physicians reported screening patients for alcohol misuse.[91] The three most common screening questions were asking the number of drinks per occasion (60%), the frequency of drinking (57%), and a binge drinking question (33%). Of those who screen, 68% reported doing so annually or at every healthcare visit, while 24% reported doing so only when they suspect that the patient has a substance or alcohol-related problem. Sixty-five percent of physicians reported that they often or always conduct a brief intervention with patients who screen positive.

When patients were asked about being screened for unhealthy alcohol use by their health providers, the data appeared slightly more promising. A study analyzing 2017 BRFSS data found that 81 percent of adults reported being asked about alcohol use by a health professional during a checkup in the previous two years.[93] However, only 38 percent reported being asked a question about binge-level alcohol consumption, which is included in USPSTF-recommended instruments. Among those who reported current binge drinking in the past 30 days during screening, only 42 percent were advised about the harms of drinking too much, and only 20 percent were advised to reduce or quit drinking by their provider. These results are similar to those reported in a secondary analysis of 2014 NSDUH data (N=25,984), in which 77 percent of respondents reported being asked by their primary care providers about their alcohol use and 12 percent reported being asked if they had a problem with drinking.[94] This study also found that regular or chronic drinkers rarely received information about alcohol treatment referrals (7.3%).[94] Other studies have found low screening and counseling rates among young adults[95] and among patients of women's reproductive health clinicians, ranging from 14 to 59 percent.[96, 97] Collectively, these studies suggest gaps in practice related to underuse of standardized screening tools and missed opportunities to intervene with patients who report binge drinking.

Physicians report several common barriers to achieving higher rates of screening patients for unhealthy alcohol use. A systematic review published in 2021 found a variety of commonly reported barriers to implementing alcohol screening and brief intervention among primary care

physicians.[98] These include not having enough time for screening or to conduct a further assessment and counseling in the event of a positive screen, fear about increasing provider workload, and worry that it would cause management or logistical issues. This systematic review, as well as other recent studies, have found that additional provider-reported barriers to complying with screening recommendations include a lack of adequate training about how to properly screen patients, not feeling confident being able to assist patients meeting criteria for unhealthy use, not feeling comfortable discussing alcohol use with patients, not trusting that patients would be honest about their alcohol use, and not feeling that available treatments are effective.[92, 98-100]

Recommendations and statements from other organizations about screening and treatment for unhealthy alcohol use are summarized in **Appendix B, Table 1**. The Department of Defense/Veterans Health Administration, Surgeon General of the United States, NIAAA, CDC, National Institute for Health and Care Excellence, and the American Society of Addiction Medicine all agree with the 2018 USPSTF recommendation that adult patients should be routinely screened for at-risk drinking and brief counseling should be provided to patients who are determined to have unhealthy alcohol use behaviors. Additionally, NIAAA recommends medical management for adults with AUD. AAP recommends that pediatricians increase their capacity in substance use detection, assessment, and intervention, and that they be familiar with SBIRT practices. Both the American College of Obstetricians and Gynecologists and the World Health Organization (WHO) recommend that all women should be screened both before pregnancy and in their first trimester of pregnancy via validated tools (e.g., T-ACE) and that providers should offer a brief intervention to all pregnant women using alcohol.

Previous USPSTF Recommendation

In 2018, the USPSTF recommended screening for unhealthy alcohol use in primary care settings in adults aged 18 or older, including pregnant women, and providing those engaged in risky or hazardous drinking with brief behavioral counseling interventions to reduce unhealthy alcohol use (B recommendation).[1] The USPSTF concluded, however, that the current evidence was insufficient to assess the balance of benefits and harms of screening and brief behavioral counseling interventions for alcohol use in primary care settings in adolescents aged 12 to 17 years (I statement).

Chapter 2. Methods

Scope and Purpose

The current review is an update of the 2018 evidence review[82] that supported the 2018 USPSTF recommendation[1] on screening and behavioral counseling to reduce unhealthy alcohol use in adolescents and adults. The USPSTF will use this report to update its recommendation. However, we did not re-review evidence that was determined to have a high strength of evidence in the previous review, but rather considered that evidence as established. Thus, evidence on the accuracy of screening tools among adults was limited to an adaptation to a widely used instrument that was under development at the time of the previous review. This review examined evidence relevant to primary care practice, including evidence on screening for unhealthy alcohol use in primary care and evidence on interventions that could be feasibly implemented in primary care, conducted in broad populations that are comparable to primary care populations.

Key Questions and Analytic Framework

With input from the USPSTF, we developed an Analytic Framework (**Figure 1**) and five key questions (KQs) to guide the literature search, data abstraction, and data synthesis.

Key Questions

1. Does primary care screening for unhealthy alcohol use in adolescents and adults reduce:
    a. alcohol use or improve other risky behaviors?
    b. morbidity or mortality or improve other health, social, or legal outcomes?
2. What is the accuracy of selected commonly used instruments to screen for unhealthy alcohol use in adolescents and adults?
3. What are the harms of screening for unhealthy alcohol use in adolescents and adults?
4. Do counseling interventions to reduce unhealthy alcohol use reduce:
    a. alcohol use or improve other risky behaviors in screen-detected individuals?
    b. morbidity or mortality or improve other health, social, or legal outcomes in screen-detected individuals?
5. What are the harms of interventions to reduce unhealthy alcohol use in screen-detected individuals?

Data Sources and Searches

In addition to re-evaluating all studies included in the 2018 review,[82] we searched the following databases for relevant English-language literature published between September 1, 2017, and December 4, 2024: MEDLINE, PsycInfo, and Cochrane Central Register of Controlled Clinical Trials. A research librarian developed and executed the search, which was peer reviewed by a second research librarian (**Appendix A**). We supplemented our searches with suggestions from experts and articles identified through news and table-of-contents alerts. We imported the literature from these sources directly into EndNote® X20 (Thomson Reuters, New York, NY).

Study Selection

We developed specific inclusion criteria to guide our study selection (**Appendix A, Table 1**). A total of 8,893 citations were reviewed using DistillerSR (Evidence Partners, Ottawa, Canada). Initial identification of low-relevance abstracts was conducted using keywords related to exclusion criteria (e.g., inpatient, rodent); this identified 2,097 abstracts that were reviewed by a single investigator. Two investigators independently reviewed the remaining 6,796 abstracts, and then two investigators independently reviewed 409 full-text articles against the inclusion criteria. We resolved discrepancies through consensus and consultation with a third investigator.

Population

We included studies conducted among adolescents or adults ages 12 years and older, including those who are pregnant. For KQs 1, 2 and 3, to maximize applicability to broad screening in primary care settings, we included general populations and excluded studies in which participants were selected based on alcohol use or a related behavior. For KQs 4 and 5, we prioritized applicability of interventions among people who had screened positive for unhealthy alcohol use, so included studies in which at least half of the enrolled sample was recruited via population-based screening, operationalized as outreach to a defined population (or a random or consecutive sample) who had been identified as potentially eligible to complete a standardized brief instrument. We excluded studies in which half or more of participants had alcohol dependence or severe AUD. We also excluded studies limited to treatment-seeking individuals, those with concomitant psychotic disorders, those presenting in an emergency setting, and other populations that were overly restrictive or not generalizable to a broad primary care population (e.g., inpatients, those court-mandated to treatment, those who are incarcerated, youth in foster care, victims of sexual violence).

Screening Tools

We required studies to screen for alcohol use using a brief standardized instrument or set of questions. Screening could be conducted in person or via telephone, mail, or electronically. For KQs 1, 3, 4, and 5, any brief screening instrument was eligible.

For KQ2, we examine the accuracy of only to two instruments among adults, the U.S. Alcohol Use Disorders Identification Test (USAUDIT) and the USAUDIT-Concise (USAUDIT-C). This approach was used because the 2018 evidence review concluded with a high strength of evidence that numerous screeners had adequate accuracy to identify adults with unhealthy alcohol use,[82] so we focused only on these two instruments which were under development at the time of the previous review. For adolescents, where the previous review found only moderate strength of evidence, we sought studies testing the accuracy of the USAUDIT and USAUDIT-C, as well as the AUDIT, AUDIT-C, NIAAA two-item screening test, S2BI, BSTAD, and comparable instruments. Many screening instruments asked about the use of other substances (cannabis, tobacco/nicotine, and other drugs) in addition to alcohol. For the purposes of this review, we examined only the accuracy of the alcohol-related questions in identifying unhealthy alcohol use, although the participants could have reported their use of these other substances as well.

Interventions and Comparators

For KQs 1 and 3, we included studies in which a broad primary care or similar population was screened for unhealthy alcohol use. Screening could be followed by usual care based on the screening results, or a study-specified behavioral counseling intervention, which may also include a range of intervention modalities and referral options. For KQs 4 and 5, we included interventions that were conducted in or recruited from primary care, or that we judged could feasibly be implemented in or referred from primary care. We operationalized interventions that could be feasibly implemented in primary care settings as those in which the expertise and tools required to administer the intervention are typically present in the primary care setting (e.g., behavioral counseling expertise, electronic devices for accessing online materials), and there are no components that could not be replicated in a typical primary care settings (e.g., interactions among existing peer groups). We focused on studies of behavioral counseling to reduce unhealthy alcohol use, with or without referral, and were open to a variety of approaches (e.g., brief advice, personalized normative feedback, motivational interviewing, cognitive behavioral therapy), strategies (e.g., action plans, diaries), delivery methods (e.g., face-to-face, electronic), length of contact (e.g., brief, extended), providers (e.g., medical, health educators, peers), and number of contacts (e.g., single, multiple). We excluded interventions to prevent initiation of use among nonusers. Consistent with the previous reviews for the USPSTF on this topic, we focused behavioral counseling interventions and excluded studies examining the efficacy of pharmacotherapy. However, intervention were eligible for inclusion if there were a number of potential referral and treatment options that included behavioral counseling as well as pharmacotherapy.

For KQs on the benefits and harms of screening (KQs 1 and 3), eligible comparators were no screening or usual care. For screening test accuracy (KQ2), we required studies to evaluate screening tests against a reference standard rather than against another screening instrument. Eligible reference standards included structured or semi-structured interviews assessing AUD and detailed quantity and frequency assessments, as well as computer-based versions of these assessments. For intervention studies (KQs 4 and 5), eligible comparators were usual care, no intervention, minimal control, or attention control comparison group.

Setting

Eligible settings were broad-based general settings, including primary care clinics, prenatal clinics, obstetrics/gynecology clinics, school-based health centers (high school or university), specialty medical treatment settings (e.g., diabetes management, dialysis clinics), research clinics or offices, community or school settings (e.g., Special Supplemental Nutrition Program for Women, Infants, and Children [WIC]; college freshmen orientation), at-home settings, and electronic or computer-based settings. We excluded studies in which screening took place in behavioral or mental health clinics, substance abuse treatment centers, emergency departments, trauma centers, worksites (including occupational screening), inpatient and residential facilities, and other institutions (e.g., correctional facilities). For KQs 4 and 5, screening to identify eligible participants needed to take place in a broad-based general setting as described above, though interventions could take place in mental health, addiction, or substance use specialty settings. For all KQs, only studies conducted in countries categorized as “Very High” on the 2021 Human

Development Index (as defined by the United Nations Development Programme) were included.[101]

Outcomes

Studies of screening and treatment effectiveness (KQs 1 and 4) were required to report at least one outcome related to alcohol use, such as frequency and/or quantity of use, abstinence, score on an instrument measuring severity of unhealthy use, or meeting criteria for AUD. Other outcomes of interest include risky behaviors (e.g., illicit drug use, risky sexual behaviors), health care outcomes (e.g., alcohol-related morbidity and mortality, all-cause mortality, mental health symptoms, obstetric/perinatal/neonatal outcomes), acute health care use (e.g., emergency department visits, inpatient stays), quality of life, and alcohol-related problems (e.g., motor vehicle crashes, arrests). In order to understand the impact of the included interventions on sustained behavior change and longer-term health benefits, we required a minimum of 6 months of followup for all populations except pregnant women. Because more immediate serious health impacts are plausible with unhealthy alcohol use during pregnancy, there was no minimum followup requirement for this population.

For KQs 3 and 5 (screening and treatment harms), eligible outcomes included serious harms identified at any point after screening or intervention (e.g., death, cardiovascular events, serious obstetrical/perinatal/neonatal complications), demoralization due to failed quit attempts, psychological harms (e.g., stigma, shame), privacy issues (e.g., insurability status), job loss, and lack of trust or interference with the doctor-patient relationship.

Screening test accuracy studies (KQ2) were required to report sensitivity, specificity, or the data to calculate these test performance measures.

Study Design

For KQs addressing benefits and harms of screening and treatment (KQs 1, 3, 4 and 5), we included randomized, controlled trials (RCTs), including cluster randomized trials and randomized stepped-wedge controlled trials. For KQs 1 and 3 only, we also included non-randomized controlled trials with concurrent comparison groups. For KQ2, we included studies of test accuracy reporting sensitivity and specificity compared with a structured or semi-structured clinical interview. We excluded studies that assembled clearly differentiated case and control groups, such as individuals being treated for AUD (cases) and a community sample with no history of alcohol treatment (controls).

Quality Assessment and Data Abstraction

Two independent reviewers applied USPSTF design-specific criteria (**Appendix A, Table 2**) as well as criteria from the Quality Assessment of Diagnostic Accuracy Studies to assess the methodological quality of all eligible studies. For each study, we rated the risk of bias by domain and assigned each study an overall quality rating of "good," "fair," or "poor." Discordant ratings for domains and overall quality were reviewed and discussed, with a third reviewer consulting as needed. Studies rated as poor quality were excluded from the review.

For intervention trials, good-quality studies were those that met all or nearly all of the specified quality criteria (e.g., comparable groups were assembled initially and maintained throughout the study, and followup was ≥90%), whereas fair-quality studies did not meet all of these criteria but did not have serious threats to their internal validity related to the design, execution, or reporting of the study. Intervention studies rated as poor quality generally had several important limitations, including at least one of the following risks of bias: very high attrition (generally >40%), differential attrition between intervention arms (generally >20%); lack of baseline comparability between groups without adjustment; or issues in trial conduct, analysis, or reporting of results that cast doubt on the validity of the findings (e.g., possible selective reporting, inappropriate exclusion of participants from analyses, and questionable validity of randomization and allocation concealment procedures). For studies of test performance, good-quality studies recruited patients consecutively or randomly; administered the index test blinded to, or at least prior to, the reference standard; used a reference standard that could accurately classify the target condition; interpreted the reference standard independently from the screening test; and administered the screening test and reference standard on the same day for all participants.

For all included studies, one reviewer extracted key elements into standardized abstraction forms in DistillerSR. A second reviewer checked the data for accuracy. For each study, we abstracted general characteristics of the study (e.g., author, year, study design), clinical and demographic characteristics of the sample and setting (e.g., age, race/ethnicity, baseline clinical characteristics, setting, country), analytic methods, and results.

For test accuracy studies (KQ2), we abstracted details of the reference standards and screening instruments. We abstracted the optimal cutoff for each screening test, either as defined by the author or selected by the reviewer as the best balance of sensitivity and specificity reported. The outcomes of interest were sensitivity and specificity, which we calculated based on provided contingency tables if they were not directly reported.

For intervention characteristics of KQ 4 and 5 trials, we abstracted detailed information about specific components: setting, mode of delivery (i.e., in-person, telephone, electronic, or print); therapeutic or intervention approach (e.g., cognitive behavioral therapy, motivational interviewing), duration, number, and length of sessions; providers and provider training; and adherence. We determined the intensity of the intervention based on the number and length of contacts and assigned one of the following designations: very brief (single contact, ≤5 minutes), brief (single contact, ≤15 minutes), extended (single contact, >15 minutes), brief multi-contact (multiple contacts, ≤15 minutes each), or extended multi-contact (multiple contacts, one or more of them >15 minutes).

Data Synthesis and Analysis

We created summary tables for all KQs showing study, population, and intervention characteristics (if applicable) and outcomes for qualitative evidence synthesis. If available, we abstracted and examined results reported in the following subgroups: race, ethnicity, sex, physical and intellectual disability, and socioeconomic status.

For studies on the accuracy of screening instruments (KQ2), we calculated confidence intervals (CIs) in Stata, version 18.0 (Stata Corp LP, College Station, TX), using data from contingency tables that included true positives, false positives, false negatives, and true negatives. If these data were not reported directly, we created contingency tables based on the total sample size, number of persons with the condition according to the reference standard, sensitivity, and specificity. No pooled analyses were performed due to the small number of studies that were available for each combination of study populations, screening tests, reported screening test cutoffs, and target conditions. We report a range of sensitivity and specificity across eligible studies to provide an overall description of findings. While many conditions were reported in our included studies, we focused our analysis on: (a) the full spectrum of unhealthy use; and (b) use disorder (*DSM-IV* abuse and dependence, or *DSM-5* use disorder). Data for other alcohol use patterns and conditions, including dependence only (*DSM-IV* dependence or *DSM-5* moderate/severe dependence) and exceeding limits, are in Appendix E.

For KQ4, we selected drinks per week as our primary outcome, both based on the methods of the previous review and because it was the most commonly reported outcome (as was the case for the previous review). We converted all related outcomes to drinks per week, such as when the included studies reported other time frames (e.g., drinks/month) or reported grams of ethanol rather than drinks. We used the conversion factor of 14 g of ethanol for one standard drink, since this is the definition of a standard drink in the United States.

We had sufficient data with acceptable comparability between studies to conduct meta-analysis among the trials of adults for the alcohol-use outcomes established as primary outcomes in the previous review: drinks per week, exceeding recommended limits, any heavy episodic drinking, and abstinence (for pregnant women). In addition to overall results, stratified analyses were conducted by population: general adult populations (age ~ ≥18 years), young adults (ages ~18 to 25 years), older adults (age ~≥65 years), pregnant women, and postpartum women. In addition, we pooled the following secondary alcohol use outcomes: heavy episodic drinking times per week, drinking days per week, drinks per drinking day, and score on an alcohol use severity scale such as the AUDIT. Few health outcomes were reported in enough trials to consider pooling; however, we were able to conduct a meta-analysis of alcohol problems or consequences.

We ran random-effects models using the restricted maximum likelihood estimate with the Knapp-Hartung adjustment for small numbers of trials, since some analyses included as few as two trials. When trials only reported results separately for subgroups (e.g., males and females), we included entries for both subgroups in the meta-analysis. For continuous outcomes we analyzed the between-group difference in change from baseline or, when combining different severity scale measures, a standardized mean difference that was based on between-group difference in change. We analyzed odds ratios for dichotomous outcomes. When multiple followup timepoints were available we chose the 12-month followup or the one closest to 12 months. When the study had multiple intervention groups, we selected that one that had the higher contact time or appeared to be the most comprehensive or congruent with the underlying theoretical model if contact time was comparable.

For the overall analyses we ran Egger's test to examine funnel plot asymmetry to explore small study effects, which can be related to publication bias. Additionally, for the analysis of drinks per week, which included 38 trials (with 41 separate entries) and had considerable statistical heterogeneity (I^2=62%), we conducted stratified analyses to explore factors that were associated with effect size for the following variables: population (general adults, younger adults, older adults, pregnant, postpartum), intervention intensity (very brief [5 minutes or less] single session, brief [6-15 minutes] single session, extended [>15 minutes] single session, brief multiple sessions, extended multiple sessions), single versus multiple sessions, whether or not the intervention involved direct contact (in person or over the phone), whether or not the intervention was entirely digitally delivered (e.g., web- or computer-based interventions, automated text messages), whether or not it was conducted in the United States, whether or not it was conducted in a primary care setting, whether or not the primary care team was involved in the intervention, whether or not the study was conducted in a low-income population or setting, baseline alcohol use (drinks per week categories: 0-7, >7-14, >14-21, >21-28, >28), risk of bias (good vs. fair quality according to USPSTF standards), and publication date (tertiles: 1987-2008, 2009-2014, 2015 to present). In addition, for the two largest population groups, general adult populations and young adults, we conducted stratified analyses of intervention intensity, single versus multiple session, entirely technology-based, direct human contact, and publication date as described above. We used Stata version 18.0 for all analyses.

Grading the Strength of the Body of Evidence

We graded the strength of the overall body of evidence for each KQ. We adapted the Evidence-based Practice Center (EPC) approach, which is based on a system developed by the Grading of Recommendations Assessment, Development and Evaluation (GRADE) Working Group.[102] Our method explicitly addresses four of the five EPC-required domains: consistency (similarity of effect direction and size), precision (degree of certainty around an estimate), reporting bias (potential for bias related to publication, selective outcome reporting, or selective analysis reporting), and study quality (i.e., study limitations). We did not address the fifth required domain—directness—as it is implied in the structure of the KQs (i.e., pertains to whether the evidence links the interventions directly to a health outcome).

Consistency was rated as consistent, inconsistent, or not applicable (e.g., single study). Precision was rated as precise, imprecise, or not applicable (e.g., no evidence). The body-of-evidence limitations reflect potential reporting bias, study quality, and other important restrictions in answering the overall KQ (e.g., lack of replication of interventions, nonreporting of outcomes important to patients).

We graded the overall strength of evidence as high, moderate, or low. "High" indicates high confidence that the evidence reflects the true effect, and that further research is very unlikely to change our confidence in the estimate of effects. "Moderate" indicates moderate confidence that the evidence reflects the true effect, and that further research may change our confidence in the estimate of effect and may change the estimate. "Low" indicates low confidence that the evidence reflects the true effect, and that further research is likely to change our confidence in the estimate of effect and is likely to change the estimate. A grade of "insufficient" indicates that

evidence is either unavailable or does not permit estimation of an effect. We developed our overall strength-of-evidence grade based on consensus discussion involving all reviewers.

Terminology

For consistency, in this report we use the following default terminology for race and ethnicity:

1. Black and White (in capitals) as descriptors for populations rather than nouns
2. Black persons as opposed to African Americans
3. Hispanic/Latino persons as opposed to Hispanic, Latine, or Latinx persons

In addition, given that recommendations for maximum alcohol consumption differ for men and women, we describe recommended cut-offs and related material by sex.

Contextual Questions

In addition to the systematically reviewed KQs, we also addressed two contextual questions (CQs) to aid with the broader interpretation of the evidence. CQs are important considerations that may not be readily answerable from the KQ evidence or RCT literature. The following CQs were prespecified in our Research Plan:

1. What is the association between reduced alcohol use and health outcomes?
2. What are the barriers and facilitators to access to interventions, and do they vary among different racial and ethnic groups or by socioeconomic status, geography, age, and other sociocultural variables?

These CQs were not systematically reviewed. Evidence for the CQs was identified based on literature retrieved for the systematic search for KQs as well as targeted searches and scanning bibliographies of relevant articles. A best evidence approach was used to identify the most recent, applicable, and robust evidence. CQ1 is addressed in the Discussion and **Appendix F**, and CQ2 is addressed in the Discussion and **Appendix G**.

Expert Review and Public Comment

The draft Research Plan was posted from February 1, 2024, to February 28, 2024. In response to public comment, we added an additional contextual question to examine the barriers to and facilitators of screening and treatment for selected populations such as those defined by age, race, ethnicity, socioeconomic status, and geography. We also added some additional outcomes, some additional social determinants of health to note if included in interventions, added additional populations of interest for seeking study-reported subgroup analyses, and clarified wording in several sections, including noting that we plan to include studies that recruit from schools and universities if the intervention is online or in a community or university-wide setting, but we will exclude classroom-based studies and those that target the school environment.

A draft version of this report was reviewed by five invited experts and three USPSTF federal partners. Experts were selected based on their expertise in fundamental methodologic and content aspects of the review and were selected to obtain diverse informed perspectives. Reviewer comments were presented to the USPSTF during its deliberations and subsequently addressed in revisions of this report. All expert comments were considered, and the report was updated to improve clarity, ensure accuracy, and address scientifically relevant concerns.

In addition, the draft evidence report was posted on the USPSTF website for public comment from <DATE>, through <DATE>. In response to comments received, [final version of report will include summary of changes made in response to public comments.].

USPSTF and AHRQ Involvement

We worked with USPSTF liaisons at key points throughout the review process to develop and refine the analytic framework and key questions and to resolve issues around scope for the final evidence synthesis. The USPSTF members approved the final Analytic Framework, KQs, and inclusion and exclusion criteria after revisions reflecting the public comment period.

AHRQ staff provided oversight for the project, coordinated systematic review, reviewed the draft report, and assisted in an external review of the draft evidence synthesis.

Chapter 3. Results

Description of Included Studies

We reviewed 8893 abstracts and 409 full-text articles for all KQs (**Appendix A, Figure 1**), and included 100 studies, reported in 148 publications. The list of included studies and excluded studies (with reasons for exclusion) are available in **Appendix C** and **Appendix D**, respectively.

KQ1. Does primary care screening for unhealthy alcohol use in adolescents and adults (a) reduce alcohol use or improve other risky behaviors; or (b) reduce morbidity or mortality or improve other health, social, or legal outcomes?

Summary of Results

One Australian trial (n=3849) compared alcohol use in late pregnancy both before and after clinics had implemented screening for alcohol use at the initial prenatal appointment. Screening was followed by referral as needed based on the screening results (**Table 3**, **Table 4**).[103] There were no statistically significant differences between pre-implementation and post-implementation on any outcome, including alcohol abstinence, heavy episodic drinking, and risk of alcohol-exposed pregnancy (**Table 5**). This study was not included in the previous review.

Detailed Results

One trial (n=3849) was included for KQ1 (**Table 3**, **Table 4**).[103] This was a stepped-wedge randomized trial conducted in Australia that randomized the order in which a practice change intervention was implemented in study clinics. We rated this study as fair quality, primarily due to attrition of more than 20 percent. The intervention involved screening all pregnant women for alcohol consumption with the AUDIT-C at their initial prenatal appointment. Those with low risk (score 0-2) were given brief advice, those with medium risk (score 3-4) were given brief advice and a referral to telephone coaching service, and those at high risk (score ≥5) were provided brief advice and a referral to drug and alcohol clinical services. Aboriginal women screening as high risk were offered the option of using an Aboriginal-focused drug and alcohol service. Implementation strategies included: (1) leadership/managerial supervision, (2) local clinical practice guidelines, (3) electronic prompt and reminder system (4) local opinion leaders/champions, (5) educational meetings and educational materials (6) academic detailing, including audit and feedback, (7) Monitoring and accountability for the performance of the delivery of healthcare. The study enrolled patients aged 18 years or older attending a 28- or 36-week prenatal appointment. Alcohol use at this appointment was compared between clinics that had or had not implemented the intervention. This study was newly published since the previous review.

This study found no statistically significant differences between groups on any of the reported outcomes (**Table 5**). Power to detect group differences was limited by the very low rates of

alcohol use in this study. Abstinence was high in both groups (89.7% in the pre-implementation group vs. 90.7% in the post-implementation group; OR, 1.13 [95% CI, 0.90 to 1.41]). Heavy episodic drinking (HED) was extremely rare in both groups with only a total of 8 individuals reporting HED (0.2% in each group; OR, 0.86 [95% CI, 0.20 to 3.60]). Only 11 individuals were considered at high risk of an alcohol-exposed pregnancy (0.5% pre-implementation vs. 0.2% post-implementation; OR, 0.43 [95% CI, 0.13 to 1.41]). No health, intermediate, or other behavioral outcomes were reported. They also did not report on the degree to which those in the intervention clinics received additional care or referrals based on their screening results.

KQ2. What is the accuracy of selected commonly used instruments to screen for unhealthy alcohol use in adolescents and adults?

Summary of Results

We identified 13 studies reporting the accuracy of 12 screening instruments in identifying unhealthy alcohol use in adolescents.[104-116] Most of these studies were conducted in the United States in primary care populations or populations generalizable to primary care and are very applicable to U.S. practice. The accuracy of the AUDIT in detecting alcohol use disorder in adolescents was reported in three studies.[108, 110, 114] The sensitivity was low at the standard cutoff (>=8), however, a lower cutoff yielded higher sensitivity, and this lower cutoff may be more appropriate for adolescent populations. A variety of brief screeners (1-2 questions) asking about frequency or quantity of alcohol use were also examined. While most of these brief screeners were not examined in more than two to three studies, many of them asked similar questions about alcohol use frequency and most had comparable accuracy in identifying alcohol use disorder. Few studies reported the accuracy of any screeners in identifying the full spectrum of unhealthy use. For adolescents, identifying any alcohol use—or at minimum the full spectrum of unhealthy use—may be more important than identifying alcohol use disorder, which is relatively uncommon among adolescents in the United States. Prevalence of alcohol use disorders and unhealthy alcohol use varied widely between studies and may suggest patient spectrum bias for some studies.

Some studies, including the largest study included (n=166,165),[116] reported the accuracy in identifying non-standard alcohol use conditions (e.g., any past year symptom of DSM-IV alcohol abuse or dependence). These non-standard conditions made these studies difficult to interpret alongside the studies reporting the standard conditions (e.g., alcohol use disorder), but supported the body of evidence in that they were still able to accurately identify a lower severity of alcohol use in adolescents.

While this review was also scoped to assess the accuracy of the USAUDIT and USAUDIT-C in identifying unhealthy alcohol use in any population, we only identified two studies examining these screeners.[117, 118] These studies were both conducted among college students in the United States with a very high prevalence of alcohol use disorder and binge use episodes. The accuracy of the USAUDIT and USAUDIT-C were similar to the performance of the AUDIT and AUDIT-

C previously examined in earlier systematic reviews conducted for the USPSTF, although the optimal cutoff varied between the two studies and these findings are not broadly applicable to a general adult population in the US.

Detailed Results

Study and Participant Characteristics

Fifteen studies (6 newly identified since the previous review) examining the accuracy of alcohol screening instruments were included; two studies recruited young adults attending college and 13 studies recruited adolescents from the community, schools, primary care, or specialty care[104-118] (**Table 6**). Six of the included studies were rated as good quality. No studies in a general adult population meeting our criteria for screening instruments (USAUDIT or USAUDIT-C) were identified. The majority of studies took place in the United States (11 of 15 studies).[105, 106, 108, 111-118] The sample size ranged from 95 to 166,165 participants. However, all but one study recruited fewer than 1600 participants, and the largest study (n=166,165)[116] used the unconventional outcomes of any past-year AUD symptom and past-year alcohol dependence as the reference conditions rather than the more typically used unhealthy alcohol use or AUD. When reported (k=10), the mean age for the adolescent studies ranged from 15 to 16 years and the young adult studies both reported a mean age of 20 years. The proportion of female participants ranged from 35 to 79 percent. The 11 U.S.-based studies were the only studies to report the race/ethnicity of participants;[105, 106, 108, 111-118] five of these studies enrolled a majority of White participants (62 to 93 percent). The other six studies reporting race/ethnicity recruited 9 to 93 percent Black/AA, 6 to 51 percent Hispanic/Latino, 6 to 19 percent Asian/PI, and 1 to 48 percent other or mixed race/ethnicity participants. Only one study[111] recruited participants reporting their race as Indigenous American ("Native American"), at 4.4 percent.

The 13 studies[104-116] recruiting adolescents reported the test performance of a variety of screening instruments (**Table 7**). Three brief screening instruments asked about the frequency of past year use of tobacco/nicotine, cannabis, and other drugs in addition to alcohol: BSTAD (k=2),[106, 115] S2BI (k=2),[105, 106] and TAPS (k=1).[106] The TAPS additionally asks followup questions about problems ("has anyone expressed concern about your drinking" and "have you tried and failed to control, cut down or stop drinking") if the initial screening question is positive. Several studies also reported the test performance of similar use questions asking about quantity (k=2),[111, 116] frequency (k=3),[111, 113, 116] heavy use episodes (k=2),[104, 116] or a combination of quantity and frequency (k=1).[111] The NIAAA Youth Screen[108, 112] (k=2) asked about personal and friends' alcohol use. In addition to the brief screeners, six studies in adolescents reported the accuracy of the AUDIT,[104, 107-110, 114] three reported on the AUDIT-C,[104, 107, 110] and one on a revised version of the AUDIT-C with an adjusted definition of binge drinking (AUDIT-CR).[104] The two studies conducted among young adults attending college reported the test performance of both the USAUDIT and the USAUDIT-C.[117, 118]

Ten studies[105-110, 112-115] used structured or semi-structured diagnostic interviews to determine a diagnosis of alcohol use disorder (including DSM-5 use disorder and DSM-IV abuse or dependence) (**Appendix E, Table 2**). These included the Composite International Diagnostic Interview (CIDI), Adolescent Diagnostic Interview (ADI), Diagnostic Interview Schedule for

Children (DISC), and the Schedule for Affective Disorders and Schizophrenia for School-Aged Children Present and Lifetime (SADS-PL) interview. Four studies[111, 116-118] asked participants to self-report symptoms based on DSM criteria in order to determine if participants had a potential alcohol use disorder. One study used a self-reported alcohol use diary to determine if adolescents were consuming alcohol at heavy or binge drinking levels. In addition to a diagnostic interview to diagnose alcohol use disorder, one study[113] used the Timeline Followback Method to identify any alcohol use.

The prevalence of alcohol use conditions relevant to this review varied among included studies, likely a reflection of the recruited population and setting. For adolescents, the proportion of participants with the full spectrum of unhealthy use ranged from 24 to 31 percent (k=2),[107, 110] and the proportion of participants with alcohol use disorder ranged from 1 to 6 percent in eight studies.[105, 106, 108, 111-115] One additional study[110] reported a much higher proportion of adolescents with alcohol use disorder (20%, based on the CIDI) than the other included studies; this study recruited students from schools in Germany and while the proportion of adolescents with DSM-IV alcohol abuse in the study was higher than the national average in Germany, the proportion of those with dependence was lower. The proportion of participants exceeding recommended limits (including heavy use, hazardous use, or binge drinking) ranged from 14 to 36 percent (k=4).[104, 108-110] For young adults, one study[117] reported the proportion of participants with at least 4 binge drinking episodes (i.e., heavy episodic drinking) per week at 37 percent. The proportion of young adults with alcohol use disorder was high in both young adult studies,[117, 118] ranging from 35 to 50 percent (k=2). Both of these studies used self-reported checklists of DSM-5 criteria to determine if a college student had an alcohol use disorder and were not conducted among random samples. One study[117] recruited from a recreational facility at a private Southeastern university and the other[118] recruited participants through a psychology participant pool and through direct or listserv emails at a public university in the Southern region of the US. It is possible that the self-reported symptoms resulted in a higher proportion of those with alcohol use disorder versus an interviewer-administered structured interview or that the recruitment methods resulted in participants with higher alcohol use than the general pool of college students.

A large proportion of the studies were determined to be at low risk of bias (6/15 studies, 40%).[106, 108, 111, 113, 114, 116] Among the studies that were rated as moderate risk of bias (9/15 studies, 60%),[104, 105, 107, 109, 110, 112, 115, 117, 118] the most common reasons for increased risk of bias included: not reporting whether participant recruitment was random or consecutive; not reporting enough information regarding the order and timing of the reference standard and screening test; not presenting a range of cutoff values or using an *a priori* threshold for the screener; not clearly reporting on whether the researchers had knowledge of the index test results during the administration and interpretation of the reference standard; or using a reference standard not based on a structured or semi-structured interview (e.g., self-report checklist based on DSM-5 criteria).

Adolescents

Detection of Full Spectrum of Unhealthy Alcohol Use

AUDIT

Two studies[107, 110] (n=820) recruiting adolescents reported the accuracy of the AUDIT in detecting the full spectrum of unhealthy alcohol use (**Appendix E, Figure 1**). At the author-identified optimal cutoff (≥5 in one study and ≥6 in the other), the sensitivity ranged from 0.79 (95% CI, 0.66 to 0.87) to 0.93 (95% CI, 0.89 to 0.96) and specificity ranged from 0.77 (95% CI, 0.73 to 0.81) to 0.79 (95% CI, 0.73 to 0.85). The study by Liskola and colleagues[107] was conducted in Finland and recruited psychiatric outpatients in addition to participants recruited from schools; this study reported a higher prevalence of unhealthy alcohol use compared to the study[110] conducted in Germany and recruiting from schools (31% v. 24%).

AUDIT-C

The same two studies[107, 110] (n=820) in adolescents also reported the accuracy of the AUDIT-C in detecting the full spectrum of unhealthy alcohol use (**Appendix E, Figure 1**). At the author-identified optimal cutoff (≥3 in one study and ≥5 in the other) sensitivity ranged from 0.73 (95% CI, 0.60 to 0.83) to 0.95 (95% CI, 0.91 to 0.97) and specificity ranged from 0.66 (95% CI, 0.62 to 0.71) to 0.81 (95% CI, 0.74 to 0.86). As with the AUDIT, when examining the same cutoff, the study by Liskola and colleagues[107] reported higher sensitivity and specificity than the study by Rumpf and colleagues.

Other Screening Instruments

No other screening instruments were studied for their accuracy to detect the full spectrum of unhealthy use in adolescents.

Variation by Sex

One study[107] reported the accuracy of the AUDIT and AUDIT-C in identifying the full spectrum of unhealthy alcohol stratified by sex (n=488 female, n=133 male). For the AUDIT at each cutoff, the sensitivity was slightly higher and specificity was slightly lower for females when compared to males **(Appendix E, Table 3).** While the AUC for the AUDIT was higher for females versus males, this difference was not statistically significant (0.938 [95% CI, 0.913 to 0.958] for females and 0.918 [95% CI, 0.855 to 0.959] for males). There was less variation seen with the AUDIT-C by sex, although at certain cutoffs it appeared to have lower sensitivity in detecting the full spectrum of unhealthy use for females. However, the AUCS for the AUDIT-C were similar for males and females and not statistically significantly different (0.912 [95% CI, 0.883 to 0.936] for females versus 0.915 [95% CI, 0.852 to 0.957] for males).

Detection of Alcohol Use Disorder

AUDIT

Three studies[108, 110, 114] (n=2,332) reported the accuracy of the AUDIT to detect alcohol use disorder among adolescents (**Figure 2**). The prevalence of alcohol use disorder in the three studies ranged from 4 to 20 percent. The optimal cutoff identified by two studies varied (≥3 and ≥6) and only one cutoff was reported in the third study (≥8, standard cutoff for the AUDIT). At the two author-reported optimal cutoffs, sensitivity of the AUDIT ranged from 0.84 (95% CI, 0.71 to 0.92) to 0.88 (95% CI, 0.76 to 0.97) and specificity was 0.77 for both (95% CIs, 0.71 to 0.83 and 0.73 to 0.80). All studies reported the standard cutoff of >=8; at this cutoff, sensitivity ranged from 0.54 (95% CI, 0.38 to 0.69) to 0.71 (95% CI, 0.57 to 0.82) and specificity ranged from 0.84 (95% CI, 0.78 to 0.89) to 0.97 (95% CI, 0.95 to 0.98).

AUDIT-C

Only one study[110] (n=225) reported the accuracy of the AUDIT-C to detect alcohol use disorder among adolescents (**Figure 2**). The proportion of adolescents with AUD was 20 percent in this study. At a cutoff of ≥5, the reported sensitivity was 0.76 (95% CI, 0.61 to 0.86) and specificity was 0.78 (95% CI, 0.71 to 0.83).

Frequency Instruments

Four studies asked adolescents to report the frequency of their alcohol use, embedded in screening tools that also screened for other substance use (tobacco, cannabis, other drugs). Three studies[105, 106, 115] (n=1,821) used named instruments, including the BSTAD, S2BI, and TAPS. The fourth study[113] (n=136) did not report a named instrument, but the screener was structured similarly to the other frequency screeners. All four studies recruited adolescents from primary care, although one[106] additionally recruited adolescents from an outpatient substance use treatment program. The prevalence of alcohol use disorder was low, ranging from 2 to 5 percent.

For the unnamed frequency screener, three cutoffs were reported (monthly use, use every 3 months, or use once in 12 months) and all reported the same sensitivity at 1.0 (95% CI, 0.51 to 1.0) but specificity ranged from 0.88 (95% CI, 0.81 to 0.93) to 0.95 (95% CI, 0.89 to 0.97). When the screening was clinician-administered, the sensitivity of monthly alcohol use decreased to 0.75 (95% CI, 0.23 to 0.97).

For the BSTAD (reported in 2 studies) at a cutoff of ≥2 days in the past year, sensitivity ranged from 0.96 (95% CI, 0.83 to 1.0) to 1.00 (95% CI, 0.48 to 1.0) and specificity ranged from 0.85 (95% CI, 0.82 to 0.88) to 0.88 (95% CI, 0.84 to 0.92). The TAPS (1 study) had a sensitivity of 0.78 (95% CI, 0.40 to 0.97) and a specificity of 0.93 (95% CI, 0.90 to 0.96) at a cutoff of ≥2 days in the past year. The poorest performance was seen with the S2BI, with sensitivity ranging from 0.50 (95% CI, 0.07 to 0.93) to 0.53 (95% CI, 0.30 to 0.75) and specificity 0.94 (95% CI, 0.92 to 0.96) to 0.95 (95% CI, 0.92 to 0.97) at a cutoff of ≥monthly use in the past year (among the options: never, once or twice, monthly, weekly or more). These studies did not report on the accuracy of the S2BI at lower cut-off levels. In one publication,[105] the authors noted that only adolescents with mild alcohol use disorder were not identified by the screener, while those with moderate to severe use disorder were correctly identified. They suggested that adolescents are more likely than adults to endorse criteria for alcohol use disorder with fewer days of alcohol use. Nevertheless, the cutoff of monthly use was also reported in an earlier study[113] with adequate sensitivity.

NIAAA Youth Alcohol Screen

Two studies (n=1,961) reported the accuracy of the NIAAA Youth Alcohol Screen to identify alcohol use disorder among adolescents (**Figure 2**). The NIAAA Youth Alcohol Screen asks adolescents about their personal use as well as friends' use of alcohol, and scoring varies based on the respondent's age. The prevalence of alcohol use disorder was low in the included studies, ranging from 2 to 4 percent. The sensitivity ranged from 0.87 (95% CI, 0.76 to 0.94) to 1.0 (95% CI, 0.68 to 1.00) and specificity from 0.84 (95% CI, 0.82 to 0.86) to 0.94 (95% CI, 0.92 to 0.97).

Variation by Age
One study[111] (n=1,193) asking questions related to the quantity and frequency of past year alcohol use reported accuracy to detect alcohol use disorder for early (12-14 years), mid (15-17 years), and late (18-20 years) adolescence (**Appendix E, Table 3**). For those in early- and mid-adolescence, a cutoff of 3 or more days of alcohol use in the past year had similar accuracy to detect alcohol use disorder (sensitivity 0.89 and 0.91, specificity 0.95 and 0.89). Similarly, the same optimal cutoff was reported for both age groups for questions related to quantity (2 or more drinks) and using quantity and frequency together (3 or more drinks). However, optimal cutoffs to identify AUD were higher for those in late adolescence (≥12 drinks per year versus ≥3 drinks per year, 12 days per year versus 3 days per year).

Detection of Heavy Episodic Drinking

AUDIT
Four studies[104, 108-110] (n=2,795) using the AUDIT reported detection of heavy episodic drinking in adolescents (**Appendix E, Figure 2; Appendix E, Table 3).** The prevalence of heavy episodic drinking ranged from 15 to 36 percent. While studies generally reported acceptable sensitivity, specificity was often low and the optimal cutoffs were not consistent among studies. At the standard AUDIT cutoff of ≥8, three studies reported sensitivity ranging from 0.33 (95% CI, 0.28 to 0.39) to 0.86 (95% CI, 0.82 to 0.89) and specificity ranging from 0.46 (95% CI, 0.41 to 0.49) to 0.99 (95% CI, 0.98 to 0.99). One small study[109] (n=95) reported only a single cutoff of ≥3 with a sensitivity of 0.96 (95% CI, 0.78 to 1.00) and specificity of 0.63 (95% CI, 0.48 to 0.76).

AUDIT-C
Two studies[104, 110] reported the accuracy of the AUDIT-C to detect heavy episodic drinking among adolescents (n=1,131) (**Appendix E, Figure 2; Appendix E, Table 3**). One study reported the optimal cutoff as ≥5 and reported a sensitivity of 0.85 (95% CI, 0.69 to 0.93) and specificity of 0.77 (95% CI, 0.71 to 0.82). The optimal cutoff was not reported in the study by Cortes-Tomas and colleagues, but a cutoff of ≥8 had the best balance of sensitivity (0.78 [95% CI, 0.73 to 0.82]) and specificity (0.67 [95% CI, 0.63 to 0.71]).

The study by Cortes-Tomas and colleagues[104] (n=906) additionally reported the accuracy of the AUDIT-C to detect heavy episodic drinking, but with the third question revised to reflect standard drinking units in Spain and limiting the period to 6 months (AUDIT-CR). The sensitivity was similar between the AUDIT-C and AUDIT-CR at each cutoff, but the specificity was improved with the AUDIT-CR (**Appendix E, Table 3**).

Heavy Episodic Drinking Instruments
One study[104] reported the accuracy of two screening questions asking only about heavy episodic drinking (**Appendix E, Figure 2; Appendix E, Table 3**). This study used the third question from the AUDIT and asked how often the participant had consumed 6+ drinks on one occasion. This study also revised the third question to assess how often in the past 6 months participants had 7/6+ (males/female) drinks in 2 hours. At a cutoff of ≥2 (≥ monthly), sensitivity ranged from 0.70 (95% CI, 0.65 to 0.75) to 0.78 (95% CI, 0.73 to 0.82) and specificity ranged from 0.61 (95% CI, 0.57 to 0.65) to 0.85 (95% CI, 0.82 to 0.88).

NIAAA Youth Alcohol Screen
One study (n=1,573)[108] reported the detection of heavy episodic drinking among adolescents using the NIAAA Youth Alcohol Screen (**Appendix E, Figure 2**); sensitivity was 0.56 (95% CI, 0.51 to 0.61) and specificity was 0.92 (95% CI, 0.90 to 0.93).

Young Adults

Detection of Full Spectrum of Unhealthy Alcohol Use

No studies reported the detection of the full spectrum of unhealthy alcohol use in young adults.

Detection of Alcohol Use Disorder

USAUDIT
Two studies[117, 118] (n=632) conducted among young adults attending college reported the accuracy of the USAUDIT in identifying likely alcohol use disorder (**Appendix E, Figure 3; Appendix E, Table 4**). The prevalence of likely alcohol use disorder was high among the recruited participants, ranging from 40 to 50 percent. The author-reported optimal cutoff varied, with one study reporting an optimal cutoff of ≥8 and the other reporting an optimal cutoff of ≥13. At these cutoffs, sensitivity to detect likely alcohol use disorder ranged from 0.61 (95% CI, 0.52 to 0.69) to 0.72 (95% CI, 0.64 to 0.78) and specificity ranged from 0.80 (95% CI, 0.74 to 0.84) to 0.86 (95% CI, 0.78 to 0.91). The study[117] reporting the low sensitivity (0.61) at the optimal cutoff of ≥13 reported higher sensitivity with lower cutoffs, although this came at the expense of decreasing specificity.

USAUDIT-C
The same two studies[117, 118] (n=632) reported the accuracy of the USAUDIT-C to detect likely alcohol use disorder (**Appendix E, Figure 3; Appendix E, Table 4**). Both studies reported ≥7 as the optimal cutoff, with sensitivity ranging from 0.61 (95% CI, 0.53 to 0.69) to 0.79 (95% CI, 0.71 to 0.85) and specificity ranging from 0.57 (95% CI, 0.48 to 0.65) to 0.79 (95% CI, 0.73 to 0.83).

Variation by Sex
The same two studies[117, 118] examining detection of likely alcohol use disorder among college students reported the detection stratified by sex (n=351 females, n=279 males). Both studies reported the same optimal cutoff for the USAUDIT for females (≥8) and a higher optimal cutoff for males (≥12 and ≥13). For the USAUDIT-C, the optimal cutoff varied between studies with ≥5 and ≥7 reported for females and ≥6 and ≥10 reported for males.

Detection of Heavy Episodic Drinking

USAUDIT
One study[117] (n=250) reported the detection of at-risk alcohol use in young adults attending college using the USAUDIT. Thirty-seven percent of young adults in this study reported heavy episodic drinking (4 instances in a week of consuming 4 or more drinks). At a cutoff of ≥6, the

author-reported optimal cutoff, the sensitivity was 0.88 (95% CI, 0.80 to 0.93) and specificity was 0.91 (95% CI, 0.86 to 0.95) (**Appendix E, Figure 4; Appendix E, Table 4**).

USAUDIT-C
The same study[117] (n=250) reported the accuracy of the AUDIT-C in identifying heavy episodic drinking among young adults. At the author-determined optimal cutoff of ≥4, the sensitivity was 0.93 (95% CI, 0.86 to 0.97) and the specificity was 0.89 (95% CI, 0.83 to 0.93) (**Appendix E, Figure 4; Appendix E, Table 4**).

Variation by Sex
This same study[117] reported the detection of heavy episodic drinking among college students stratified by sex (n=88 females, n=162 males). At-risk alcohol use was more prevalent among males at 43 percent versus females at 25 percent. For the USAUDIT-C, the same optimal cutoff was identified for males and females (≥4). For the USAUDIT, a lower optimal cutoff for males was reported to detect at-risk alcohol use (≥5 versus ≥6 for females).

KQ3. What are the harms of screening for unhealthy alcohol use in adolescents and adults?

Results

No studies reported on the harms of alcohol screening. The one trial included for KQ1, which reported alcohol use outcomes, found no pattern of findings that suggested a harmful effect of screening on alcohol use. Aside from the included evidence, hypothesized concerns may include stigma, discrimination, privacy concerns, negative impact on the patient-provider relationship, and risk of legal action for "child abuse" among pregnant women in some states, however we found no evidence examining any of these potential harms.

KQ4. Do counseling interventions to reduce unhealthy alcohol use (a) reduce alcohol use or improve other risky behaviors in screen-detected individuals; or (b) reduce morbidity or mortality or improve other health, social, or legal outcomes in screen-detected individuals?

Summary of Results

In five RCTs of adolescents (N=2,964), every trial reported a different alcohol use outcome, with variable results.[119-123] Four of these trials were conducted in U.S. primary care settings among youth aged 12 or 14 through 18.[119, 121-123] One of these was the largest included trial among adolescents, and examined the benefit of screening, brief intervention, and referral to treatment (SBIRT) in pediatric practices in a large, integrated health system in the US.[123] This trial did not directly measure alcohol use, but found fewer alcohol-related diagnoses in the electronic medical record after 7 years among youth who had screened positive for alcohol or drug use or depression symptoms (N=1871) in practices that implemented routine SBIRT (OR, 0.69 [95% CI, 0.51 to 0.94], p=0.017; 4.8% in the IG vs. 7.8% in the CG). The remaining three U.S.-based

trials did not demonstrate a statistically significant benefit, although findings generally trended in the direction of benefit.[119, 121, 122] The interventions for all of the U.S.-based trials included content that covered both alcohol and drug use, and the largest study additionally included mood symptoms, if it was relevant for the individual patient. It is uncertain whether the effects would be the same if they had focused only on alcohol use. The final trial found that a digitally delivered intervention among Swiss 16- to 19-years olds (of legal age to purchase beer and wine) reduced alcohol use among high-risk, but not medium-risk, high school students.[120] Other outcomes such as consequences of alcohol use were rarely reported across all five trials.

Seventy-nine RCTs (N=40,486) were included that tested interventions to reduce unhealthy alcohol use in adult populations.[124-202] Forty-seven (59%) of the trials among adults were conducted in the United States and 35 (44%) were conducted in primary care settings. The 79 trials included 110 intervention groups. Sixty-four intervention arms (58%) included only one session, and 46 of these involved an estimated 15 minutes or less of contact time. Digital delivery was the most common delivery method in trials among young adults (26/45 [64%]) and in-person delivery was most common among all other adult populations. Pooled analysis indicated that participants in the intervention groups reduced alcohol consumption by an average of 1.6 drinks per week more than those in the control groups (mean difference [MD], -1.6 [95% CI, -2.2 to -1.0]; 38 studies [41 groups analyzed], n=17,816; I^2=62%). Among these studies, the median reduction in drinks per week was 3.6 drinks among the intervention groups and 2.3 drinks among the control groups. The effect size was smallest, but still statistically significant, in studies among young adults (MD, -0.9 [95% CI, -1.3 to -0.5]; 16 studies, n=7,477; I^2=0%, p=0.05 for difference across populations). Interventions to reduce unhealthy alcohol use were also associated with a 35 percent reduction in the odds of exceeding recommended drinking limits and a 26 percent reduction in the odds of any heavy episodic drinking in the followup period (exceeding limits: OR, 0.65 [95% CI, 0.55 to 0.76], 17 trials [19 groups included in the analysis], N=10,163; I^2=57%; any heavy episodic drinking: OR, 0.74 [95% CI, 0.64 to 0.85], 16 trials [18 groups included in the analysis], N=10,130; I^2=40%). A number of other alcohol use outcomes also showed benefits, but typically with small effect sizes.

Consequences of alcohol use were reported by 23 studies, but the pooled effects were very small and statistically significant only when limited to young adults (standardized mean difference [SMD], -0.07 [95% CI, -0.13 to -0.01] 14 RCTs, N=6,305, I^2=0%, among young adults).[138, 143, 159, 160, 162, 163, 165, 167, 170, 171, 174-184, 186, 191] This typically equated to a difference between groups of less than 1 point in change from baseline, on 23- to 100-point scales. Three of five trials reporting ED visits found fewer ED visits among intervention participants over 1 to 4 years,[140, 145, 188] but two other trials reported no statistically significant differences between groups at 6-month followup.[148, 159] Other health, social, and legal outcomes were very sparsely reported, and few between-group differences were statistically significant.

Detailed Results

Eighty-four trials (n=43,450) addressing the benefits of interventions to reduce unhealthy alcohol use were included for KQ4, five that were limited to adolescents and 79 that were entirely or predominantly among adults (**Table 8**, **Table 9**, **Table 10**).

Adolescents

Study Characteristics

Five RCTs[119-123] (N=2,964) were limited to adolescents, with sample sizes ranging from 119[122] to 1,871[123] (**Table 11**, **Table 12**). Three of these trials were newly identified for this review.[119, 121, 123] The average age of participants was 16 to 17 years, and the percent that were girls ranged from 53 to 71 percent. Black and Latino/Hispanic populations were fairly well-represented in the studies conducted in the United States; the percent of participants who were Black ranged from 17 to 84 percent and the percent who were Latino/Hispanic ranged from 24 to 66 percent, where it was reported. One[120] study was rated as good quality and the remaining four were fair quality.

One trial was focused only on alcohol use,[120] and four additionally addressed cannabis or other drug use.[119, 121-123] One trial also recruited youth with depression symptoms regardless of alcohol or drug use.[123] Two trials included participants in their study regardless of alcohol use, but only data among the subset of participants with risky alcohol or drug use were included in this review.[120, 122]

Four trials were conducted in U.S. primary care settings and included a single, individual, in-person counseling session.[119, 121-123] All of these U.S.-based studies used motivational interviewing techniques, and two also described incorporating personalized normative feedback.[121, 122] These studies screened for alcohol use using the NIAAA Youth Screen,[119, 121] the CRAFFT,[122], and a series of 3 items asking about any past year alcohol, marijuana, or drug use (yes/no).[123] These trials included participants as young as 12 or 14 years through age 18.

The remaining trial recruited from high schools in Switzerland and was a tech-based intervention involving immediate personalized normative feedback followed by up to 97 text messages over 3 months.[120] This study used the combination of the Daily Drinking Questionnaire plus a single item assessing the frequency of HED episodes in the past 30 days to identify at-risk alcohol use. This study had a more limited age range of 16-19, and 16 is the minimum legal age to purchase beer and wine in most areas of Switzerland.

The largest trial (N=1,871) was a pragmatic cluster randomized trial of a screening, brief intervention, and referral to treatment (SBIRT) intervention in pediatric practices in a large, integrated health system in the United States.[123] Pediatricians were randomized into one of three conditions (15 in each group): pediatrician-delivered SBIRT, SBIRT delivered by an embedded mental health professional, and usual care. The study found similar results for the two active intervention groups and combined them when reporting the outcome of interest to our review. Patients aged 12 to 18 years with well-child visits were included in the study, and those who screened positive for alcohol or drug use in the past year (using yes/no item), or symptoms of depression were followed for up to 7 years. Outcomes were determined from the participants' electronic medical records. Because of the broad nature of this study's intervention, only alcohol-specific outcomes were included in this review, since depression or drug use interventions could have been the mechanism of improvement for other outcomes. However, we included alcohol-specific outcomes because we determined that changes in these outcomes would likely reflect the impact of the alcohol-focused interventions provided in the study.

Results

Alcohol-related outcomes

The results of these trials are shown in **Table 13** and **Table 14**. All trials showed some findings in the direction of benefit for alcohol-related outcomes, either overall or for one group in stratified analyses, however some results were not statistically significant, and some findings showed no benefit.

The largest trial found that the primary care-based SBIRT intervention resulted in fewer alcohol-related diagnoses in the medical record after 7 years, among youth who had screened positive for alcohol or drug use or depression symptoms (OR, 0.69 [95% CI, 0.51 to 0.94], p=0.017; 4.8% in the IG vs. 7.8% in the CG).[123] Alcohol-related diagnoses included alcohol use disorders (ICD-10 code F10) as well as alcoholic psychoses, alcohol dependence syndrome, and nondependent alcohol abuse codes (ICD-9 codes 291, 303, 305.0).

Another U.S. -based trial found a non-statistically significant reduction in peak number of drinks per day at 6-months followup (mean difference in mean change between groups [MD]: -0.87 [95% CI -1.82 to 0.08], p=0.21; -0.3 drinks/day in the IG vs 0.6 drinks/day in the CG).[119] The effect was smaller at 12 months (MD, -0.28 [95% CI, -1.25 to 0.69], p=0.70).

Another U.S.-based trial similarly found reductions in days to first alcohol use and days to first HED episode that were not statistically significant. The median (IQR) time to first alcohol use was 97 (51-222) days in the intervention group compared with 44 (21-143) days in the control group (HR, 0.69 [95% CI, 0.47 to 1.02], p-value not reported, HRs<1.0 indicate longer time to first use in the intervention group).[121] Findings were similar for time to first HED episode (Median [IQR] days, 366 [124-366] in the IG vs. 213 [51-366] in the CG, HR, 0.66 [95% CI, 0.40 to 1.10], p-value not reported).

The final U.S.-based trial found a nearly statistically significant reduction on a 7-point item measuring frequency of alcohol use for boys (MD, -0.6 [95% CI not reported], p=0.08), but no benefit for girls (MD, 0.4 [95% CI not reported], p=0.24).[122] This was based on only 35 boys, however, and boys represented a relatively small portion of the sample (35/119 [29%]). This study did not report overall results, presumably because the interaction term exploring the impact of sex on the treatment effect was significant, however this raised concerns about reporting bias.

The fifth trial, among Swiss 16 to 19-year-old high school students, found statistically significant improvements in the number of HED episodes/week and any HED episodes among participants who reported more than two HED episodes in the month before entering the study, but minimal impact on those with one or two HED episodes or more than 14/7 (male/female) drinks in a typical week.[120] This was the only trial with an intervention focused only on alcohol rather than on alcohol and drug use (or mood symptoms for one trial), and was the only trial in which participants were of legal age to purchase beer and wine.

Other outcomes

One of the U.S.-based trials found that participants in the intervention group experienced fewer alcohol-related consequences at the 12-month followup (p=0.03), although findings were not statistically significant at the 6-month followup (p=0.08, **Table 14**).[119] This scale (range, 0-20) included items for six consequences, but details were not provided other than one example, "doing something they regretted because of drinking." A separate U.S.-based trial found a statistically significant reduction in the likelihood of riding with an intoxicated driver at 12-month followup (OR, 0.29 [95% CI, 0.09 to 0.89], p-value not reported; 38.3% in the IG vs 68.4% in the CG), although findings were not statistically significant at earlier timepoints.[121] For studies with interventions that addressed other drug use or mood symptoms, we did not include drug and mood outcomes, since these outcomes may have been influenced by the drug and mood-related content of the interventions.

Adults

Study Characteristics

Seventy-nine RCTs (N=40,486) were included that tested interventions to reduce unhealthy alcohol use in adult populations (**Appendix E, Table 5**).[124-202] A wide range of populations were represented, with thirty-eight conducted among general adult populations,[124-161] twenty-six among young adults,[162-187] four among older adults,[188-191] two among postpartum women,[192, 193] and nine among pregnant women.[194-202] A summary of the study and population characteristics are in **Table 8** and **Table 9**, and a summary of the intervention characteristics are in **Table 10**. In addition, detailed tables including information on study, population and intervention characteristics for each trial are in **Appendix E, Tables 6 and 7**. Fourteen studies[125-127, 131, 134, 135, 145, 148, 149, 160, 164, 169, 183, 185] were not included in the previous review on this topic for the USPSTF[82] and the remaining sixty-five were included in the previous review. One trial included in the previous review was excluded from the current review because it was limited to a narrow population (homeless women) inconsistent with the other included studies.[203]

Forty-seven (59%) of the trials among adults were conducted in the United States and 35 (44%) were conducted in primary care settings. Other settings included OB-GYN or reproductive health clinics, other medical settings (e.g., STI, HIV, or sexual health clinics; in hospital immediately postpartum; dental clinics, health care clinic or system with multiple specialties), college or university, online, and community-based recruitment. Eleven trials were rated as good quality (reflecting low risk of bias),[131, 134, 135, 140, 153, 162, 170, 186-188, 191] and the mean study retention was 81 percent at the followup closest to 12 months.

The average age across all trials among adults was 34.2 years, and 48% of all participants in the included trials were women. Fifteen trials focused on low-income populations or settings.[125, 129, 131, 134, 145, 148, 154, 161, 193, 196-201] The trials' samples were predominantly White; among studies conducted in the United States, 71 percent of participants were White, 15 percent were Black, 14 percent where Hispanic/Latino, 10 percent were Asian or Asian-American, and only 2 percent were Indigenous American. Other race and ethnic groups were rarely reported and constituted only a very small proportion or participants when reported.

All but four trials were focused primarily on reducing alcohol consumption. Of these four, one trial addressed both alcohol and cannabis use,[185] two addressed alcohol and other drug use,[148, 159] and the fourth trial addressed both alcohol consumption and co-occurring mental health symptoms.[125] Participants were most commonly selected into the trials based on exceeding a screener cut-off (e.g., AUDIT>=8, AUDIT-C>=4 or 5), or exceeding a weekly alcohol intake threshold (typically 7 drinks/week for women, 14 drinks/week for men), or some prespecified rate of heavy episodic drinking, or a combination of these. Some trials were not restricted to those with unhealthy alcohol use, but we included these if they reported results for a subset of participants with unhealthy alcohol use[148, 160, 166] or if the mean baseline drinking met a common criteria for unhealthy alcohol use, such as weekly use among those under age 21.[173, 175, 179, 186] Across all trials among adults, participants drank an average of 18 drinks per week and had an average of 1.6 heavy episodic drinking episodes per week among trials reporting these measures. Drinks per week was highest in trials among general adult populations (26 drinks/week) and heavy episodic drinking was highest among young adults (2.0 times/week).

The 79 trials included 110 intervention groups. Sixty-four intervention arms (58%) included only one session, and 46 of these involved an estimated 15 minutes or less of contact time. Only 12 trials (15%) included an intervention arm with more than four sessions.[125, 129, 138, 151, 158-160, 164, 168, 185, 200] The maximum duration of intervention was 9 months. Sixty-four (58%) of the interventions were delivered fully or in part by a human (in-person or over the phone), 42 (38%) were digitally delivered interventions, and four were print-based interventions delivered by mail.[127, 136, 175, 186] Digital delivery was the most common delivery method in trials among young adults (26/45 [64%]) and in-person delivery was most common among all other adult populations. The most commonly reported intervention elements were personalized normative feedback (67 [61%] of the interventions) and motivational interviewing techniques (38 [35%] of the interventions). Personalized normative feedback involved telling participants how their alcohol use compared to others, typically to others in a similar age range, sometimes in the same area or university. Personalized normative feedback and motivational interviewing were often used in tandem. Eight trials involved personalized feedback on how alcohol consumption was affecting the participant's health, such as elevated liver enzymes, symptoms or medical conditions that could be exacerbated by alcohol use, and use of medications that could have dangerous effects if combined with alcohol.[129, 142, 145, 158, 160, 188, 190, 202] Twenty-eight (25%) of the interventions involved the primary care team in some way, and the primary care provider delivered all or most of the intervention in 16 (15%) of the interventions. Group sessions were uncommon, only three trials included group sessions.[129, 168, 173]

Two trials in Mexican-Americans[129] and Hispanic/Latino immigrants in the United States and Spain[125] reported that their interventions were culturally tailored, including Spanish-speaking interventionists. One other trial also described their intervention as culturally tailored, among a predominantly Black population of women seeking care at an STI clinic.[131] Another trial conducted in Scotland reported that their intervention was tailored to the target group by "casting the intervention text messages in the language and the drinking culture of disadvantaged young men".[134] One trial each reported providing information to help participants address social needs[131] or find medical health support.[172]

Results

Alcohol use

Trials were very heterogeneous in the outcomes reported. Data were sufficient for meta-analysis for drinks per week, percent exceeding recommended drinking limits, percent with heavy episodic drinking, percent abstinent from alcohol, heavy episodic use episodes per week, drinking days per week, drinks per drinking day, and severity scale score. The first four of these were the main outcomes for this review, consistent with the previous review and are shown in **Table 15**. The others were not pooled in the previous review and were considered secondary outcomes, shown in **Table 16**.

The most commonly reported outcome was drinks per week, reported by 46 trials, of which 38 could be included in the meta-analysis (**Appendix E, Table 8**). Participants in the intervention groups reduced alcohol consumption by an average of 1.6 drinks per week more than those in the control groups in the pooled analysis (mean difference [MD], -1.6 [95% CI, -2.2 to -1.0]; 38 studies [41 groups analyzed], N=17,816; I^2=62%, **Appendix E, Figure 5**). Among these studies, the median reduction in drinks per week was 3.6 drinks among the intervention groups and 2.3 drinks among the control groups. The effect among general adult populations was a reduction of 2.3 drinks per week (MD, -2.3 [95% CI, -3.6 to -1.1]; 19 studies [22 groups analyzed], N=9,439; I^2=68%). The effect size was smallest in studies among young adults (MD, -0.9 [95% CI, -1.3 to -0.5]; 16 studies, N=7,477; I^2=0%, p=0.05 for difference across populations, **Figure 3**). Of the eight trials that did not provide sufficient information to include in the meta-analysis, three showed statistically significant group differences for either the earlier (but not later) followup[157, 188] or the most intensive and personalized intervention group (but not the other intervention groups).[181] The other five not included in the meta-analysis did not find statistically significant group differences in drinks per week, although findings typically trended in the direction of benefit.[129, 137, 173, 193, 201]

Fourteen trials reported subgroup analyses for drinks per week or related alcohol consumption outcomes among populations that were a priori designated for inclusion in our review (i.e., age groups, race, ethnicity, sex, physical or intellectual disability, socioeconomic status), or a post-hoc dimension of interest, alcohol use severity.[124, 131, 135, 139-141, 145, 150-153, 156-158] Eleven of these reported results separately for men and women.[124, 139-141, 145, 150, 151, 153, 156-158] Nine of these studies found that statistical significance was consistent across findings for men and women, and two studies that found the effect was significant for men but not women.[157, 158] One trial in a general adult population conducted subgroup analyses among younger adults (ages 18-30) and found that the intervention was effective among young adults, as it was for the full sample.[140] Four trials examined effects by baseline alcohol use severity, and while effect sizes tended to be larger in the group with heavier alcohol use, none of the subgroups had a statistically significant benefit in any of these studies, consistent with the overall study findings for this outcome in these studies.[131, 135, 145, 152] The only subgroup analysis by race was from a small study (n=78) in pregnant women, which found a statistically significant increase in the likelihood of in abstinence among Black but not White participants.[199] In summary, there was no clear evidence that the interventions were more or less effective in any subgroups, based on study-reported subgroup analyses.

We explored the heterogeneity in effect sizes across trials for drinks per week, since it was the most commonly reported outcome and had high statistical heterogeneity (**Figure 3).** As mentioned above, trials among younger adults had smaller effects than other populations. In addition, trials with interventions that involved direct contact with a human, via phone or in-person, had larger effect sizes (p=0.006). This effect was driven by the trials among general adult populations (p<0.001). No such association was found for younger adults, however, in whom effect sizes were similar regardless of whether the intervention was digitally delivered or delivered with human contact (p=0.71). Among all trials of adults, there were also trends for larger effects with multiple versus single sessions (p=0.06), with higher baseline alcohol use (p=0.09), and being in a primary care setting (p=0.06), however these findings were not statistically significant. Effects sizes were similar to the overall effect in subgroup analyses among studies with the highest applicability to USPSTF recommendations: those conducted in the United States, in primary care or OB-GYN settings, and in U.S.-based primary care or OB-GYN settings.

More recently published studies had smaller effect sizes (p=0.03). Study characteristics are not equally distributed across time, however, so these differences may reflect changes in study characteristics over time. For example, the earliest trials were predominantly in general adult populations and studies among young adults were more common in recent years. In addition, digital interventions without human contact have been studied in more recent years, and some of the earliest published studies had very high baseline alcohol use levels.

We found no clear effect modification related to risk of bias rating (p=0.47), focusing on a low-income population (p=0.17), being in a U.S.-based setting (p=0.19). In addition, we did not find a statistically significant small-studies effect, based on Egger's test (p=0.07). Small-studies effects can indicate possible publication or reporting bias. This nearly significant association was substantially weakened when controlling for publication year (p=0.57), suggesting that early studies tended to be smaller, further complicating the possibility of determining the reasons for larger effects in earlier trials.

Interventions to reduce unhealthy alcohol use were also associated with a 35 percent reduction in the odds of exceeding recommended drinking limits (definitions varied across studies) and a 26 percent reduction in the odds of any heavy episodic drinking in the followup period (exceeding limits: OR, 0.65 [95% CI, 0.55 to 0.76], 17 trials [19 groups included in the analysis], N=10,163; I^2=57%; any heavy episodic drinking: OR, 0.74 [95% CI, 0.64 to 0.85], 16 trials [18 groups included in the analysis], N=10,130; I^2=40%, **Appendix E, Tables 9-10; Appendix E, Figures 6-7**). The median percent exceeding recommended limits was 51.5 percent in the intervention groups and 57.1 percent in the control groups. There were no statistically significant differences between populations of general adult, young adult, older adult populations for these two outcomes (p=0.44 for exceeding limits, p=0.15 for heavy episodic drinking) (**Appendix E, Table 11**). There was also an increase in the likelihood of abstinence among studies limited to pregnant women (OR, 2.26 [95% CI, 1.25 to 4.07], 5 trials, N=796; I^2=40%) (**Appendix E, Table 11; Appendix E, Figure 8**). The median percent reporting abstinence among pregnant women in the intervention groups was 79.7 percent, compared to 62.3 percent in the control groups.

Pooled analyses also showed larger reductions in heavy episodic drinking episodes per week, drinking days per week, and severity scale scores (**Table 16**) for participants in the interventions compared with control groups, but effect sizes were very small. The pooled effect for drinks per drinking day did not demonstrate a benefit. (See **Appendix E, Tables 12-15; Appendix E, Figures 9-12** for detailed results for the secondary pooled outcomes). A wide range of other drinking outcomes were reported, but these outcomes were rarely reported by more than one or two studies (**Appendix E, Table 16**). Peak number of drinks per day during the assessment period was the most commonly reported other drinking outcome and had mixed results, although findings typically trended in the direction of benefit.[136, 164, 173, 176, 184]

Other behavioral outcomes

Other behavioral outcomes included drinking and driving, risky sexual behaviors, "risky behaviors" broadly, and other substance use (**Appendix E, Table 17**). The proportion of participants who self-reported drinking and driving in the previous two months was statistically significantly lower in the intervention group than the control group in a study among general adults (30/151 [19.9]% in the intervention group vs. 55/156 [35.3]% in the control group, OR, 0.46 [95% CI, 0.27 to 0.76]).[137] The finding was close to statistically significant in a trial of older adults (10.9% in the intervention group vs. 16.1% in the control group, OR, 0.64 [calculated 95% CI, 0.44 to 0.93], study-reported adjusted p-value, 0.06).[188] There was no impact on the number of times participants drove after 3 or more drinks in a study of young adults, however.[184] Alcohol-related interventions had minimal effect on risky sexual behaviors with generally small effect sizes and few findings being statistically significant.[131, 133, 169] One study found no impact on risk-taking behaviors ($p>0.2$ at all 3 followup points).[184] Another study found that an alcohol-focused intervention had no impact on other drug use (detailed results not provided, $p>0.05$; **Appendix E, Table 18**).[125]

Health, social, and legal outcomes

The most commonly reported health, social, or legal outcome was alcohol-related consequences or problems; 23 studies reported a measure of consequences or problems, broadly (e.g., not limited to legal or educational consequences only) (**Appendix E, Table 19**).[138, 143, 159, 160, 162, 163, 165, 167, 170, 171, 174-184, 186, 191] Four of these studies were among general adult populations,[138, 143, 159, 160] one was among older adults,[191] and the remaining 19 were among young adults. Several different instruments were used, and the most common instrument was the Rutgers Alcohol Problems Index (RAPI). It asks about a wide range of issues, such as going to school or work while intoxicated, getting into fights, neglecting responsibilities, having difficulty controlling drinking, and being told by friends or neighbors they should cut down on drinking. Different studies used different scoring schemes for the RAPI, however, so absolute values are not comparable across all RAPI results. Combining data for all of the broad measures of alcohol-related problems or consequences, there was a very small statistically nonsignificant effect of the interventions (SMD, -0.05 [95% CI, -0.11 to 0.02], 18 RCTs, N=7,255, I^2=17%) (**Table 17; Appendix E, Figure 13**). The effect when limited to studies among young adults was similarly very small, however it was statistically significant (SMD, -0.07 [95% CI, -0.13 to -0.01] 14 RCTs, N=6,305, I^2=0%,). In these studies there was typically a difference between groups of less than 1 point in change from baseline, on 23- to 100-point scales. In addition, four studies reported alcohol-related problems or consequences in a specific area, such as legal, family, and academic concerns.[129, 170-172] Ones study[129] reported greater reductions in family issues ($p=0.003$, **Appendix E, Table 20**) for two of three intervention groups, but no statistically significant

differences in the other group or in employment-related consequences. Two[170, 171] other studies found statistically significant or nearly significant improvements in the academic realm.

Eight trials reported on emergency or inpatient healthcare utilization (**Appendix E, Table 21**).[140, 145, 148, 157, 159, 160, 167, 188] The best evidence comes from a trial with 4-year followup, and reported findings overall and for the subset of participants age 18-30.[140] This trial reported a reduction in hospital days in the 4 years after the intervention (420 days/392 persons [1.07 days/person] in the intervention group vs. 664 days/382 persons [1.74 days/person] in the control group, calculated IRR, 0.62 [95% CI, 0.55 to 0.70], p<0.05, **Table 18)**.[140] However, five other trials found no group differences in inpatient utilization.[145, 148, 157, 160, 188] Of five trials reporting emergency department (ED) use, three found reductions in emergency department visits over 1 to 4 years of followup,[140, 145, 188] but two other trials did not find a reduction in ED visits after 6 months.[148, 159] One trial found no group differences in the composite outcome of inpatient stays, ED visits, urgent care visits, or detoxification care.[167]

Three trials reported outcomes related to crashes or injuries (**Appendix E, Table 22**).[140, 148, 156] The study with 48-month followup found a statistically significant reduction in total and non-fatal injury vehicle crashes among young adults (ages 18 to 30), but not in the overall population (see **Table 19** for all vehicle-related outcomes from this study). In the intervention group there were 114 vehicle crashes over 4 years (1.0/person), nine with injuries (0.08/person). In the control there were 149 (1.3/person), twenty with injuries (0.18/person) (total crashes IRR, 0.75 [95% CI, 0.59 to 0.96; non-fatal injury crashes IRR, 0.44 [95% CI, 0.20 to 0.97]).[140] The findings were not statistically significant for the full general adult population, however (crashes with property damage only IRR, 0.91 [95% CI, 0.65 to 1.26], 67 events/392 persons in the IG vs 72 events/382 persons in the CG; non-fatal injury crashes IRR, 0.63 [95% CI, 0.36 to 1.10], 20 events/392 persons in the IG vs 31 events/382 persons in the CG).[140] The other two trials found no statistically significant group differences in crash-related outcomes in the short term (6 to 12 months).[148, 156] Three trials reported on legal outcomes, such as arrests, moving violations, or score on a legal problems rating scale (**Appendix E, Table 23**).[129, 140, 148] The trial with 4-year followup reported a statistically significant reduction in liquor violations for both the overall sample of general adults and among young adults after 48 months.[140] No other legal outcomes showed a benefit in this or the other two trials at 6 to 18 months.

Other health outcomes reported include mortality,[140] having an "abnormal" health score,[156] fetal mortality rate, [196] and having a pregnancy rated as "healthy",[197] none of which showed group differences (**Appendix E, Table 24**). A number of included trials captured mortality in their participant flow diagram, however we only included mortality if it was robustly assessed as a primary or secondary study outcome, which was the case for only one study.[140] In this study in a general adult population, 3 of 392 intervention participants died (0.8%) and 7 of 382 control participants died (1.8%) after 4 years of followup, and this difference was not statistically significant (OR, 0.41 [95% CI, 0.11 to 1.61]).

KQ5. What are the harms of interventions to reduce unhealthy alcohol use in screen-detected individuals?

Results

Seven studies reported on adverse outcomes (n=3,991), all of them were among adult populations.[125, 128, 175, 177, 181, 191, 197] All reported that there were no adverse events in either the intervention or control groups (**Table 20**). In addition, there was no suggestion of paradoxical harmful effects among the KQ4 evidence.

Chapter 4. Discussion

Summary of Evidence

Among adolescents, we found no studies looking at the direct effects of screening for unhealthy alcohol use on alcohol consumption compared with no screening. We did, however, find that screening tools are likely adequate to identify adolescents with alcohol use disorders (moderate strength of evidence). The findings on the benefits of interventions to reduce unhealthy alcohol use in primary care or comparable settings were limited (low strength of evidence). Only five trials met our inclusion criteria, all reported different alcohol use outcomes, and most addressed both drug and alcohol use. Further, although most findings trended in the direction of benefit, few were statistically significant. See **Table 21** for a summary of this review's findings.

We found inadequate evidence on the direct impact of screening for alcohol use among adults in primary care or comparable settings, with only one included screening trial. However, we also found that interventions to reduce alcohol use among adults with unhealthy use identified through screening were effective in reducing alcohol use (moderate strength of evidence). These interventions found greater reductions in weekly alcohol consumption and increases in the likelihood of drinking within recommend limits, avoiding heavy episodic drinking episodes, and abstaining from alcohol during pregnancy, with no suggestion of harm. In addition, our previous review found high strength of evidence that commonly used screening tools are adequate to identify adults with unhealthy alcohol use.[82]

Direct evidence on the impact of screening (KQ1)

While the one KQ1 trial on the direct effects of screening did not show positive results, those results trended in the direction of benefit, supporting the indirect chain of evidence (i.e., adequate screening tools plus effective interventions among screen-detected individuals). This KQ1 study of a screening program was limited to pregnant women, and discussions about alcohol use may be common in usual care among pregnant women, potentially attenuating the effect size. Thus, improvements in alcohol use outcomes due to the training and implementation activities may have been modest and may not fully reflect the impact of alcohol-related discussions among pregnant women.

Accuracy of screening instruments (KQ2)

We explored screening instrument accuracy for adolescents and, among all ages, for the USAUDIT and USAUDIT-C in primary care or comparable broad populations. The AUDIT and past-year frequency screeners showed adequate accuracy to identify adolescents with AUD, although this was based on only one to three studies per cutoff. The sensitivity was low at the standard AUDIT cutoff (≥8), however, a lower cutoff yielded higher sensitivity, and this lower cutoff may be more appropriate for adolescent populations, where much lower levels of alcohol consumption could be problematic than with adults. We found only two studies of the USAUDIT, both limited to young adult college students, which found sensitivity ranging from

0.61 to 0.79 and specificity ranging from 0.57 to 0.86 at the study-reported optimal cutoffs. However, the studies in young adults reported extremely high rates of AUD (40% to 50%) and used self-report checklists to diagnose AUD, which raised some concerns about the validity of their results. These results are supported by the larger body of literature covered by the previous USPSTF review, which included 35 studies of screening instrument accuracy among adult populations, for a limited list of the most widely cited or used screening tools.[82] The previous review found that, among adults, brief screeners typically reported sensitivity and specificity in the range of 0.70 to 0.85 for identifying adults with unhealthy alcohol use, and generally higher specificities for the full AUDIT at the standard cutoff of ≥8.

Benefits of interventions to reduce unhealthy alcohol use in adolescents (KQ4)

As mentioned above, evidence on the benefits of interventions to reduce unhealthy alcohol use in adolescents was limited. This may be in part due to our criterion that studies included a screen-detected population. The KQ4 evidence was reviewed in order to support a recommendation on screening, and it is plausible that interventions could have a different impact on people who seek treatment compared with those who were identified through screening. Thus, this requirement substantially improves the applicability of the results to the chain of evidence that begins with screening. Nevertheless, we sought evidence that was not limited to screen-detected samples for comparison with our results.

A 2015 meta-analysis without this screening requirement examined the effectiveness of brief alcohol interventions for adolescents and young adults and identified 24 RCTs or quasi-experimental controlled studies among adolescents (age 11-18 years).[204] This meta-analysis found that brief alcohol interventions led to significant reductions in alcohol consumption (SMD, 0.27 [95% CI, 0.16, 0.38], 24 studies) among adolescents. The authors translated this standardized effect size back into the number of days alcohol was consumed in the past 30 days. Using the median from the control groups, the mean effect size of 0.27 translated into a reduction of 1.3 drinking days per month, with adolescents in the intervention groups consuming alcohol an average of 4.9 days in the past month, versus 6.2 days for those in control groups.

This review also found a reduction in alcohol-related problems (SMD, 0.19 [95% CI 0.06, 0.31], 8 studies), which they estimated corresponded to an 8-percentile improvement on alcohol-related problem outcomes, relative to control group participants. Most of these studies (17 of 24) delivered their universal interventions to unselected samples of adolescents, many of whom were presumably not engaging in unhealthy alcohol use, and the applicability to youth with unhealthy alcohol use was unclear. These studies had a mean followup of 24 weeks, indicating that approximately half of these studies would not have met our minimum followup criteria. In addition, 20 (83%) of these studies were conducted in school settings, again limiting their applicability to primary care. However, a subgroup analysis limited to the two studies conducted in primary care or similar health care settings found a similar effect size for alcohol consumption (SMD, 0.29 [95% CI, 0.11, 0.48]).

In addition, a separate 2024 systematic review examined the impact of psychosocial treatment of AUD among adolescents and young adults.[205] This review identified eight studies that were

limited to adolescents. All eight studies showed improvement in at least one alcohol use outcome at followup of 6 months of more. None of these studies were included in our review, however. Of these eight studies, four were comparative effectiveness studies of youth already engaged in treatment for AUD (not screen-detected), two were among youth presenting to EDs with acute alcohol intoxication, and the final two did appear to identify participants through screening, but one was school-based and included youth with drug or alcohol use, and the other recruited youth with alcohol *dependence* from runaway shelters so also did not meet our inclusion criteria. However, taken together, these two reviews of the broader literature suggest that interventions can reduce alcohol use in adolescents with unhealthy alcohol use. The findings in healthcare settings are limited, however, and it remains uncertain whether the findings among studies conducted in schools or among treatment-seeking individuals are applicable to healthcare-based screen-detected populations.

Finally, one important difference between the evidence among adults and that among adolescents is that almost all studies among adolescents looked at substance use more broadly rather than only at alcohol use. Interventions aimed to reduce the use of both alcohol and drugs, and the screeners included for KQ2 typically asked about multiple substances.

Benefits of interventions to reduce unhealthy alcohol use in adults (KQ4)

The average baseline use was 18 drinks per week, with the intervention groups reducing their use by a median of 3.6 drinks per week. This level of reduction is consistent with, a longitudinal observational analysis of clinical trial data found lower rates of cardiovascular disease among adults with diabetes who decreased their alcohol intake by at least 2 drinks per week.[206] In general, epidemiologic evidence shows the most clear benefits of reducing alcohol use among those with very high baseline use (e.g., 6 or more drinks per day or alcohol dependence), but a separate stream of epidemiologic evidence suggests no safe level of alcohol consumption, with increased risk of injuries, liver cirrhosis, and alcohol-related cancers as low as one drink per day. Broadly, evidence on the negative health impacts of alcohol use includes animal studies, dose-response associations among humans, and has shown plausible biologic mechanisms, suggesting that reductions in use could be beneficial even among those with lower alcohol use levels. See **Appendix F** for a more detailed exploration of the association between reductions in alcohol use and health.

In our review, the effects on alcohol use tended to be smaller among trials that were limited to young adults. Among studies in general adult populations (i.e., not limited to young adults), human contact, either in-person or via phone, was associated with larger effect sizes compared to print or digital interventions, but this was not the case among studies limited to young adults. Effects also tended to be larger in studies with heavier baseline drinking and that were conducted in the late 1990s and early 2000s, compared with later trials. Other factors that showed nearly significant association with effects sizes were the participation of the primary care team in the intervention and having multiple intervention contacts. Older trials tended to have higher baseline drinking levels, almost always included human contact, often involved the primary care team, and typically included more than one contact session, so the independent effects of these factors could not be disentangled. In addition, usual care, public health messages, and the

availability of free resources related to alcohol use were likely different from the current environment, adding to the difficulty of understanding the mechanisms behind the associations observed in our review.

We also found 35 percent and 26 percent relative reductions in the odds of exceeding recommended limits and any heavy episodic drinking episodes, respectively. This translates to a number need to treat (NNT) of 9 individuals to move one person to drinking within recommended limits, and an NNT of 13 for any heavy episodic drinking episodes, applying the median control group rates to the results of the meta-analysis (median of 57.1% in the control group exceeding limits, 48.6% for any heavy episodic drinking episodes). We also found that the odds of abstinence among pregnant women was more than doubled with brief interventions (OR, 2.26 [95% CI, 1.25 to 4.07]; NNT, 6 based on control group median of 62.3%).

Overall, we rated the strength of evidence on the impact of interventions to reduce alcohol consumption to be moderate for alcohol use outcomes. On the one hand, this is a large body of evidence, and results have been relatively stable over several updates to this evidence base. We rated the strength of evidence as moderate rather than high, however, primarily over concerns about heterogeneity in reporting alcohol consumption outcomes (e.g., the most widely reported outcome was reported by only 58 percent of studies with sufficient detail to include in a meta-analysis) and the potential underreporting of alcohol use due to social desirability bias. See Limitations of the Literature for a discussion on the potential risk of underreporting. The evidence for health, legal, and social outcomes was rated as low, since no single outcome showed robust findings and most were reported by six or fewer studies.

Although predominantly comprised of White participants, there was also some representation of Black and Hispanic individuals in the evidence included in this review, and no suggestion that the interventions were less efficacious in these populations. However, there were very few Indigenous American participants in the included studies, and no studies with a majority of Indigenous American participants. A separate systematic review identified studies of culturally tailored interventions for alcohol and drug use among Indigenous communities in North America.[207] None of the eighteen studies they found met our inclusion criteria, for a variety of reasons (e.g., not an RCT, residential treatment setting, focus on drug use only, not limited to people with screen-detected unhealthy alcohol use, community-level elements that would not be feasible in most healthcare settings). This review did not report study results, but instead focused on describing study and intervention characteristics. Most of the studies in their review used Community-Based Participatory Research principles in the design of their intervention, including meetings with tribal elders or formal boards and councils made up of tribal representatives. Eleven (61%) of the interventions integrated cultural practices into the interventions, which included drum circles, sweat lodges, ceremony and developing traditional skills. The inclusion of tribal elders and cultural practices may be important for supporting a sense of cultural safety for participants of Indigenous descent, which could help promote engagement in interventions to reduce unhealthy alcohol use, but such features were not well-represented in our review.

Differences from the previous review for the USPSTF

This current review was very similar to the previous review, however there were some differences in addition to added evidence. Altogether, 24 new studies were added, including one

new trial for KQ1 (benefits of screening programs), six for KQ2 (accuracy of screening instruments), and 17 new trials for KQ4 (benefits of interventions to reduce alcohol consumption). The scope of the current review was narrowed to address areas where evidence was rated as Insufficient, Low, or Moderate in the previous review, so the current review did not examine the accuracy of screening tools for adults, with the exception of one newly developed tool, the USAUDIT.

We used more conservative pooling methods, using the restricted maximum likelihood method rather than the previously used Dersimonian and Laird method and further applied the Knapp-Hartung adjustment, which can have a large impact on confidence intervals when there are very few trials. The impact was that confidence intervals tended to be larger in the current review, however there were no changes in statistical significance due to this change in analytic approach from the previous review. Another change in our meta-analysis methods was that we limited our meta-analyses to trials among adults in the current review, while studies among adolescents were combined with those among adults in the meta-analysis in the previous review. In addition, there were some minor changes to the data from the previous review, such as small modifications to rules for category assignments, but these had extremely minimal impact on the results. There were no changes in our conclusions related to changes in our methods or analytic approach.

Concerns related to variation across populations in screening and interventions for unhealthy alcohol use

The highest rates of unhealthy alcohol use in the United States are among White males and Indigenous American populations. Indigenous American populations experience a disproportionate burden of alcohol use, with alcohol-related mortality up to 10 times higher than other race and ethnic groups. For example, annual death rates per 100,000 persons is 18.2 for non-Latino White males and 113.2 for American Indian and Alaska Native males.[34] Reasons for high alcohol use burden are likely due to factors that are largely outside the control of the health care system, such as historical dislocation and trauma, traumatic life events, negative stereotypes and discrimination, and differences in income, employment, and access to education.[208, 209] Because Indigenous Americans make up a small proportion of the U.S. population, they are not well represented in studies of interventions to reduce unhealthy alcohol use, which often are designed to meet the needs of majority White populations.[210, 211] Adapting interventions to incorporate cultural elements and promote a sense of cultural safety among Indigenous American populations may promote engagement and improve the impact of interventions to reduce unhealthy alcohol use. For a more thorough discussion of factors effecting variation in access to interventions see **Appendix G**.

Limitations of Our Approach

There are a number of limitations to our approach. First, we did not include studies in narrowly focused populations, such as those with a single medical condition, youth in foster care, or women with a history of sexual trauma. While persons in these populations do attend primary care appointments, it is unclear whether the findings limited to these populations would generalize to primary care patients broadly. The result is that we can provide little information on

effects in these specific populations, however we believe the generalizability of our findings to the population of primary care patients, broadly, is enhanced by this restriction. We did include studies limited to populations with multiple comorbidities, such as a study of Latino men with comorbid mental health symptoms and unhealthy alcohol use.[125] Ultimately, we recognize that determining whether a population was too narrow to be representative of primary care was a judgement call and other review teams may have made different decisions.

Second, as we were limited to the methods and reporting of existing publications, we at times had to estimate an item or apply the "closest" category when none of the categories were a perfect match to the study. For example, estimating the number of sessions and categorizing treatment intensity was challenging if it was not explicitly stated. This was particularly challenging for automated interventions. For automated interventions we counted the number of days in which the person interacted with automated contact, and assumed contact time was "brief", but this metric may not be comparable between automated and human-based interventions. Another challenge came in assigning a target population to each study. Although we assigned all studies to a single target population category, the population categories are not cleanly delineated; for example, some studies that primarily included adults also extended into the older adolescent age range, so may have included some adolescents.

Third, we conducted extensive subgroup analyses to explore heterogeneity in effect size. Therefore, some positive associations may be expected purely due to chance. In addition, we provided pooled estimates for some subgroup analyses that included only two to three studies; these estimates are very likely to change as evidence accrues, and we opted to use conservative pooling methods to help guard against chance positive findings due to the many analyses conducted and to highlight the uncertainty of these findings.

Finally, we did not include pharmacotherapy treatment for AUD in our review, which has a potentially valuable role in helping people with AUD. The focus on this review was on behavioral counseling interventions, which are first-line interventions that would be appropriate and commonly used after screening positive for unhealthy alcohol use. AHRQ recently commissioned a separate evidence review on pharmacotherapy for AUD.[212]

Limitations of the Literature

The included evidence has some important limitations. First, alcohol use outcomes were self-reported, and evidence has accrued that people are prone to underreport their alcohol use[213-217] and that the degree of underreporting is associated with social desirability responding bias and self-deceptive enhancement bias.[218] In other words, people with stronger desire to provide socially desirable responses and to present themselves in the best possible light tend to underreport their alcohol use more than those with less pronounced needs to present themselves positively. It is possible that these biases are equal across intervention and control groups, so have little impact on between-group differences. Given that participants in the intervention group have been directly encouraged to reduce their drinking with greater contact or intensity than those in the control group, however, it is also plausible that those in the intervention groups could be more prone to underreporting alcohol use. Thus, it is possible that the effect sizes systematically overestimate the intervention effects, however we could not determine whether

this was the case in our included studies. Some included studies enlisted other informants to report on participants' consumption as a means of minimizing underreporting, and previous research has found high concordance between self-reported alcohol consumption and that reported by an informant close to the study participant, as high as 97% at 12 month's followup, suggesting that use of informants promotes accuracy of self-reported consumption.[219] This study found much lower concordance between self-reported consumption and liver enzyme levels, which had low sensitivity for identifying alcohol consumption. Given the low accuracy of laboratory measures to determine previous alcohol consumption, use of self-reported outcomes will likely persist for this evidence base.

Second, it is also plausible that control groups have become more effective at reducing alcohol use over time. This would systematically underestimate the effects of the interventions in more recent years. Funders have supported research to promote dissemination of screening and interventions for unhealthy alcohol use in primary care settings,[220] and clinical guidelines, tools, and education modules providing instruction in screening and interventions in health care settings have been published in the past 15 years.[221-223] These activities may have helped improve screening rates and the use of related primary care-based interventions and best practices for them.

Third, there are some important limitations related to outcomes. There was very limited reporting of health outcomes, and few results beyond one-year post-baseline. In addition, there was heterogeneity in the outcomes reported. The most widely reported outcome (drinks/week) was reported by only 46 of the 79 adult trials (58%), and only 38 (48%) could be included in the meta-analysis. Other outcomes were much more sparsely reported.

Fourth, we included studies conducted outside of the United States, which may have limited generalizability to US-based primary care settings due to differences in laws (e.g., minimum legal age for purchasing or consuming alcohol) and cultures.

Future Research Needs

There are two important research gaps related to our key questions and analytic framework. First, the most important gap in the evidence is the impact of interventions to reduce unhealthy alcohol use among adolescents who have screened positive for unhealthy alcohol use rather than those seeking treatment. It may be more difficult to use screening as a recruitment method with adolescents than with adults. There are privacy issues that are important to consider, as young people may not want their parents to learn about their alcohol use. Careful handling of the consent process and informing parents in the case of concerning alcohol use is paramount and likely makes this approach more difficult, time-consuming, and costly with adolescents than with adults. If such studies are conducted, it would be valuable for these studies to report standard alcohol use outcomes, such as abstinence, heavy episodic drinking, drinks per drinking day, and drinks per week or per month (depending on the age of the participants).

The second research gap identified by our review is on the accuracy of the USAUDIT among general adult populations. While it seems likely that the minor modifications of the AUDIT to be consistent with standard U.S. drink sizes would result in accuracy that is comparable with or

better than the standard AUDIT, confirmation would improve our confidence that the USAUDIT should be more widely used in the United States.

Because the USPSTF has a long-standing B recommendation for screening in primary care among adults, studies examining the direct impact of alcohol use screening among adults (compared to no systematic screening program) will be difficult to conduct. Similarly, the American Academy of Pediatrics already recommends screening and brief interventions for adolescents. Thus, studies focused on strategies for implementing screening and counseling (i.e., how to best improve screening rates and impact) may be most useful.

Conclusions

Behavioral counseling interventions to reduce unhealthy alcohol use are effective in reducing alcohol consumption among adults. The evidence is limited among adolescents, although some individual study findings were promising. Existing screening tools are likely adequate to identify adolescents with AUD, however evidence is weaker on identification of the full spectrum of unhealthy alcohol use.

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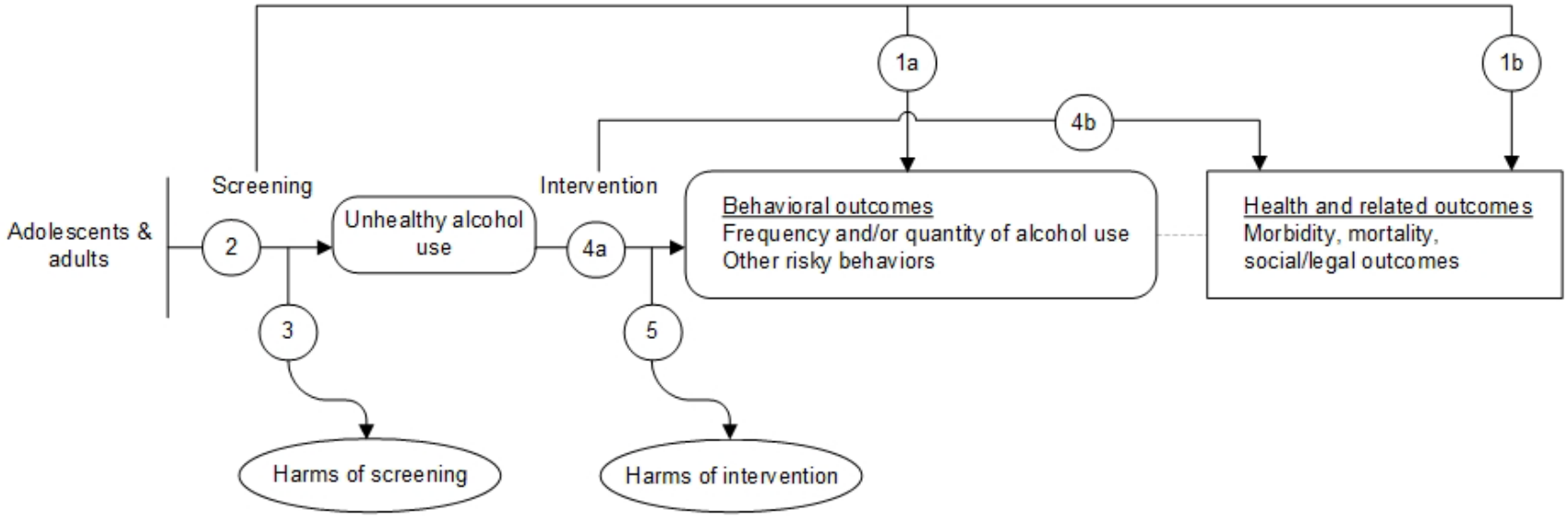
Figure 1. Analytic Framework

Figures

Figure 1. Analytic Framework

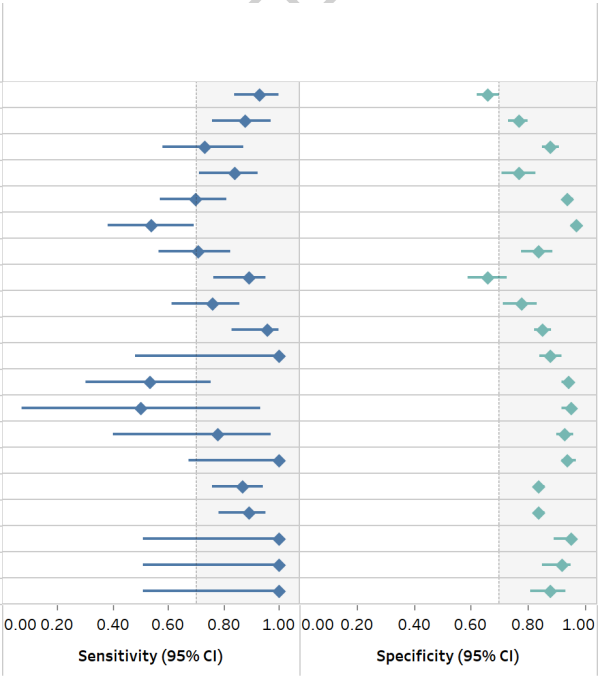


Note: Evidence reviews for the US Preventive Services Task Force (USPSTF) use an analytic framework to visually display the key questions that the review will address to allow the USPSTF to evaluate the effectiveness and safety of a preventive service. The questions are depicted by linkages that relate interventions and outcomes. A dashed line indicates a relationship between an intermediate outcome and a health outcome that is presumed to describe the natural progression of the disease. Refer to the USPSTF Procedure Manual for interpretation of the analytic framework.[224]

Figure 2. Detection of Alcohol Use Disorder in Adolescents (KQ2)

Figure 2. Detection of Alcohol Use Disorder in Adolescents (KQ2)

Screening instrument	Cutoff	Author, year	N screened	Prevalence, %	Sensitivity (95% CI)	Specificity (95% CI)
AUDIT	≥2	Knight, 2003	538	7.6	0.93 (0.84, 1.00)	0.66 (0.62, 0.70)
	≥3	Knight, 2003	538	7.6	0.88 (0.76, 0.97)*	0.77 (0.73, 0.80)*
	≥5	Knight, 2003	538	7.6	0.73 (0.58, 0.87)	0.88 (0.85, 0.91)
	≥6	Rumpf, 2013	225	20.0	0.84 (0.71, 0.92)*	0.77 (0.71, 0.83)*
	≥8	D'Amico, 2016	1569	3.9	0.70 (0.57, 0.81)	0.94 (0.93, 0.96)
		Knight, 2003	538	7.6	0.54 (0.38, 0.69)	0.97 (0.95, 0.98)
		Rumpf, 2013	225	20.0	0.71 (0.57, 0.82)	0.84 (0.78, 0.89)
AUDIT-C	≥4	Rumpf, 2013	225	20.0	0.89 (0.77, 0.95)	0.66 (0.59, 0.73)
	≥5	Rumpf, 2013	225	20.0	0.76 (0.61, 0.86)*	0.78 (0.71, 0.83)*
BSTAD	≥2 days	Kelly, 2014	525	4.6	0.96 (0.83, 1.00)*	0.85 (0.82, 0.88)
		Levy, 2023	258	1.9	1.00 (0.48, 1.00)*	0.88 (0.84, 0.92)*
S2BI	≥monthly	Levy, 2021	517	2.9	0.53 (0.30, 0.75)	0.94 (0.92, 0.96)
		Levy, 2023	253	1.6	0.50 (0.07, 0.93)*	0.95 (0.92, 0.97)*
TAPS	≥2	Levy, 2023	268	3.4	0.78 (0.40, 0.97)*	0.93 (0.90, 0.96)*
NIAAA Youth Screen	≥13	Levy, 2016	388	2.1	1.00 (0.68, 1.00)*	0.94 (0.92, 0.97)*
	Moderate-high risk (NIAAA recommended)	D'Amico, 2016	1573	3.9	0.87 (0.76, 0.94)	0.84 (0.82, 0.86)*
	Moderate-high risk (Study determined)	D'Amico, 2016	1573	3.9	0.89 (0.78, 0.95)*	0.84 (0.82, 0.86)*
Frequency	≥Monthly	Harris, 2016	136	2.9	1.00 (0.51, 1.00)	0.95 (0.89, 0.97)
	3-month use	Harris, 2016	136	2.9	1.00 (0.51, 1.00)	0.92 (0.85, 0.95)
	12-month use	Harris, 2016	136	2.9	1.00 (0.51, 1.00)	0.88 (0.81, 0.93)

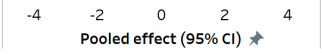


* Author-reported optimal cutoff

Abbreviations: AUDIT = Alcohol Use Disorders Identification Test, AUDIT-C = Alcohol Use Disorders Identification Test-Concise; BSTAD = Brief Screener for Tobacco, Alcohol, and other Drugs; CI = confidence interval; KQ = key question; N= number of participants; NIAA = National Institute on Alcohol Abuse and Alcoholism; S2BI = Screening to Brief Intervention; TAPS = Tobacco, Alcohol, Prescription medication, and other Substance use

Figure 3. Drinks per Week Stratified and Subgroup Meta-Analysis Results (KQ4)

Analysis Group	Analysis	K	N	I2	Tau2	Pooled effect (95% CI)
Overall	All studies (adults only)	41	17816	62	1.3	-1.6 (-2.2, -1.0)
High Applicability	USA	21	9602	65	1.1	-1.3 (-2.0, -0.7)
	Primary care or OB-GYN setting	22	8510	74	3.6	-2.3 (-3.5, -1.1)
	Primary care or OB-GYN in the USA	9	4989	79	2.4	-1.8 (-3.2, -0.4)
	Primary care team involved, PC setting	16	5654	75	4.5	-2.9 (-4.4, -1.3)
	Primary care team NOT involved, PC setting	5	2621	17	0.5	-0.2 (-2.0, 1.6)
Comparison with Previous Review	In previous review	36	16088	65	1.6	-1.6 (-2.3, -1.0)
	NOT in previous review	5	1728	0	0	-1.5 (-2.3, -0.6)
Population	General adults	22	9439	67	3.4	-2.3 (-3.6, -1.1)
	Young adults	16	7477	0		-0.9 (-1.3, -0.5)
	Young adults, excluding all-comers trials	14	5406	8	0.06	-1.0 (-1.6, -0.4)
	Older adults	2	665	82	6.9	-3.0 (-28.8, 22.8)
	Postpartum	1	235			-2.3 (-3.6, -1.0)
Baseline Severity	Baseline drinks/week 0-7	3	2284	0	0	-1.0 (-1.7, -0.2)
	Baseline drinks/week >7 - 14	14	6137	48	0.7	-1.0 (-1.7, -0.2)
	Baseline drinks/week >14 - 21	9	3409	58	1.8	-2.1 (-3.7, -0.4)
	Baseline drinks/week >21 - 28	5	2982	43	0.9	-2.2 (-3.8, -0.6)
	Baseline drinks/week >28	8	2119	54	10.1	-4.0 (-7.2, -0.7)
Publication Date	Published 1987-2008	18	5605	61	2.6	-2.8 (-4.1, -1.5)
	Published 2009-2014	15	8191	49	0.7	-1.2 (-1.9, -0.5)
	Published 2015-2024	8	4020	38	0.4	-0.8 (-1.8, 0.1)
Single Session	Single session	21	9558	27	0.3	-1.1 (-1.6, -0.6)
	Multiple sessions	20	8258	76	3.3	-2.2 (-3.5, -1.0)
	Single session, general adults only	8	4918	50	1	-1.4 (-2.5, -0.2)
	Multiple sessions, general adults only	14	4521	58	4.6	-2.9 (-4.8, -1.0)
	Single session, young adults only	13	4640	0	0	-1.1 (-1.6, -0.5)
	Multiple sessions, young adults only	3	2837	0	0	-0.8 (-2.2, 0.6)
Delivery	Direct contact (phone, in-person), general adults	17	5076	0	0	-3.3 (-4.3, -2.4)
	No direct contact, general adults	5	4363	33	0.4	-0.5 (-1.9, 0.9)
	Direct contact, young adults	5	2291	0	0	-0.8 (-1.7, 0.2)
	No direct contact, young adults	11	5186	0	0	-1.0 (-1.5, -0.5)
	e-Automated only, general adults	4	3185	42	0.9	-0.5 (-2.7, 1.7)
	Not e-Automated only, general adults	18	6254	46	1.9	-2.9 (-4.1, -1.7)
	e-Automated only, young adults	10	3698	7	0.1	-1.1 (-1.8, -0.4)
	Not e-Automated only, young adults	6	3779	0	0	-0.8 (-1.4, -0.2)



Abbreviations: CI = confidence interval; K = number of studies; KQ = key question; N = number of participants; OB-GYN = obstetrics and gynecology; PC = primary care; USA = United States of America

Tables

Table 1. Unhealthy Alcohol Use: Terms and Definitions

Term	Source	Definition
Low risk use/Lower risk use	DoD/VA[225]	Limiting alcohol consumption to amounts and patterns that are unlikely to cause harm to oneself or others.
	NIAAA[226]	No greater than 3/4 drinks on any day AND no greater than 7/14 drinks/week for women/men.
Drinking in Moderation	USDA[6]	Adults of legal drinking age can choose not to drink or to drink in moderation by limiting intake to no more than 3 drinks in a day for men and no more than 2 in a day for women, when alcohol is consumed. Drinking less is better for health than drinking more.
Risky/At-Risk Use	NIAAA[226]	Consumption of alcohol above recommended daily, weekly, or per occasion amounts, but not meeting criteria for alcohol use disorder. For women: more than 3 drinks in a day or more than 7 drinks per week. For men: more than 4 drinks in a day or more than 14 drinks per week. Should avoid alcohol completely: adolescents, women who are pregnant or trying to get pregnant, adults when: planning to drive a vehicle or operate machinery, taking medication that interacts with alcohol, they have a medical condition that alcohol can aggravate.
Hazardous Use	WHO[227]	A pattern of substance use that increases the risk of harmful consequences for the user. In contrast to harmful use, hazardous use refers to patterns of use that are of public health significance despite the absence of a current alcohol use disorder in the individual user.
	ASAM[228]	Alcohol use that increases the risk or likelihood of health consequences. This does not include alcohol use that has already led to health consequences.
Harmful Use	WHO[227]	A pattern of drinking that is already causing damage to health. The damage may be either physical (e.g., liver damage from chronic drinking) or mental (e.g., depressive episodes secondary to drinking). Overlapping with DSM-5 alcohol use disorder criteria.
	ASAM[228]	Consumption of alcohol that results in health consequences in the absence of addiction.
Alcohol Misuse	NIAAA[229]	Drinking in a manner, situation, amount, or frequency that could cause harm to users or to those around them. For individuals younger than the legal drinking age of 21, or for pregnant women, any alcohol use constitutes alcohol misuse.
Excessive Alcohol Use	CDC[230]	Any of: • Binge drinking—Four or more drinks for women, or five or more drinks for men during an occasion. • Heavy drinking—Eight or more drinks for women, or 15 or more drinks for men during a week. • Underage drinking—any alcohol use by people younger than 21. • Drinking while pregnant—any alcohol use during pregnancy.
Alcohol Use Disorder	DSM-5[231]	A maladaptive pattern of alcohol use leading to clinically significant impairment or distress, as manifested by two (or more) of the following, occurring within a 12-month period: 1. Having times when the patient drank more, or longer, than intended. 2. More than once wanted to cut down or stop, tried it, but could not. 3. Spending a lot of time drinking or being sick/getting over the aftereffects of drinking. 4. Wanting to drink so badly that they could not think of anything else. 5. Found that drinking (or being sick from drinking) often interfered with taking care of home or family responsibilities, caused problems at work, or caused problems at school. 6. Continuing to drink even though it was causing trouble with family and friends. 7. Given up or cut back on activities that were important or interesting in order to drink.

Table 1. Unhealthy Alcohol Use: Terms and Definitions

Term	Source	Definition
		8. More than once gotten into situations while or after drinking that increased the chances of getting hurt (e.g., driving, swimming, unsafe sexual behavior). 9. Continued to drink even though it was causing depression or anxiety, other health problems, or causing memory blackouts. 10. Having to drink much more than previously in order to get the desired effect, or finding that the usual number of drinks had much less effect than previously. 11. Experiencing the symptoms of withdrawal after the effects of alcohol were wearing off, such as trouble sleeping, shakiness, restlessness, nausea, sweating, racing heart, or seizure. Severity is determined based on the number of symptoms present: Mild: 2-3 symptoms Moderate: 4-5 symptoms Severe: 6 or more symptoms
Binge Drinking*	NIAAA[4]	A pattern of alcohol consumption that brings blood alcohol concentration (BAC) to 0.08% or higher. For a typical adult, this pattern corresponds to consuming ≥4/5 drinks in 2 hours for women/men.
Heavy Drinking†	NIAAA[4]	For women/men: ≥4/5 drinks/day or ≥8/15 drinks/week
	SAMHSA[22][9]	Binge drinking ≥5 days in the past 30 days.
High-Intensity Drinking	NIAAA[229]	Consuming alcohol at levels that are two or three times the sex-specific binge drinking threshold.

*According to ASAM, the preferred term is "heavy drinking episode."
† May be synonymous with "risky drinking" or "alcohol misuse," depending on source.

Abbreviations: ASAM = American Society of Addiction Medicine; DoD/VA = Department of Defense/Veterans Health Administration; DSM-5 = Diagnostic and Statistical Manual of Mental Disorders; NIAAA = National Institute on Alcohol Abuse and Alcoholism; SAMHSA = Substance Abuse and Mental Health Services Administration; USDA = United States Department of Agriculture; WHO = World Health Organization

Table 2. Prevalence of Alcohol Use Patterns in the U.S., by Age and Sex (2023 NSDUH)

Table 2. Prevalence of Alcohol Use Patterns in the U.S., by Age and Sex (2023 NSDUH)

Sex	Age Group	Any Lifetime Use, %	Any Past-Year Use, %	Any Past-Month Use, %	Binge Drinking, Past-Month, %	Heavy Use, Past-Month, %	Met Criteria for AUD, %
All	≥12 years	79.1	62.5	47.5	21.7	5.8	10.2
	12 to 17 years	21.6	16.9	6.9	3.9	0.5	2.9
	≥18 years	84.9	67.1	51.6	23.5	6.3	10.9
	18 to 25 years	NR	NR	49.6	28.7	6.9	15.1
Males	≥12 years	80.1	63.9	50.1	24.3	7.1	12.1
	12 to 17 years	19.1	14.7	6.0	3.3	0.5	2.0
	≥18 years	84.9	69.1	54.8	26.5	7.8	13.2
	18 to 25 years	NR	NR	48.4	28.0	6.7	15.0
Females	≥12 years	78.1	61.2	45.0	19.2	4.5	8.3
	12 to 17 years	24.1	19.2	7.9	4.5	0.6	3.8
	≥18 years	84.9	65.3	48.6	20.6	4.9	8.7
	18 to 25 years	NR	NR	50.8	29.4	7.2	15.1

Source: 2023 NSDUH[232]

Binge drinking = 5/4+ (M/F) drinks on the same occasion
Heavy alcohol use = Binge drinking on 5+ days in the previous month

Abbreviations: AUD = alcohol use disorder; NSDUH = National Survey on Drug Use and Health; NR = not reported

Table 3. KQ1 Study Characteristics

Table 3. Study and Population characteristics for Key Questions 1 and 3

Study (Quality rating)	Study Design	Country	N	Brief population description	Mean age, yrs	Female, %	Race/ ethnicity, %	SES	Baseline alcohol use
Tsang, 2022[103] (Fair)	Randomized, stepped-wedge controlled trial	AUS	3849	Pregnant women attending an in-person prenatal visit, aged >=18 years	30	100	Aboriginal/ Torres Strait Islander: 4.5	"Most disadvantaged" SES group*: 51% High school graduate or less: 24% University degree or higher: 40% Unemployed: 25%	AUDIT-C prior to pregnancy (median): 3 [5=likely hazardous use]

* Socioeconomic disadvantage was classified using the Index of Relative Socio-Economic Disadvantage, with most disadvantaged defined as quintiles 1 and 2.

Abbreviations: AUDIT-C = Alcohol Use Disorders Identification Test-Concise; AUS = Australia; N = number of participants randomized; SES = socioeconomic status; yrs = years

Table 4. Intervention characteristics for Key Questions 1 and 3

Table 4. Intervention characteristics for Key Questions 1 and 3

Study	Screener	Brief description	No sessions	Delivery	Therapeutic approach	Setting	Interventionist	Control
Tsang, 2022[103]	AUDIT-C	Brief advice with referral to additional services as needed (minutes duration NR)	1	Individual	General counseling, Referral	OBGYN	Midwives, Obstetrician-gynecologist	Usual care

Abbreviations: AUDIT-C = Alcohol Use Disorders Identification Test-Concise; IG1 = intervention group 1; NR = not reported; OBGYN = obstetrics and gynecology

Table 5. Results for Key Question 1

Table 5. Results for Key Question 1

Study	Outcome	Followup	N analyzed	Pre-implementation group	Post-implementation group	Effect Type	Effect (95% CI)	Study-reported p-value
Tsang, 2022[103]	Abstinence, alcohol	Gestation weeks 28 or 36	3846	1173/1308 (89.7)	2303/2538 (90.7)	OR	1.13 (0.90 to 1.41)	NR, NS
	AUDIT-C >=1	Gestation weeks 28 or 36	3847	135/1308 (10.3)	235/2539 (9.3)	OR	0.80 (0.62 to 1.03)	0.08
	AUDIT-C	Gestation weeks 28 or 36	3847	Median, 0 (Range, 0 to 7)	Median, 0 (Range, 0 to 5)	NR	NR	NR
	Heavy episodic drinking	Gestation weeks 28 or 36	3847	3/1308 (0.2)	5/2539 (0.2)	OR	0.86 (0.20 to 3.60)	NR, NS
	High risk of alcohol-exposed pregnancy	Gestation weeks 28 or 36	3847	6/1308 (0.5)	5/2539 (0.2)	OR	0.43 (0.13 to 1.41)	NR, NS

Abbreviations: AUDIT-C=Alcohol Use Disorders Identification Test-Concise; CI = confidence interval; N = number of participants; NR=not reported; NS=not statistically significant; OR=odds ratio

Table 6. Summary Population Characteristics for Key Question 2

Table 6. Summary Population Characteristics for Key Question 2

Population	No. studies	No. participants	No. (%) good quality	No. (%) conducted in U.S.	Other countries represented	No. (%) in primary care	Other settings	Average age	% Female	No. (%) studies majority nonwhite
Adolescents	13	173,680 (range 95-166,165)	6 (46)	9 (69)	CHL, DEU, ESP, FIN	7 (54)	High school, specialty care	16	57	5 (38)
Young adults	2	632 (range 250-382)	0 (0)	2 (100)	NA	0 (0)	University/college	20	52	0 (0)

Abbreviations: CHL = Chile; DEU = Germany; ESP = Spain, FIN = Finland; NA = not applicable

Table 7. Study and Population Characteristics for Key Question 2

Population group	Author, year	Quality	Country	Recruitment setting	Brief population description	N screened	Mean age (range)	Percent female	Race/Ethnicity*	SES	Screening tests
Adolescents	Chung, 2012[116]	Good	US	Community-based	Adolescents aged 12-18 years	166,165	NR (12-18)	49	White: 62 Black: 15 Hispanic/Latino: 16 Asian/PI: 4 Other: 3	NR	5+ drinks Frequency Quantity
	Clark, 2016[111]	Good	US	Primary care	Adolescents aged 12-20 living in rural Pennsylvania	1193	15 (12-20)	57	White: 93 Black: 1 Hispanic/Latino: 4 Indigenous Amer.: 4 Other: 1	NR	Frequency Quantity Quantity x Frequency
	Cortes-Tomas, 2017[104]	Fair	ESP	High School	Adolescents aged 15-17 years	906	16 (15-17)	52	NR	NR	AUDIT AUDIT-C AUDIT-CR 6+ drinks (AUDIT-3) 7/6+ drinks (AUDIT-3R)
	D'Amico, 2016[108]	Good	US	Primary care	Adolescents, aged 12-18 years	1573	16 (12-18)	58	White: 15 Black: 27 Hispanic/Latino: 51 Other: 7	NR	AUDIT NIAAA Youth Screen
	Harris, 2016[113]	Good	US	Primary care	Adolescents, aged 12-17 years	136	15 (12-17)	54	White: 18 Black: 28 Hispanic/Latino: 24 Asian/PI: 12 Other: 18	58% college graduate parent	Frequency
	Kelly, 2014[115]	Fair	US	Primary care	Adolescents, aged 12-17 years	525	NR (12-17)	54	White: 1 Black: 93 Other: 6	97.5% enrolled in school	BSTAD

Table 7. Study and Population Characteristics for Key Question 2

Population group	Author, year	Quality	Country	Recruitment setting	Brief population description	N screened	Mean age (range)	Percent female	Race/Ethnicity*	SES	Screening tests
	Knight, 2003[114]	Good	US	Primary care	Adolescents aged 14-18 years	538	16 (NR)	68	White: 24 Black: 51 Hispanic/Latino: 19 Other: 6	NR	AUDIT
	Levy, 2016[112]	Fair	US	Other medical	Children, aged 9-18 years with type 1 diabetes, asthma, cystic fibrosis, inflammatory bowel disease, or juvenile idiopathic arthritis	388	NR (9-18)	52	White: 76 Other: 24	69.8% college graduate parent	NIAAA Youth Screen
	Levy, 2021[105]	Fair	US	Primary care	Adolescents aged 14-18 years	517	16 (14-18)	66	White: 24 Black: 40 Hispanic/Latino: 6 Asian/PI: 6 Other: 48	49% parental education college degree or higher	S2BI
	Levy, 2023[106]	Good	US	Primary care, Other medical	Adolescents aged 12-17 years	798	15 (12-17)	54	White: 66 Black: 8 Hispanic/Latino: 15 Asian/PI: 9 Other: 18	71% caregiver education college degree or higher	S2BI BSTAD TAPS
	Liskola, 2018[107]	Fair	FIN	High School, Psychiatric outpatients	Adolescents	621	16 (12-19)	79	NR	NR	AUDIT AUDIT-C
	Rumpf, 2013[110]	Fair	DEU	High School	Adolescents aged 14-18 years	225	15 (NR)	51	NR	NR	AUDIT AUDIT-C
	Santis, 2009[109]	Fair	CHL	High School	Students	95	16 (NR)	44	NR	NR	AUDIT
Young adults	McCabe, 2019[117]	Fair	US	University / College	Undergraduate students aged 18 years or older	250	20 (≥18)	35	White: 50 Black: 9 Hispanic/Latino: 22	NR	USAUDIT USAUDIT-C

Table 7. Study and Population Characteristics for Key Question 2

Population group	Author, year	Quality	Country	Recruitment setting	Brief population description	N screened	Mean age (range)	Percent female	Race/Ethnicity*	SES	Screening tests
									Asian/PI: 19 Other: 1		
	Villarosa-Hurlocker, 2020[118]	Fair	US	University / College	Undergraduate students	382	20 (NR)	69	White: 65 Black: 28 Hispanic/Latino: 2 Asian/PI: 3 Other:2	NR	USAUDIT USAUDIT-C

* In some instances, ethnicity was reported separately from race (e.g., non-Hispanic and White versus non-Hispanic White).

Abbreviations: Amer = American; AUDIT = Alcohol Use Disorders Identification Test; AUDIT-3= Alcohol Use Disorders Identification Test-3; AUDIT-3R= Alcohol Use Disorders Identification Test-3R; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; AUDIT-CR = Alcohol Use Disorders Identification Test-Concise (Revised); AUS = Australia; BSTAD = Brief Screener for Tobacco, Alcohol, and other Drugs; CHL = Chile; DEU = Germany; ESP = Spain; N = number of participants; FIN = Finland; NIAAA = National Institute on Alcohol Abuse and Alcoholism; NR = not reported; PI = Pacific Islander; S2BI = Screening to Brief Intervention; SES = socioeconomic status; TAPS = Tobacco, Alcohol, Prescription medication, and other Substance use; US = United States; USAUDIT = U.S. Alcohol Use Disorders Identification Test; USAUDIT-C = U.S. Alcohol Use Disorders Identification Test-Concise

Table 8. Summary of Study Characteristics for Key Questions 4 and 5

Population	No. studies	No. randomized	No. (%) good quality	No. (%) conducted in U.S.	Other countries represented	No. (%) in primary care	Other settings	Mean % followup (range)	No. (%) in previous review
Adolescents	**5**	**2,964**	**1 (20)**	**4 (80)**	**SWL**	**4 (80)**	**High school**	**89 (72, 100)**	**2 (40)**
Adult populations	**79**	**40,486**	**11 (14)**	**47 (59)**	**(see below)**	**35 (44)**	**(see below)**	**81 (59,100)**	**65 (82)**
Adults (general)	38	19,855	5 (13)	15 (39)	AUS, CAN, CHL, DEU, DNK, ESP, FIN, NLD, UK	27 (71)	Other medical, reproductive/OB-GYN, community	79 (59, 96)	28 (74)
Young adults	26	15,849	4 (15)	19 (73)	AUS, NLD, SWE	4 (15)	University, other medical, community	81 (65, 91)	22 (85)
Older adults	4	2,504	2 (50)	3 (75)	UK	4 (100)		88 (83, 92)	4 (100)
Postpartum women	2	358	0 (0)	2 (100)		0 (0)	Other medical, reproductive/OB-GYN	79 (70, 88)	1 (100)
Pregnant women	9	1,920	0 (0)	8 (89)	NLD	0 (0)	Reproductive/OB-GYN, community	84 (63, 100)	9 (100)
All populations	**84**	**43,450**	**12 (14)**	**51 (61)**	**(see above)**	**39 (46)**	**(see above)**	**81 (59, 100)**	**67 (80)**

Abbreviations: AUS = Australia; CAN = Canada; CHL = Chile: DEU = Germany; DNK = Denmark; ESP = Spain; FIN = Finland; NLD = Netherlands; No. = number; NZL = New Zealand; RCT = randomized controlled trial; SWE = Sweden; SWL = Switzerland; UK = United Kingdom

Table 9. Summary of Population Characteristics for Key Questions 4 and 5

Population	No. studies	Average age*	% Female*	No. (%) studies majority low SES§	% Indigenous American*† (no. studies reporting)	% Asian*† (no. studies reporting)	% Black*† (no. studies reporting)	% Hispanic*† (no. studies reporting)	% White*† (no. studies reporting)	Baseline alcohol use, mean (no. studies reporting)
Adolescents	**5**	**16.0**	**56**	**1 (20)**	**NR (0)**	**11 (1)**	**34 (3)**	**29 (3)**	**26 (3)**	**Drinks/week: 12 (1)** **HED/week: 0.5 (1)**
Adult populations	**79**	**34.2**	**48**	**15 (19)**	**2 (11)**	**10 (15)**	**15 (34)**	**14 (29)**	**71 (44)**	**Drinks/week: 18 (47)** **HED/week:1.6 (17)**
Adults (general)	38	42.2	41	8 (21)	2 (3)	1 (3)	30 (9)	16 (8)	76 (13)	Drinks/week: 26 (22) HED/week: 1.2 (5)
Young adults	26	20.0	52	0 (0)	0.5 (5)	14 (10)	7 (13)	10 (13)	68 (18)	Drinks/week: 11 (19) HED/week: 2.0 (10)
Older adults	4	68.5	30	0 (0)	1.5 (1)	NR (0)	0.3 (1)	7 (2)	94 (2)	Drinks/week: 15 (3) HED/week: 1 (1)
Postpartum women	2	27.7	100	1 (50)	7 (1)	1 (1)	34 (2)	3 (1)	55 (2)	Drinks/week: 8 (1) HED/week: 0.8 (1)
Pregnant women	9	28.7	100	6 (67)	NR (0)	2 (1)	31 (8)	18 (4)	50 (7)	Drinks/week: 3 (2) HED/week: NR
All populations	**84**	**32.7**	**48**	**16 (19)**	**2 (11)**	**12 (16)**	**17 (37)**	**16 (32)**	**67 (47)**	**Drinks/week: 18 (48)** **HED/week: 1.5 (18)**

* Weighted by n randomized.
† Among studies conducted in the U.S. (k=51).
‡ Assuming studies not reporting race/ethnicity were majority white.
§ Assuming studies not reporting SES are not majority low SES; low SES defined as >50% uninsured, had Medicaid coverage, an annual income at or below the federal poverty level, on public assistance; >20% homeless; or recruited from a setting that predominantly serves low income patients.

Abbreviations: HED = heavy episodic drinking; No. = number; NR = not reported; SES = socioeconomic status

Table 10. Intervention Characteristics for Key Questions 4 and 5 (All Intervention Conditions): Number (%) of Intervention Arms with Designated Characteristics

Table 10. Intervention Characteristics for Key Questions 4 and 5 (All Intervention Conditions): Number (%) of Intervention Arms with Designated Characteristics

Population	K*	Single session	Multiple sessions	Est. total contacts, median (range)	Human-delivered intervention	Digital only	PNF	MI	CBT	Primary care team involved	PCP delivered most/all of intervention
Adolescents	**5**	**4 (80)**	**1 (20)**	**1 (1 to 96)**	**5 (100)**	**0 (0)**	**3 (60)**	**4 (80)**	**0 (0)**	**2 (40)**	**2 (40)**
Adult populations	**110**	**64 (58)**	**46 (42)**	**1 (0 to 70)**	**64 (58)**	**42 (38)**	**67 (61)**	**38 (35)**	**13 (12)**	**28 (25)**	**16 (15)**
Adults (general)	49	22 (45)	27 (55)	2 (0 to 11)	37 (76)	10 (20)	24 (49)	18 (37)	6 (12)	23 (47)	13 (27)
Young adults	45	35 (78)	10 (22)	1 (0 to 70)	14 (31)	29 (64)	39 (87)	12 (27)	3 (7)	2 (4)	2 (4)
Older adults	4	0 (0)	4 (100)	4 (3 to 4)	4 (100)	0 (0)	1 (25)	2 (50)	1 (25)	3 (75)	1 (25)
Postpartum women	2	1 (50)	1 (50)	2.5 (1 to 4)	1 (50)	1 (50)	1 (50)	2 (100)	1 (50)	0 (0)	NA
Pregnant women	10	6 (60)	4 (40)	1 (1 to 5)	8 (80)	2 (20)	2 (20)	4 (40)	2 (20)	0 (0)	NA
All populations	**115**	**68 (59)**	**47 (41)**	**1 (0 to 96)**	**69 (60)**	**42 (36)**	**70 (61)**	**42 (37)**	**13 (11)**	**30 (26)**	**18 (16)**

* k is the number of intervention groups; some studies included multiple active intervention groups; control groups are not counted separately

Abbreviations: CBT = cognitive behavioral therapy; Est. = estimated; k = number of study arms; MI = motivational interviewing; No. = number; PCP = primary care provider; PNF = personalized normative feedback

Table 11. Study and Population Characteristics for Studies Among Adolescents, Key Question 4

Study (Quality rating)	Country	N	Setting	Screener	Alcohol use eligibility criteria	Age range (mean), years	Female, %	Race/ethnicity, %	Socioeconomic information	BL alcohol use
D'Amico, 2018[119] (Fair)	USA	294	Primary care	NIAAA-YS	Positive for high risk alcohol use	12-18 (16)	58	Black: 17 Lat./Hisp: 66 White: 12	Mother education, some college or more: 26% Recruitment clinics served "a high proportion of low-income patients"	AUD dx: 18.0 Drinking days in past year (mean): 10 Days Heavy alcohol use in past year (mean): 5.4
Haug, 2016[120] (Good)	SWL	469	High School	DDQ + 30-day frequency of HED item	Included subgroup: ≥1 HED episode (≥5/4 [M/F] drinks/single occasion) or ≥14/7 (M/F) drinks/typical week	16-19 (16.8)	52.6	NR	Secondary school: 90% Technical/high school or university: 6%	NR
Knight, 2019[121] (Fair)	USA	211	Primary care	NIAAA-YS	Included subgroup: Any use of alcohol or cannabis in the past 12 months	12-18 (16.4)	54	Lat./Hisp: 26 White: 50	Parent/guardian college graduate: 71%	Any alcohol use in past year: 91% Any heavy use episodes in past year: 33%
Mason, 2015[122] (Fair)	USA	119	Primary care	CRAFFT	2 or 3 on CRAFFT (at risk for substance use disorder)	14-18 (16.4)	71.0	Black: 84.0	NR	NR
Sterling, 2021[123] (Fair)	USA	1871	Primary care	Any past year alcohol, marijuana or hashish, or other drug use (3 Y/N items)	Included subgroup: Past year alcohol or drug use (or presence of mood symptoms or suicidality)	12-18 (15.8)	56	Asian: 11 Black: 34 Lat./Hisp: 24 White: 25	Medicaid coverage in prior year: 6%	AUD dx: 1

Abbreviations: AUD = alcohol use disorder; BL = baseline; CRAFFT = Car, Relax, Alone, Forget, Family, Friends, Trouble Screener; DDQ = Daily Drinking Questionnaire; dx = diagnosis; F = female; HED = heavy episodic drinking; Lat./Hisp = Latina/Latino/Hispanic; M = male; N = number of participants; NIAAA-YS = National Institute of Alcohol Abuse and Alcoholism Screening Guide youth screen; NR = not reported; SWL = Switzerland; USA = United States of America; Y/N = yes or no

Table 12. Intervention Characteristics for Studies Among Adolescents, Key Question 4

Study	Intensity category*	Substances addressed	Brief description	Duration	Delivery	Therapeutic approach	Interventionist	Control
D'Amico, 2018[119]	Brief Single	Alcohol and other drugs	One 15-20 min individual MI session	1 day	Individual in-person	MI	Interventionist (generic)	Usual care
Haug, 2016[120]	Brief Multiple	Alcohol	Web-based personalized feedback + 95/97 ([medium/high risk] text messages)	3 months	Tech	PNF	Self-directed	No intervention
Knight, 2019[121]	Brief Single	Alcohol and other drugs	One 6-9 min personalized normative feedback counseling session	1 day	Individual in-person, Tech, Print	MI, PNF	Medical doctors (PCP role: Delivered most/all)	Usual care
Mason, 2015[122]	Extended Single	Alcohol and other drugs	One 20-min individual counseling session	1 day	Individual in-person	MI, PNF	Mental or behavioral health specialists	Attention control
Sterling, 2021[123]	Brief Single	Alcohol and other drugs (or mood symptoms)	One counseling session with a pediatrician or embedded mental health specialist based on CRAFFT+ results, with referrals as needed.	1 day	Individual in-person	MI, TTM	Medical doctors, Psychologists (PCP role: Delivered most/all)	Usual care

* Categories include Very brief (<=5 minutes), Brief (5-15 minutes), and Extended (>15 minutes) sessions, and may include either a single session or multiple sessions.

Abbreviations: CRAFFT = Car, Relax, Alone, Forget, Family or Friends, Trouble Screener ; MI = motivational interviewing; min = minute; PCP = primary care provider; PNF = personalized normative feedback; TTM = Transtheoretical Model of Change

Table 13. Drinking Outcomes from Studies of Adolescents, Key Question 4

Study	Outcome	Analysis	FUP mo	N	IG BL Mean (SD)	CG BL Mean (SD)	IG results*	CG results*	Stat	Effect (95% CI)	p
D'Amico, 2018[119†]	Peak number of drinks per day	Overall	6	294	3.9 (4.2)	3.6 (4.5)	-0.3 (4)	0.6 (4.3)	MD in Chg	-0.87 (-1.82 to 0.08)	0.21
			12	294	3.9 (4.2)	3.6 (4.5)	-0.4 (4.2)	-0.1 (4.3)	MD in Chg	-0.28 (-1.25 to 0.69)	0.70
Haug, 2016[120‡]	Drinks/week	High risk drinkers	6	154	17.9 (11.7)	15.1 (9.2)	-7.9 (10.5)	-3.5 (8.8)	MD in Chg	-4.41 (-7.48 to -1.34)	0.11
		Medium risk drinkers	6	323	7.1 (6.9)	6.7 (5.5)	-.9 (6.6)	-1.3 (5)	MD in Chg	0.32 (-0.99 to 1.63)	0.33
	Heavy drinking episodes/ week	High risk drinkers	6	154	0.7 (0.4)	0.7 (0.3)	-0.4 (0.4)	-.2 (0.3)	MD in Chg	-0.16 (-0.26 to -0.05)	0.01
		Medium risk drinkers	6	323	0.2 (0.1)	0.2 (0.1)	0 (0.2)	0 (0.2)	MD in Chg	0.00 (-0.05 to 0.04)	0.31
	Any Binge Drinking	High risk drinkers	6	154	NA	NA	61/80 (76.3)	68/74 (91.9)	OR	0.29 (0.09 to 0.98)	0.047
		Medium risk drinkers	6	323	NA	NA	117/181 (64.6)	97/142 (68.3)	OR	0.76 (0.44 to 1.31)	0.33
Knight, 2019[121]	Days to first alcohol use during followup	Overall	12	211	NA	NA	Median (IQR): 97 (51-222)	Median (IQR): 44 (21-143)	HR	0.69 (0.47 to 1.02)[§]	NR, NS
	Days to first HED episode during followup	Overall	12	211	NA	NA	Median (IQR): 366 (124-366)	Median (IQR): 213 (51-366)	HR	0.66 (0.40 to 1.10)[§]	NR, NS
Mason, 2015[122]	Frequency item score (range 0-7)	Boys	6	35	0.5 (NR)	0.5 (NR)	-0.3 (NR)	0.3 (NR)	MD in Chg	-0.6 (NR)	0.08
		Girls	6	84	0.7 (NR)	1.2 (NR)	0.1 (NR)	-0.4 (NR)	MD in Chg	0.5 (NR)	0.24
Sterling, 2021[123]	Alcohol-related dx in EHR	Overall	84	1871	NA	NA	60/1255 (4.8)	48/616 (7.8)	OR	0.69 (0.51 to 0.94)	0.017

***** For continuous outcomes, mean change from baseline (SD) is shown; for dichotomous outcomes, number of events/number of participants (percent) is shown

† This study also reported Drinks/week and Heavy drinking episodes/week but did not provide sufficient information to calculate mean change; findings were statistically insignificant for both outcomes at both followup timepoints.

‡ Medium risk: 1 or 2 HED episodes (>=5/4 [Males/Females] drinks/occasion) during the preceding 30 days or no HED occasions during the preceding 30 days but 14/7 (Males/Females) drinks consumed during a typical week. High risk: >2 HED episodes during the preceding 30 days.

§ HRs <1.0 indicate that patients in the intervention group tended to have a longer time to first use compared with patients in the control group.

Table 13. Drinking Outcomes from Studies of Adolescents, Key Question 4

Abbreviations: BL = baseline; CI = confidence interval; CG = control group; chg = change; dx = diagnosis; EHR = electronic health record; FUP = followup; HED = heavy episodic drinking; HR = hazard ratio; IG = intervention group; IQR = interquartile range; MD = mean difference; mo = month; NA = not applicable; NR = not reported; NS = not statistically significant; OR = odds ratio; SD = standard deviation

Table 14. Other Outcomes from Studies of Adolescents, Key Question 4

Study	Outcome	FUP mo	N	IG BL	CG BL	IG results*	CG results*	Stat	Effect (95% CI)	p
D'Amico, 2018[119]	Alcohol-related consequences (range, 0-20)	6	294	NR	NR	FUP = 2.2 (3.5)	FUP = 3.6 (8.5)	NR	NR	0.08
		12	294	NR	NR	FUP = 2 (4.5)	FUP = 4.3 (12.4)	NR	NR	0.03
Knight, 2019[121]	Riding with intoxicated driver	6	65	NA	NA	20/44 (45.5)	12/21 (57.1)	OR	0.63 (0.22 to 1.78)	NR, NS
		9	60	NA	NA	16/39 (41.0)	13/21 (61.9)	OR	0.43 (0.14 to 1.27)	NR, NS
		12	66	NA	NA	18/47 (38.3)	13/19 (68.4)	OR	0.29 (0.09 to 0.89)	<0.05

*For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: BL = baseline; CG = control group; FUP = followup; IG = intervention group; mo = month; NA = not applicable; NR = not reported; NS = not statistically significant; OR = odds ratio; SD = standard deviation

Table 15. Summary of Meta-Analysis Results for Primary Alcohol Use Outcomes for Adult Populations, Key Question 4

Outcome (effect measure)	Population	No. studies (No. groups)	N analyzed	I^2, %	Tau^2	Median change or % (IQR), IG	Median change or % (IQR), CG	Pooled effect (95% CI)*
Drinks per week (WMD)	**Adult Populations**	**38 (41)**	**17,816**	**62**	**1.3**	**-3.6 (-6.5, -1.6)**	**-2.3 (-4.5, -0.4)**	**-1.6 (-2.2 to -1.0)**
	General Adults	19 (22)	9,439	67	3.4	-6.5 (-11.5, -0.5)	-3.5 (-7.3, -0.6)	-2.3 (-3.6 to -1.1
	Young Adults	16 (16)	7,477	0	<.01	-2.1 (-3.6, -1.5)	-1.5 (-2.5, 09)	-0.9 (-1.3 to -0.5)
	Older Adults	2 (2)	665	82	6.8	Range: -5.7, -5.4	Range: -4.5, -0.1	-3.1 (-28.8 to 22.8)
	Postpartum	1 (1)	235	NA	NA	-3.6	-1.3	-2.3 (-3.6 to -1.0)
	Pregnant	0	--	--	--	--	--	NR
% Exceeding recommended drinking limits (OR)	**Adult Populations**	**17 (19)**	**10,163**	**57**	**0.1**	**51.5 (28.1, 64.3)**	**57.1 (39.4, 71.0)**	**0.65 (0.55 to 0.76)**
	General Adults	12 (14)	5,367	63	0.1	51.6 (43.3, 64.3)	61.1 (50.6, 71.0)	0.67 (0.53 to 0.85)
	Young Adults	2 (2)	3,068	0	0	Range: 18.7, 33.0	Range: 25.0, 39.9	0.71 (0.34 to 1.48)
	Older Adults	3 (3)	1,728	0	0	36.1 (15.9, 69.4)	46.2 (29.7, 71.0)	0.58 (0.31 to 1.11)
	Postpartum	0	--	--	--	--	--	NR
	Pregnant	0	--	--	--	--	--	NR
% With heavy episodic drinking (OR)	**Adult Populations**	**16 (18)**	**10,130**	**40**	**0.03**	**43.3 (22.5, 53.6)**	**48.6 (37.7, 65.2)**	**0.74 (0.64 to 0.85)**
	General Adults	10 (12)	5,853	50	0.04	48.4 (28.9, 54.0)	50.3 (39.4, 66.2)	0.73 (0.60 to 0.90)
	Young Adults	3 (3)	2,576	0	0	52.9 (38.3, 76.0)	54.5 (37.7, 79.6)	0.86 (0.63 to 1.18)
	Older Adults	3 (3)	1,701	0	0	10.8 (10.0, 30.8)	16.1 (13.3, 49.3)	0.59 (0.33 to 1.07)
	Postpartum	0	--	--	--	--	--	NR
	Pregnant	0	--	--	--	--	--	NR
% Abstinent from alcohol (OR)	**Pregnant**	**5**	**796**	**0**	**0.0**	**79.7 (44.9, 88.6)**	**62.3 (33.0, 71.7)**	**2.26 (1.25 to 4.07)**

* Random effects model using the restricted maximum likelihood method with a Knapp-Hartung adjustment; effect is for the between-group difference in change from baseline to followup for continuous measures, or percent with an event for dichotomous outcomes.

Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; IQR = interquartile range; N = number of participants; NA = not applicable; No. = number; NR = not reported; OR = odds ratio; WMD = weighted mean difference between group in change from baseline

Table 16. Summary of Meta-Analysis Results for Secondary Alcohol Use Outcomes for Adult Populations, Key Question 4

Outcome (effect measure)	Population	No. studies (No. groups)	N analyzed	I^2, %	Tau^2	Median change or % (IQR), IG	Median change or % (IQR), CG	Pooled effect (95% CI)*
Heavy episodic use episodes per week (WMD)	**Adult Populations**	**16 (16)**	**6,585**	**26**	**0.003**	**-0.4 (-0.6, -0.3)**	**-0.3 (-0.4, -0.1)**	**-0.1 (-0.2 to -0.05)**
	General Adults	6 (6)	2,895	46	0.005	-0.5 (-0.6, -0.5)	-0.3 (-0.4, -0.3)	-0.1 (-0.3 to -0.03)
	Young Adults	8 (8)	3,297	0	0	-0.4 (-0.5, -0.2)	-0.3 (-0.5, -0.2)	-0.1 (-0.2 to 0.02)
	Older Adults	1 (1)	158	NA	NA	-0.6	0.2	-0.8 (-1.4 to -0.2)
	Postpartum	1 (1)	235	NA	NA	-0.5	-0.1	-0.3 (-0.5 to -0.1)
	Pregnant	0	--	--	--	--	--	NR
Drinking days per week (WMD)	**Adult Populations**	**14 (15)**	**5,029**	**0**	**0**	**-0.2 (-0.6, -0.1)**	**-0.1 (-0.3, -0.03)**	**-0.1 (-0.2 to -0.02)**
	General Adults	7 (8)	2,321	0	0	-0.4 (-1.1, -0.1)	-0.1 (-1.2, -0.1)	-0.1 (-0.2 to 0.03)
	Young Adults	6 (6)	2,375	0	0	-0.2 (-0.2, -0.2)	-0.1 (-0.2, 0.1)	-0.1 (-0.2 to -0.02)
	Older Adults	0	--	--	--	--	--	NR
	Postpartum	1 (1)	235	NA	NA	-0.9	-0.3	-0.6 (-1.5 to 0.4)
	Pregnant	1 (1)	98	NA	NA	0.03	-0.04	0.1 (-0.1 to 0.2)
Drinks per drinking day (WMD)	**Adult Populations**	**15 (17)**	**4.931**	**58**	**0.1**	**-0.6 (-1.3, 0.2)**	**-0.3 (-0.9, 0)**	**-0.1 (-0.5 to 0.2)**
	General Adults	9 (11)	3,556	0	0	-0.3 (-1.3, -0.1)	-0.3 (-0.7, 0.7)	-0.1 (-0.3 to 0.2)
	Young Adults	4 (4)	1,026	56	0.1	-1.0 (-1.3, -0.7)	-0.7 (-1.0, -0.2)	-0.4 (-1.2 to 0.4)
	Older Adults	0	--	--	--	--	--	NR
	Postpartum	0	--	--	--	--	--	NR
	Pregnant	2 (2)	349	0	0			0.2 (0.1 to 0.3)
Severity scale score (standardized mean difference)	**Adult Populations**	**16 (16)**	**6,043**	**20**	**0.003**	**-2.2 (-4.3, -1.7)†**	**-2.2 (-5.1, -1.5)†**	**-0.11 (-0.19 to -0.03)**
	General Adults	9 (9)	3,571	0.01	0	-2.6 (-5.8, -1.8)	-1.6 (-5.1, -1.5)	-0.14 (-0.23 to -0.05)
	Young Adults	4 (4)	1,395	63	0.02	Range: -1.7, -1.7	Range, -2.7, -0.9	-0.12 (-0.44 to 0.20)
	Older Adults	2 (2)	979	0	0	--	--	-0.03 (-0.82 to 0.77)
	Postpartum	0	--	--	--	--	--	NR
	Pregnant	1	98	NA	NA	-4.3	-5.2	0.19 (-0.20 to 0.58)

* Random effects model using the restricted maximum likelihood method with a Knapp-Hartung adjustment; effect is for the between-group difference in change from baseline to followup

† Change from baseline for studies that reported the AUDIT are shown. The AUDIT has a range of 0 to 40, reported by 6 studies that included sufficient data to calculate change from baseline for each group

Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; IQR = interquartile range; N = number of participants; NA = not applicable; No. = number; NR = not reported; WMD = weighted mean difference between group in change from baseline

Table 17. Summary of Meta-Analysis Results for Consequences of Alcohol Use for Adult Populations, Key Question 4

Outcome (effect measure)	Population	No. studies (No. groups)	N analyzed	I^2, %	Tau^2	Median change or % (IQR), IG*	Median change or % (IQR), CG*	SMD (95% CI)†
Consequences of alcohol use (standardized mean difference)	**Adult Populations**	**18 (18)**	**7,255**	**17**	**.002**	**-1.5 (-2.1, -0.7)**	**-1.0 (-2.1, -0.7)**	**-0.05 (-0.11 to 0.02)**
	General Adults	3 (3)	491	39	.02	-1.9 (-2.1, -1.5)	-1.9 (-3.4, -1.1)	0.07 (-0.43 to 0.57)
	Young Adults	14 (14)	6305	0	<.001	-1.3 (-2.8, -0.7)	-0.9 (-2.1, -0.6)	-0.07 (-0.13 to -0.01)
	Older Adults	1 (1)	459	NA	NA	-0.7 (NA)	-0.8 (NA)	0.03 (-0.15 to 0.21)
	Postpartum	0	--	--	--	--	--	--
	Pregnant	0	--	--	--	--	--	--

*Median change is reported in the native units; instrument ranges varied

†Random effects model using the restricted maximum likelihood method with a Knapp-Hartung adjustment; effect is for the standardized between-group difference in change from baseline to followup

Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; IQR = interquartile range; N = number of participants; NA = not applicable; No. = number; NR = not reported; SMD = standardized mean difference

Table 18. Inpatient and Emergency Department Utilization from Study with 4-Year Followup

Table 18. Inpatient and Emergency Department Utilization from Study with 4-Year Followup[140]

Outcome	Analysis	IG results (Event rate)	CG results (Event rate)	IRR (95% CI)	Study-reported p-value
Hospital days	Overall	420 events/392 persons (1.07/persons)	664 events/382 persons (1.74/persons)	0.62 (0.55 to 0.70)	<0.05
Hospital days	Young adults (18-30 yrs)	131 events/114 persons (1.15/persons)	150 events/112 persons (1.34/persons)	0.86 (0.68 to 1.08)	NR, NS
Emergency department visits	Overall	302 events/392 persons (0.77/persons)	376 events/382 persons (0.98/persons)	0.78 (0.67 to 0.91)	NR, NS
Emergency department visits	Young adults (18-30 yrs)	103 events/114 persons (0.9/persons)	177 events/112 persons (1.58/persons)	0.57 (0.45 to 0.73)	<0.01

Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; IRR = incidence rate ratio; NR = not reported; NS = not statistically significant; yrs = years

Table 19. Vehicle-Related Outcomes from Study with 4-Year Followup[140]

Outcome	Subgroup	IG results (Event rate)	CG results (Event rate)	IRR (95% CI)	Study-reported p-value
DWI Citation	Overall	25 events/392 persons (0.06/persons)	25 events/382 persons (0.07/persons)	0.97 (0.56 to 1.70)	NR, NS
DWI Citation	Young adults (18-30 yrs)	8 events/114 persons (0.07/persons)	10 events/112 persons (0.09/persons)	0.79 (0.31 to 1.99)	NR, NS
Other moving violations (driving)	Overall	169 events/392 persons (0.43/persons)	177 events/382 persons (0.46/persons)	0.93 (0.75 to 1.15)	NR, NS
Other moving violations (driving)	Young adults (18-30 yrs)	78 events/114 persons (0.68/persons)	81 events/112 persons (0.72/persons)	0.95 (0.69 to 1.29)	NR, NS
Motor vehicle crash with fatalities	Overall	0 events/392 persons (0/persons)	2 events/382 persons (0.01/persons)	(could not calculate)	NR, NS
Motor vehicle crash with fatalities	Young adults (18-30 yrs)	0 events/114 persons (0/persons)	1 events/112 persons (0.01/persons)	(could not calculate)	NR, NS
Motor vehicle crash with non-fatal injuries	Overall	20 events/392 persons (0.05/persons)	31 events/382 persons (0.08/persons)	0.63 (0.36 to 1.10)	NR, NS
Motor vehicle crash with non-fatal injuries	Young adults (18-30 yrs)	9 events/114 persons (0.08/persons)	20 events/112 persons (0.18/persons)	0.44 (0.20 to 0.97)	<0.05
Motor vehicle crash with property damage only	Overall	67 events/392 persons (0.17/persons)	72 events/382 persons (0.19/persons)	0.91 (0.65 to 1.26)	NR, NS
Motor vehicle crash with property damage only	Young adults (18-30 yrs)	19 events/114 persons (0.17/persons)	28 events/112 persons (0.25/persons)	0.67 (0.37 to 1.19)	NR, NS
Total motor vehicle events	Overall	281 events/292 persons (0.72/persons)	307 events/382 persons (0.80/persons)	0.90 (0.76 to 1.05)	NR
Total motor vehicle events	Young adults (18-30 yrs)	114 events/114 persons (1.0/persons)	149 events/112 persons (1.3/persons)	0.75 (0.59 to 0.96)	<0.05

Abbreviations: CG = control group; CI = confidence interval; DWI = driving while intoxicated; IG = intervention group; IRR = incidence rate ratio; NR = not reported; NS = not statistically significant; yrs = years

Table 20. Results for Adverse Outcomes from Trials Among Adults, Key Question 5

Study	Country	Population	Outcome	Group	FUP, mo.	IG results	CG results	p
Alegria, 2019[125]	USA, ESP	Adults	Any adverse events	IG1	6	0/172 (0.0)	0/169 (0.0)	NR
Bischof, 2008[128]	DEU	Adults	Any adverse events	IG1	12	0/131 (0.0)	0/139 (0.0)	NR
Bischof, 2008[128]	DEU	Adults	Any adverse events	IG2	12	0/138 (0.0)	0/139 (0.0)	NR
Larimer, 2007[175]	USA	Young adults	Any adverse events	IG1	12	0/737 (0.0)	0/751 (0.0)	NR
Lewis, 2014[177]	USA	Young adults	Any adverse events	IG1	6	0/119 (0.0)	0/121 (0.0)	NR
Lewis, 2014[177]	USA	Young adults	Any adverse events	IG2	6	0/119 (0.0)	0/121 (0.0)	NR
Neighbors, 2010[181]	USA	Young adults	Any adverse events	IG1	24	0/164 (0.0)	0/164 (0.0)	NR
Neighbors, 2010[181]	USA	Young adults	Any adverse events	IG2	24	0/163 (0.0)	0/164 (0.0)	NR
Neighbors, 2010[181]	USA	Young adults	Any adverse events	IG3	24	0/163 (0.0)	0/164 (0.0)	NR
Neighbors, 2010[181]	USA	Young adults	Any adverse events	IG4	24	0/164 (0.0)	0/164 (0.0)	NR
Ondersma, 2015[197]	USA	Pregnant	Any adverse events	IG1	6	0/20 (0.0)	0/19 (0.0)	NR
Watson, 2013[191]	UK	Older adults	Any adverse events	IG1	12	0/263 (0.0)	0/259 (0.0)	NR

Abbreviations: DEU = Germany; ESP = Spain; FUP = followup; IG = intervention group; mo = months; NR = not reported; UK = United Kingdom; USA = United States of America

Table 21. Summary of Evidence

Table 21. Summary of Evidence

Key Question	Number of included studies (No. participants)	Summary of findings	Consistency and precision	Other limitations	Strength of evidence	Applicability
1 (benefits of screening)	1 stepped-wedge randomized controlled trial (n=3849)	No statistically significant differences in alcohol outcomes during late pregnancy before and after implementation of early pregnancy screening.	Consistency: NA Precision: imprecise	Only a single study which only included pregnant women; health outcomes were not reported, minimal alcohol use in this sample limiting power to detect differences; risk of pressure to underreport alcohol use, since participants were pregnant.	Insufficient	Implementation study conducted in OB-GYN setting, limited to pregnant women.

Table 21. Summary of Evidence

Key Question	Number of included studies (No. participants)	Summary of findings	Consistency and precision	Other limitations	Strength of evidence	Applicability
2 (accuracy of screening tools) Adolescents	13 (n=173,680)	Most common screeners were the AUDIT and brief past year frequency screeners (k=6 each) **AUD**: *AUDIT, ≥8 standard cutoff* (k=3, n analyzed=2,332) Sensitivity 0.54 to 0.71 Specificity 0.84 to 0.97 Lower cutoffs resulted in better test performance in 2 studies. *Past-year frequency screeners (excluding S2BI), various cutoffs* (k=3, n analyzed=1,187) Sensitivity 0.78 to 1.0 Specificity 0.85 to 0.92 One frequency screener (S2BI) had lower sensitivity (0.50 to 0.53) (k=2, n analyzed=770) **Unhealthy Alcohol Use**: *AUDIT, ≥8 cutoff* (k=2, n analyzed=820) Sensitivity 0.66 to 0.71 Specificity 0.86 to 0.92 Lower cutoffs resulted in better test performance in 2 studies. *Past-year frequency instruments* NR	Consistent Imprecise	Largest study reported a non-standard outcome by age and sex subgroups (n=7,515 in the remaining studies). Author identified optimal cutoffs were often inconsistent between studies. Varying prevalence of AUD and unhealthy use may indicate a bias in patient spectrum for some studies. In adolescence, identifying any alcohol use may be more important than detecting AUD, or a minimum, the full spectrum of unhealthy use.	Moderate (AUD) Low (Unhealthy, heavy, or heavy episodic alcohol use)	Many of the frequency screeners asked about other substances in addition to alcohol Most studies conducted in the US, several from primary care Lower cutoffs for the AUDIT (versus the standard ≥8) may be better for adolescents

Table 21. Summary of Evidence

Key Question	Number of included studies (No. participants)	Summary of findings	Consistency and precision	Other limitations	Strength of evidence	Applicability
2 (accuracy of USAUDIT, USAUDIT-C) Adults	2 (n=632)	**AUD** *USAUDIT, optimal cutoff varied* (k=2, n=632, moderate risk of bias, young adults only) Sensitivity 0.61 to 0.72 Specificity 0.80 to 0.86 Optimal cutoffs based on both Se and Sp; if Se was prioritized, a lower cutoff would increase Se at the expense of Sp. *USAUDIT-C, optimal cutoff* ≥7 (k=2, n=632) Sensitivity 0.61 to 0.79 Specificity 0.57 to 0.79	Inconsistent Imprecise	Very high prevalence of AUD (40-50%) and binge use episodes. Did not use a structured interview to diagnose AUD. Both studies limited to young adult college students; no studies in general adult populations.	Insufficient	Likely not applicable to an unselected population due to high prevalence of unhealthy use. Not applicable to general adult populations.
3 (harms of screening)	0 studies directly reported	No studies reported on harms of screening. The study included for KQ1 found no pattern of findings that suggested a harmful effect of screening on alcohol use.	Consistency: NA Precision: NA	No evidence	Insufficient	No evidence
4 (benefits of interventions to reduce unhealthy alcohol use) Adolescents	5 RCTs (n=2,964)	1 US-based study found a reduced likelihood of alcohol-related diagnoses in the EHR in the 7 years after implementing a screening, brief intervention, and referral program for alcohol, drug use, or mood symptoms (OR, 0.69 [95% CI, 0.51 to 0.94], p=0.017; 4.8% in the IG vs. 7.8% in the CG). 2 other studies found reduced alcohol use among one subgroup of participants in stratified analyses. Other alcohol use outcomes were not significant, although most trended in the direction of benefit. Other outcomes were rarely reported.	Consistency: consistent Precision: imprecise	No two studies reported the same outcome; 4 studies addressed drug use in addition to alcohol use, and the study showing the clearest benefit also addressed mood symptoms	Low	4 of 5 studies were conducted in the US primary care settings; Black, Hispanic/Latino, and White populations were represented Non-US study included youth of legal age to purchase beer and wine in their country

Table 21. Summary of Evidence

Key Question	Number of included studies (No. participants)	Summary of findings	Consistency and precision	Other limitations	Strength of evidence	Applicability
4 (benefits of interventions to reduce unhealthy alcohol use) Adults	79 RCTs (n=40,486)	**Alcohol use**: Pooled results generally showed reduced alcohol use in the intervention groups, e.g.: • Drinks per week, mean difference in change (95% CI): -1.6 (-2.2 to -1.0), 38 RCTs, N=17,816 • % exceeding recommended limits, OR (95% CI): 0.65 (0.55 to 0.76), 17 RCTs, N=10,163 • % with heavy episodic drinking, OR (95% CI): 0.74 (0.64 to 0.85), 16 RCTs, N=10,130 Effect sizes were comparable or slightly larger when limited to US and primary care settings. **Health, social, legal**: Very small but statistically significant reduction in consequences of alcohol use score in young adults (SMD, -0.07 [95% CI, -0.13 to -0.01], 14 RCTs, N=6,305), but the overall effect across all populations was not significant. ED visits were reduced in 3 of 5 studies. One trial with 4-year follow-up showed reduced inpatient days, but the effects were not significant in 5 other trials. Other outcomes very sparsely reported.	Alcohol use: consistent, precise Health, legal, social: consistent, imprecise	Heterogeneity in reporting specific of outcomes, some studies did not provide sufficient data for pooling. Outcomes were self-reported and underreporting consumption has been documented; and possible that social desirability bias could lead to overestimated effect sizes. For health social and legal outcome, no outcome was widely reported.	Alcohol use: Moderate Health, legal, and social outcome: Low	59% conducted in the US, 44% conducted in primary care settings. Minimal representation of Indigenous American populations, but some representation of Black (34%) and Hispanic (29%) populations in US-based trials.
5 (harms of interventions to reduce unhealthy alcohol use) Adolescents	0 studies directly reported	No studies reported on harms of interventions. The studies included for KQ4 found no pattern of findings that suggested a harmful effect of interventions to reduce unhealthy alcohol use.	Consistency: NA Precision: NA	No evidence	Insufficient	No evidence

Table 21. Summary of Evidence

Key Question	Number of included studies (No. participants)	Summary of findings	Consistency and precision	Other limitations	Strength of evidence	Applicability
5 (harms of interventions to reduce unhealthy alcohol use) Adults	7 RCTs (n=3,991)	All reported that there were no adverse events in either the intervention or control groups. In addition, there was no suggestion of paradoxical harmful effects among the KQ4 evidence.	Consistency: Consistent Precision: Imprecise	Reported in small subset of trials, ascertainment rarely described	Low	4 studies conducted in the US

Abbreviations: AUD = alcohol use disorder; AUDIT = Alcohol Use Disorders Identification Test; CI = confidence interval; EHR = electronic health record; k = number of studies; KQ = key question; NA = not applicable; No. = number; NR = not reported; OB-GYN = obstetrics and gynecology; OR = odds ratio; RCT = randomized clinical trial; S2BI = Screening to Brief Intervention; Se = sensitivity; Sp = specificity; US = United States; USAUDIT = US Alcohol Use Disorders Identification Test; USAUDIT-C = Alcohol Use Disorders Identification Test-Concise

Screening and Behavioral Counseling Interventions to Reduce Unhealthy Alcohol Use in Adolescents and Adults: An Updated Systematic Review for the U.S. Preventive Services Task Force

Appendix A, Detailed Methods

Appendix A, Literature Search Strategies for Primary Literature

Librarian: Melinda Davies
Peer reviewer and date: Christiane Voisin, 3/17/2024

MEDLINE via Ovid - Main review search:
Ovid MEDLINE(R) ALL <1946 to March 15, 2024>
1 Alcohol-Related Disorders/ 5826
2 Alcoholic intoxication/ 13108
3 Alcoholism/ or Alcoholics/ 81254
4 Binge Drinking/ 2645
5 (alcohol$ adj2 (use$ or abuse$ or misuse$ or depend$ or addict$ or excess$ or exceed$ or harmful or risk$ or hazardous or problem$ or unhealthy or heavy or chronic or quit or disorder$)).ti,ab,kf. 117854
6 ((harmful$ or risk$ or hazardous or problem$ or binge$ or heavy or unhealthy or excess$ or exceed$) adj drink$).ti,ab,kf. 23337
7 heavy episodic.ti,ab,kf. 1288
8 maximum drinks.ti,ab,kf. 85
9 (alcoholism or alcoholic$).ti,ab,kf. 105219
10 or/1-9 237406
11 Mass screening/ 117364
12 screen$.ti,ab,kf. 1026623
13 (assessment adj (tool$ or instrument$)).ti,ab,kf. 46108
14 (alcohol$ adj5 (scale$ or inventor$ or questionnaire$ or survey$ or index$ or checklist$ or interview$)).ti,ab,kf. 15562
15 Substance Abuse Detection/ 10554
16 or/11-15 1117155
17 "Alcohol Use Disorders Identification Test".ti,ab,kf. 2384
18 AUDIT-C.ti,ab,kf. 950
19 "Alcohol Smoking and Substance Involvement Screening Test".ti,ab,kf. 322
20 SASQ.ti,ab,kf. 17
21 Single Alcohol Screening Question$.ti,ab,kf. 17
22 (("National Institute on Alcohol Abuse and Alcoholism" or NIAAA) and Single Item).ti,ab,kf. 9
23 Cut down Annoyed Guilty Eye-opener.ti,ab,kf. 73
24 "Brief Screener for Tobacco Alcohol and other Drugs".ti,ab,kf. 1
25 BSTAD.ti,ab,kf. 2
26 Comorbidity Alcohol Risk Evaluation Tool.ti,ab,kf. 9
27 Tolerance Annoyed Cut down Eye opener.ti,ab,kf. 5
28 Tolerance Worried Eye-opener Amnesia Kut down.ti,ab,kf. 2
29 (((timeline or time line) adj1 (followback or follow back)) and (alcohol$ or drink$)).ti,ab,kf. 627
30 or/17-29 3814

31 10 and (16 or 30) 25928
32 (clinical trial or adaptive clinical trial or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or equivalence trial or pragmatic clinical trial or Meta-Analysis).pt. 1159711
33 clinical trials as topic/ or adaptive clinical trials as topic/ or clinical trials, phase iii as topic/ or clinical trials, phase iv as topic/ or controlled clinical trials as topic/ or non-randomized controlled trials as topic/ or randomized controlled trials as topic/ or equivalence trials as topic/ or intention to treat analysis/ or pragmatic clinical trials as topic/ or meta-analysis as topic/ 397121
34 control groups/ or double-blind method/ or single-blind method/ or random allocation/ or placebos/ 329422
35 (random$ or placebo or phase iii or phase 3).ti,ab. 1617325
36 (RCT or sham or dummy or single blind$ or double blind$ or allocated or allocation or triple blind$ or treble blind$).ti,ab. 466455
37 ((control$ or clinical) adj3 (study or studies or trial$ or group$)).ti,ab. 1960343
38 (Nonrandom$ or non random$ or non-random$ or quasi-random$ or quasirandom$).ti,ab. 56498
39 ((open label or open-label) adj5 (study or studies or trial$)).ti,ab. 47281
40 ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial$)).ti,ab. 12398
41 (pragmatic study or pragmatic studies).ti,ab. 621
42 ((pragmatic or practical) adj3 trial$).ti,ab. 6271
43 ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial$)).ti,ab. 13359
44 (metaanaly$ or meta analy$).ti,ab. 298547
45 (comparison group$ or matched comparison).ti,ab. 25027
46 or/32-45 3706272
47 31 and 46 5687
48 "Sensitivity and Specificity"/ 370995
49 "Predictive Value of Tests"/ 224299
50 ROC Curve/ 72237
51 False Negative Reactions/ 18298
52 False Positive Reactions/ 28609
53 Diagnostic Errors/ 39972
54 "Reproducibility of Results"/ 473037
55 Reference Values/ 164400
56 Reference Standards/ 46351
57 Observer Variation/ 45177
58 Receiver operat$.ti,ab. 139954
59 ROC curve$.ti,ab. 60631
60 sensitivit$.ti,ab. 1040231
61 specificit$.ti,ab. 602410
62 predictive value.ti,ab. 120659
63 accuracy.ti,ab. 584927
64 false positive$.ti,ab. 70343
65 false negative$.ti,ab. 39530
66 miss rate$.ti,ab. 718

67 error rate$.ti,ab. 18869
68 or/48-67 2772193
69 (10 and 16) or 30 26188
70 68 and 69 3666
71 Psychotherapy, Brief/ 3700
72 (alcohol adj1 reduc$).ti,ab,kf. 4983
73 (alcohol adj (therap$ or treatment$)).ti,ab,kf. 2637
74 controlled drink$.ti,ab,kf. 276
75 Behavior Therapy/ 30809
76 Cognitive Therapy/ 31060
77 Counseling/ 40377
78 Directive Counseling/ 2429
79 Patient Education as Topic/ 88448
80 Risk Reduction Behavior/ 14356
81 Feedback, psychological/ 3757
82 Health education/ 64135
83 Health promotion/ 82452
84 Motivation/ 81766
85 Internet/ 82451
86 Motivational interviewing/ 2643
87 Persuasive communication/ 4070
88 Self-help groups/ 9666
89 Text messaging/ 4678
90 Therapy, computer-assisted/ 6980
91 (advice or advise$).ti,ab,kf. 102195
92 counsel$.ti,ab,kf. 142357
93 psychotherapy.ti,ab,kf. 45664
94 behavio?r$ chang$.ti,ab,kf. 51585
95 behavio?r$ intervention$.ti,ab,kf. 14810
96 behavio?r$ modification$.ti,ab,kf. 5512
97 motivational interview$.ti,ab,kf. 5928
98 (cognitive behavio$ or behavio$ therapy or cbt).ti,ab,kf. 48510
99 ("brief intervention$" or "brief therapy").ti,ab,kf. 5713
100 self help.ti,ab,kf. 8298
101 text messag$.ti,ab,kf. 6790
102 (web or website).ti,ab,kf. 225054
103 (computer adj (based or mediated or assisted)).ti,ab,kf. 47367
104 12 step.ti,ab,kf. 1060
105 twelve step.ti,ab,kf. 247
106 Alcoholics Anonymous/ 1260
107 alcoholics anonymous.ti,ab,kf. 925
108 (intervention$ or psychosocial).ti. 239008
109 or/71-108 1217761
110 10 and 109 29214
111 Alcohol-Related Disorders/pc, rh, th [Prevention & Control, Rehabilitation, Therapy] 1635

112 Alcoholic intoxication/pc, rh, th 1516
113 Alcoholism/pc, rh, th 20912
114 Binge Drinking/pc, rh, th or Alcohol-Related Disorders/px 1868
115 or/110-114 44884
116 or/32-36 2527418
117 115 and 116 8754
118 47 or 70 or 117 15216
119 limit 118 to english language 14718
120 exp Geographic Locations/ 4968404
121 "Andorra"/ or "Argentina"/ or exp "Australia"/ or "Austria"/ or "Bahamas"/ or "Bahrain"/ or "Republic of Belarus"/ or "Belgium"/ or "Brunei"/ or exp "Canada"/ or "Chile"/ or "Costa Rica"/ or "Croatia"/ or "Cyprus"/ or "Czech Republic"/ or exp "Denmark"/ or "Estonia"/ or "Finland"/ or exp "France"/ or "Georgia Republic"/ or exp "Germany"/ or "Greece"/ or "Hong Kong"/ or "Hungary"/ or "Iceland"/ or "Ireland"/ or "Israel"/ or exp "Italy"/ or exp "Japan"/ or "Kazakhstan"/ or "Kuwait"/ or "Latvia"/ or "Liechtenstein"/ or "Lithuania"/ or "Luxembourg"/ or "Malaysia"/ or "Malta"/ or "Mauritius"/ or "Montenegro"/ or "Netherlands"/ or "New Zealand"/ or exp "Norway"/ or "Oman"/ or exp "Panama"/ or "Poland"/ or "Portugal"/ or "Qatar"/ or "Romania"/ or exp "Russia"/ or "San Marino"/ or "Saudi Arabia"/ or "Serbia"/ or "Singapore"/ or "Slovakia"/ or "Slovenia"/ or exp "Republic of Korea"/ or "Spain"/ or "Sweden"/ or "Switzerland"/ or "Thailand"/ or "Trinidad and Tobago"/ or "Turkey"/ or "United Arab Emirates"/ or exp "United Kingdom"/ or exp "United States"/ or "Uruguay"/ or European Union/ or Developed Countries/ or "Organisation for Economic Co-Operation and Development"/ or australasia/ or europe/ or north america/ or "scandinavian and nordic countries"/ 3697534
122 120 not 121 1285143
123 119 not 122 13865
124 (201709* or 201710* or 201711* or 201712* or 2018* or 2019* or 2020* or 2021* or 2022* or 2023* or 2024*).dt,da,ez. 10290206
125 123 and 124 5162

MEDLINE via Ovid - Bridge search:
Ovid MEDLINE(R) ALL <1946 to December 02, 2024>
1 Alcohol-Related Disorders/ 5880
2 Alcoholic intoxication/ 13188
3 Alcoholism/ or Alcoholics/ 82091
4 Binge Drinking/ 2769
5 (alcohol$ adj2 (use$ or abuse$ or misuse$ or depend$ or addict$ or excess$ or exceed$ or harmful or risk$ or hazardous or problem$ or unhealthy or heavy or chronic or quit or disorder$)).ti,ab,kf. 122132
6 ((harmful$ or risk$ or hazardous or problem$ or binge$ or heavy or unhealthy or excess$ or exceed$) adj drink$).ti,ab,kf. 24049
7 heavy episodic.ti,ab,kf. 1354
8 maximum drinks.ti,ab,kf. 89
9 (alcoholism or alcoholic$).ti,ab,kf. 108183
10 or/1-9 244601
11 Mass screening/ 119977
12 screen$.ti,ab,kf. 1084105

13 (assessment adj (tool$ or instrument$)).ti,ab,kf. 50023
14 (alcohol$ adj5 (scale$ or inventor$ or questionnaire$ or survey$ or index$ or checklist$ or interview$)).ti,ab,kf. 16088
15 Substance Abuse Detection/ 10898
16 or/11-15 1178758
17 "Alcohol Use Disorders Identification Test".ti,ab,kf. 2517
18 AUDIT-C.ti,ab,kf. 1018
19 "Alcohol Smoking and Substance Involvement Screening Test".ti,ab,kf. 336
20 SASQ.ti,ab,kf. 18
21 Single Alcohol Screening Question$.ti,ab,kf. 19
22 (("National Institute on Alcohol Abuse and Alcoholism" or NIAAA) and Single Item).ti,ab,kf. 9
23 Cut down Annoyed Guilty Eye-opener.ti,ab,kf. 75
24 "Brief Screener for Tobacco Alcohol and other Drugs".ti,ab,kf. 1
25 BSTAD.ti,ab,kf. 3
26 Comorbidity Alcohol Risk Evaluation Tool.ti,ab,kf. 9
27 Tolerance Annoyed Cut down Eye opener.ti,ab,kf. 5
28 Tolerance Worried Eye-opener Amnesia Kut down.ti,ab,kf. 2
29 (((timeline or time line) adj1 (followback or follow back)) and (alcohol$ or drink$)).ti,ab,kf. 654
30 or/17-29 4016
31 10 and (16 or 30) 26987
32 (clinical trial or adaptive clinical trial or clinical trial, phase iii or clinical trial, phase iv or controlled clinical trial or randomized controlled trial or equivalence trial or pragmatic clinical trial or Meta-Analysis).pt. 1193274
33 clinical trials as topic/ or adaptive clinical trials as topic/ or clinical trials, phase iii as topic/ or clinical trials, phase iv as topic/ or controlled clinical trials as topic/ or non-randomized controlled trials as topic/ or randomized controlled trials as topic/ or equivalence trials as topic/ or intention to treat analysis/ or pragmatic clinical trials as topic/ or meta-analysis as topic/ 409678
34 control groups/ or double-blind method/ or single-blind method/ or random allocation/ or placebos/ 335075
35 (random$ or placebo or phase iii or phase 3).ti,ab. 1697965
36 (RCT or sham or dummy or single blind$ or double blind$ or allocated or allocation or triple blind$ or treble blind$).ti,ab. 485602
37 ((control$ or clinical) adj3 (study or studies or trial$ or group$)).ti,ab. 2056278
38 (Nonrandom$ or non random$ or non-random$ or quasi-random$ or quasirandom$).ti,ab. 59191
39 ((open label or open-label) adj5 (study or studies or trial$)).ti,ab. 49803
40 ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial$)).ti,ab. 13475
41 (pragmatic study or pragmatic studies).ti,ab. 666
42 ((pragmatic or practical) adj3 trial$).ti,ab. 6794
43 ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial$)).ti,ab. 14665
44 (metaanaly$ or meta analy$).ti,ab. 326460
45 (comparison group$ or matched comparison).ti,ab. 25937

46	or/32-45	3865433
47	31 and 46	5949
48	"Sensitivity and Specificity"/	375942
49	"Predictive Value of Tests"/	229871
50	ROC Curve/	76266
51	False Negative Reactions/	18365
52	False Positive Reactions/	28745
53	Diagnostic Errors/	40339
54	"Reproducibility of Results"/	484547
55	Reference Values/	165302
56	Reference Standards/	46616
57	Observer Variation/	45761
58	Receiver operat$.ti,ab.	152410
59	ROC curve$.ti,ab.	66845
60	sensitivit$.ti,ab.	1089439
61	specificit$.ti,ab.	626383
62	predictive value.ti,ab.	127052
63	accuracy.ti,ab.	631459
64	false positive$.ti,ab.	72574
65	false negative$.ti,ab.	40652
66	miss rate$.ti,ab.	752
67	error rate$.ti,ab.	19858
68	or/48-67	2889599
69	(10 and 16) or 30	27264
70	68 and 69	3813
71	Psychotherapy, Brief/	3745
72	(alcohol adj1 reduc$).ti,ab,kf.	5216
73	(alcohol adj (therap$ or treatment$)).ti,ab,kf.	2708
74	controlled drink$.ti,ab,kf.	276
75	Behavior Therapy/	31208
76	Cognitive Therapy/	32214
77	Counseling/	40975
78	Directive Counseling/	2429
79	Patient Education as Topic/	89678
80	Risk Reduction Behavior/	14606
81	Feedback, psychological/	3817
82	Health education/	64690
83	Health promotion/	84155
84	Motivation/	83825
85	Internet/	84561
86	Motivational interviewing/	2792
87	Persuasive communication/	4137
88	Self-help groups/	9759
89	Text messaging/	4926
90	Therapy, computer-assisted/	7017
91	(advice or advise$).ti,ab,kf.	106503

92 counsel$.ti,ab,kf. 148913
93 psychotherapy.ti,ab,kf. 47148
94 behavio?r$ chang$.ti,ab,kf. 54460
95 behavio?r$ intervention$.ti,ab,kf. 15609
96 behavio?r$ modification$.ti,ab,kf. 5693
97 motivational interview$.ti,ab,kf. 6236
98 (cognitive behavio$ or behavio$ therapy or cbt).ti,ab,kf. 50963
99 ("brief intervention$" or "brief therapy").ti,ab,kf. 5959
100 self help.ti,ab,kf. 8602
101 text messag$.ti,ab,kf. 7257
102 (web or website).ti,ab,kf. 248157
103 (computer adj (based or mediated or assisted)).ti,ab,kf. 48638
104 12 step.ti,ab,kf. 1089
105 twelve step.ti,ab,kf. 255
106 Alcoholics Anonymous/ 1265
107 alcoholics anonymous.ti,ab,kf. 942
108 (intervention$ or psychosocial).ti. 253503
109 or/71-108 1276696
110 10 and 109 30211
111 Alcohol-Related Disorders/pc, rh, th [Prevention & Control, Rehabilitation, Therapy] 1646
112 Alcoholic intoxication/pc, rh, th 1521
113 Alcoholism/pc, rh, th 21093
114 Binge Drinking/pc, rh, th or Alcohol-Related Disorders/px 1881
115 or/110-114 45953
116 or/32-36 2626595
117 115 and 116 9083
118 47 or 70 or 117 15826
119 limit 118 to english language 15320
120 exp Geographic Locations/ 5104551
121 "Andorra"/ or "Argentina"/ or exp "Australia"/ or "Austria"/ or "Bahamas"/ or "Bahrain"/ or "Republic of Belarus"/ or "Belgium"/ or "Brunei"/ or exp "Canada"/ or "Chile"/ or "Costa Rica"/ or "Croatia"/ or "Cyprus"/ or "Czech Republic"/ or exp "Denmark"/ or "Estonia"/ or "Finland"/ or exp "France"/ or "Georgia Republic"/ or exp "Germany"/ or "Greece"/ or "Hong Kong"/ or "Hungary"/ or "Iceland"/ or "Ireland"/ or "Israel"/ or exp "Italy"/ or exp "Japan"/ or "Kazakhstan"/ or "Kuwait"/ or "Latvia"/ or "Liechtenstein"/ or "Lithuania"/ or "Luxembourg"/ or "Malaysia"/ or "Malta"/ or "Mauritius"/ or "Montenegro"/ or "Netherlands"/ or "New Zealand"/ or exp "Norway"/ or "Oman"/ or exp "Panama"/ or "Poland"/ or "Portugal"/ or "Qatar"/ or "Romania"/ or exp "Russia"/ or "San Marino"/ or "Saudi Arabia"/ or "Serbia"/ or "Singapore"/ or "Slovakia"/ or "Slovenia"/ or exp "Republic of Korea"/ or "Spain"/ or "Sweden"/ or "Switzerland"/ or "Thailand"/ or "Trinidad and Tobago"/ or "Turkey"/ or "United Arab Emirates"/ or exp "United Kingdom"/ or exp "United States"/ or "Uruguay"/ or European Union/ or Developed Countries/ or "Organisation for Economic Co-Operation and Development"/ or australasia/ or europe/ or north america/ or "scandinavian and nordic countries"/ 3781190
122 120 not 121 1338005
123 119 not 122 14411

124 (201709* or 201710* or 201711* or 201712* or 2018* or 2019* or 2020* or 2021* or 2022* or 2023* or 2024*).dt,da,ez. 11407922
125 123 and 124 5708
126 2024*.dt,da,ez. 1623914
127 123 and 126 825

PsycInfo via Ovid - Main review search:
APA PsycInfo <1806 to March Week 3 2024>

1 exp "alcohol use disorder"/ 58412
2 (alcoholism or alcoholic$).ti,ab,id. 37583
3 (alcohol$ adj3 (use$ or abuse$ or misuse$ or depend$ or addict$ or excess$ or exceed$ or harmful or risk$ or hazardous or problem$ or unhealthy or heavy or chronic or quit or disorder$)).ti,ab,id. 91497
4 ((harmful$ or risk$ or hazardous or problem$ or binge$ or heavy or excessive or unhealthy or excess$ or exceed$) adj drink$).ti,ab,id. 19009
5 heavy episodic.ti,ab,id. 1174
6 or/1-5 121208
7 Screening/ 10286
8 Health Screening/ 4730
9 Screening Tests/ 9685
10 Intake Interview/ 382
11 Symptom Checklists/ 949
12 Interviews/ 13098
13 Questionnaires/ 26726
14 Rating Scales/ 25747
15 Self Report/ 23589
16 General Health Questionnaire/ 372
17 Computer Assisted Diagnosis/ 1733
18 screen$.ti,ab,id. 125418
19 (assessment adj (tool$ or instrument$)).ti,ab,id. 22035
20 (alcohol$ adj5 (scale$ or inventor$ or questionnaire$ or survey$ or index$ or checklist$ or interview$)).ti,ab,id. 10999
21 self report$.ti,ab,id. 156563
22 identif$.ti. 39056
23 or/7-22392114
24 "Alcohol Use Disorders Identification Test".ti,ab,tm. 10786
25 AUDIT-C.ti,ab,tm. 593
26 "Alcohol Smoking and Substance Involvement Screening Test".ti,ab,tm. 1067
27 SASQ.ti,ab,tm. 13
28 Single Alcohol Screening Question$.ti,ab,tm. 16
29 (("National Institute on Alcohol Abuse and Alcoholism" or NIAAA) and Single Item).ti,ab,tm. 8
30 Cut down Annoyed Guilty Eye-opener.ti,ab,tm. 51
31 "Brief Screener for Tobacco Alcohol and other Drugs".ti,ab,tm. 5
32 BSTAD.ti,ab,tm. 2

33 Comorbidity Alcohol Risk Evaluation Tool.ti,ab,tm. 14
34 Tolerance Annoyed Cut down Eye opener.ti,ab,tm. 5
35 Tolerance Worried Eye-opener Amnesia Kut down.ti,ab,tm. 4
36 (((timeline or time line) adj1 (followback or follow back)) and (alcohol$ or drink$)).ti,ab,tm. 2012
37 or/24-36 13344
38 exp randomized controlled trials/ or placebo/ or random sampling/ or experiment controls/ or meta analysis/ or (meta analysis or metasynthesis).md. 45533
39 (random$ or placebo or phase iii or phase 3).ti,ab. 274145
40 (RCT or sham or dummy or single blind$ or double blind$ or allocated or allocation or triple blind$ or treble blind$).ti,ab. 80481
41 ((control$ or clinical) adj3 (study or studies or trial$ or group$)).ti,ab. 265682
42 (Nonrandom$ or non random$ or non-random$ or quasi-random$ or quasirandom$).ti,ab. 6708
43 ((open label or open-label) adj5 (study or studies or trial$)).ti,ab. 5399
44 ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial$)).ti,ab. 1267
45 (pragmatic study or pragmatic studies).ti,ab. 155
46 ((pragmatic or practical) adj3 trial$).ti,ab. 1148
47 ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial$)).ti,ab. 7445
48 (metaanaly$ or meta analy$).ti,ab. 53911
49 (comparison group$ or matched comparison).ti,ab. 15920
50 or/38-49 528551
51 6 and (23 or 37) and 50 5483
52 Test Validity/ 92595
53 Test Reliability/ 61296
54 Interrater Reliability/ 3532
55 validity.ti,ab,id. 181183
56 reliability.ti,ab,id. 114941
57 Receiver operat$.ti,ab,id. 8264
58 ROC curve$.ti,ab,id. 3110
59 sensitivit$.ti,ab,id. 113611
60 specificit$.ti,ab,id. 46478
61 predictive value.ti,ab,id. 9225
62 accuracy.ti,ab,id. 92105
63 false positive$.ti,ab,id. 4967
64 false negative$.ti,ab,id. 1862
65 miss rate$.ti,ab,id. 98
66 error rate$.ti,ab,id. 6312
67 or/52-66 457707
68 (6 and 23) or 37 33580
69 67 and 68 4813
70 alcohol treatment/ 9120
71 Rehabilitation Counseling/ 1495
72 (alcohol adj1 reduc$).ti,ab,id. 3420
73 (alcohol adj (therap$ or treatment$)).ti,ab,id. 2544

74 controlled drink$.ti,ab,id. 391
75 Health Promotion/ 29443
76 Motivation/ 64761
77 Behavior Modification/ 10816
78 Behavior Change/ 14134
79 behavio?r$ chang$.ti,ab,id. 33229
80 behavio?r$ intervention$.ti,ab,id. 15232
81 behavio?r$ modification$.ti,ab,id. 6389
82 behavior therapy/ 16385
83 cognitive behavior therapy/ 25354
84 cognitive therapy/ 14141
85 Cognitive Techniques/ 1739
86 (cognitive behavio$ or behavio$ therapy or cbt).ti,ab,id. 64628
87 brief intervention$.ti,ab,id. 4584
88 Persuasive Communication/ 5696
89 Motivational Interviewing/ 3148
90 motivational interview$.ti,ab,id. 4823
91 Health Knowledge/ 9659
92 Health Behavior/ 32317
93 Health Education/ 15249
94 Client Education/ 4760
95 Feedback/ 22780
96 Feedback.ti. 16438
97 Online Therapy/ 4629
98 Computer Assisted Therapy/ 1253
99 Computer Mediated Communication/6917
100 Computer Assisted Testing/ 3385
101 Internet/ 31540
102 (computer adj (based or mediated or assisted)).ti,ab,id. 21625
103 text messag$.ti,ab,id. 3231
104 email$.ti,ab,id.7205
105 internet.ti,ab,id. 50686
106 (web or website).ti,ab,id. 54464
107 Self Help Techniques/4741
108 self help.ti,ab,id. 9938
109 counseling/ 26316
110 Group Counseling/ 5212
111 counseling.ti,ab,id. 89688
112 counselling.ti,ab,id. 14106
113 psychotherapy.ti,ab,id. 110075
114 Alcoholics Anonymous/ 1341
115 Twelve Step Programs/ 825
116 alcoholics anonymous.ti,ab,id. 2361
117 12 step.ti,ab,id. 1803
118 twelve step.ti,ab,id. 591
119 advice.ti,ab,id. 24249

120 advise$.ti,ab,id. 9945
121 (intervention$ or psychosocial).ti. 113649
122 or/70-121 729108
123 or/38-41 493752
124 6 and 122 and 123 6193
125 51 or 69 or 124 13424
126 limit 125 to english language 12821
127 (201709* or 201710* or 201711* or 201712* or 2018* or 2019* or 2020* or 2021* or 2022* or 2023* or 2024*).up.1178636
128 126 and 127 3689

PsycInfo via Ovid – Bridge:
APA PsycInfo <1806 to November 2024 Week 5>
1 exp "alcohol use disorder"/ 59583
2 (alcoholism or alcoholic$).ti,ab,id. 37823
3 (alcohol$ adj3 (use$ or abuse$ or misuse$ or depend$ or addict$ or excess$ or exceed$ or harmful or risk$ or hazardous or problem$ or unhealthy or heavy or chronic or quit or disorder$)).ti,ab,id. 93902
4 ((harmful$ or risk$ or hazardous or problem$ or binge$ or heavy or excessive or unhealthy or excess$ or exceed$) adj drink$).ti,ab,id. 19556
5 heavy episodic.ti,ab,id. 1220
6 or/1-5 123951
7 Screening/ 10378
8 Health Screening/ 4947
9 Screening Tests/ 10301
10 Intake Interview/ 390
11 Symptom Checklists/ 986
12 Interviews/ 13304
13 Questionnaires/ 27819
14 Rating Scales/ 26293
15 Self Report/ 24355
16 General Health Questionnaire/ 385
17 Computer Assisted Diagnosis/ 1831
18 screen$.ti,ab,id. 131656
19 (assessment adj (tool$ or instrument$)).ti,ab,id. 23124
20 (alcohol$ adj5 (scale$ or inventor$ or questionnaire$ or survey$ or index$ or checklist$ or interview$)).ti,ab,id. 11230
21 self report$.ti,ab,id. 163523
22 identif$.ti. 40479
23 or/7-22408579
24 "Alcohol Use Disorders Identification Test".ti,ab,tm. 11396
25 AUDIT-C.ti,ab,tm. 634
26 "Alcohol Smoking and Substance Involvement Screening Test".ti,ab,tm. 1128
27 SASQ.ti,ab,tm. 14
28 Single Alcohol Screening Question$.ti,ab,tm. 17

29 (("National Institute on Alcohol Abuse and Alcoholism" or NIAAA) and Single Item).ti,ab,tm. 8
30 Cut down Annoyed Guilty Eye-opener.ti,ab,tm. 52
31 "Brief Screener for Tobacco Alcohol and other Drugs".ti,ab,tm. 6
32 BSTAD.ti,ab,tm. 3
33 Comorbidity Alcohol Risk Evaluation Tool.ti,ab,tm. 14
34 Tolerance Annoyed Cut down Eye opener.ti,ab,tm. 5
35 Tolerance Worried Eye-opener Amnesia Kut down.ti,ab,tm. 4
36 (((timeline or time line) adj1 (followback or follow back)) and (alcohol$ or drink$)).ti,ab,tm. 2086
37 or/24-36 14070
38 exp randomized controlled trials/ or placebo/ or random sampling/ or experiment controls/ or meta analysis/ or (meta analysis or metasynthesis).md. 48975
39 (random$ or placebo or phase iii or phase 3).ti,ab. 285263
40 (RCT or sham or dummy or single blind$ or double blind$ or allocated or allocation or triple blind$ or treble blind$).ti,ab. 83421
41 ((control$ or clinical) adj3 (study or studies or trial$ or group$)).ti,ab. 276304
42 (Nonrandom$ or non random$ or non-random$ or quasi-random$ or quasirandom$).ti,ab. 7052
43 ((open label or open-label) adj5 (study or studies or trial$)).ti,ab. 5551
44 ((equivalence or superiority or non-inferiority or noninferiority) adj3 (study or studies or trial$)).ti,ab. 1337
45 (pragmatic study or pragmatic studies).ti,ab. 159
46 ((pragmatic or practical) adj3 trial$).ti,ab. 1262
47 ((quasiexperimental or quasi-experimental) adj3 (study or studies or trial$)).ti,ab. 7928
48 (metaanaly$ or meta analy$).ti,ab. 58041
49 (comparison group$ or matched comparison).ti,ab. 16253
50 or/38-49 549101
51 6 and (23 or 37) and 50 5695
52 Test Validity/ 95578
53 Test Reliability/ 62936
54 Interrater Reliability/ 3614
55 validity.ti,ab,id. 186765
56 reliability.ti,ab,id. 119047
57 Receiver operat$.ti,ab,id. 8790
58 ROC curve$.ti,ab,id. 3305
59 sensitivit$.ti,ab,id. 117312
60 specificit$.ti,ab,id. 47987
61 predictive value.ti,ab,id. 9560
62 accuracy.ti,ab,id. 96032
63 false positive$.ti,ab,id. 5130
64 false negative$.ti,ab,id. 1927
65 miss rate$.ti,ab,id. 99
66 error rate$.ti,ab,id. 6473
67 or/52-66 472900
68 (6 and 23) or 37 34822

69 67 and 68 4955
70 alcohol treatment/ 9299
71 Rehabilitation Counseling/ 1506
72 (alcohol adj1 reduc$).ti,ab,id. 3554
73 (alcohol adj (therap$ or treatment$)).ti,ab,id. 2589
74 controlled drink$.ti,ab,id. 394
75 Health Promotion/ 30426
76 Motivation/ 66846
77 Behavior Modification/ 10853
78 Behavior Change/ 14526
79 behavio?r$ chang$.ti,ab,id. 34419
80 behavio?r$ intervention$.ti,ab,id. 15829
81 behavio?r$ modification$.ti,ab,id. 6437
82 behavior therapy/ 16686
83 cognitive behavior therapy/ 26367
84 cognitive therapy/ 14194
85 Cognitive Techniques/ 1748
86 (cognitive behavio$ or behavio$ therapy or cbt).ti,ab,id. 66587
87 brief intervention$.ti,ab,id. 4767
88 Persuasive Communication/ 5778
89 Motivational Interviewing/ 3289
90 motivational interview$.ti,ab,id. 5007
91 Health Knowledge/ 10105
92 Health Behavior/ 33175
93 Health Education/ 15684
94 Client Education/ 4926
95 Feedback/ 23625
96 Feedback.ti. 16967
97 Online Therapy/ 5058
98 Computer Assisted Therapy/ 1277
99 Computer Mediated Communication/7071
100 Computer Assisted Testing/ 3486
101 Internet/ 31969
102 (computer adj (based or mediated or assisted)).ti,ab,id. 22020
103 text messag$.ti,ab,id. 3431
104 email$.ti,ab,id.7762
105 internet.ti,ab,id. 52801
106 (web or website).ti,ab,id. 58187
107 Self Help Techniques/4824
108 self help.ti,ab,id. 10130
109 counseling/ 26808
110 Group Counseling/ 5238
111 counseling.ti,ab,id. 91478
112 counselling.ti,ab,id. 14614
113 psychotherapy.ti,ab,id. 112224
114 Alcoholics Anonymous/ 1366

115 Twelve Step Programs/ 846
116 alcoholics anonymous.ti,ab,id. 2390
117 12 step.ti,ab,id. 1840
118 twelve step.ti,ab,id. 600
119 advice.ti,ab,id. 24990
120 advise$.ti,ab,id. 10271
121 (intervention$ or psychosocial).ti. 118890
122 or/70-121 752713
123 or/38-41 512795
124 6 and 122 and 123 6424
125 51 or 69 or 124 13888
126 limit 125 to english language 13299
127 (201709* or 201710* or 201711* or 201712* or 2018* or 2019* or 2020* or 2021* or 2022* or 2023* or 2024*).up.1324981
128 126 and 127 4166
129 2024*.up. 189654
130 126 and 129 528

Cochrane Central Register of Controlled Clinical Trials (CENTRAL) via Wiley – main review search

Date Run: 18/03/2024 22:25:23
ID Search Hits
#1 (alcohol* NEAR/2 (use* or abuse* or misuse* or depend* or addict* or excess* or exceed* or harmful or risk* or hazardous or problem* or unhealthy or heavy or chronic or quit or disorder*)):ti,ab,kw 15240
#2 ((harmful* or risk* or hazardous or problem* or binge* or heavy or unhealthy or excess* or exceed*) NEAR/1 drink*):ti,ab,kw 4659
#3 heavy episodic:ti,ab,kw 246
#4 maximum drinks:ti,ab,kw 290
#5 (alcoholism or alcoholic*):ti,ab,kw 16212
#6 {OR #1-#5} 25564
#7 screen*:ti,ab,kw 101240
#8 (assessment NEAR/1 (tool* or instrument*)):ti,ab,kw 7909
#9 (alcohol* NEAR/5 (scale* or inventor* or questionnaire* or survey* or index* or checklist* or interview*)):ti,ab,kw 2299
#10 {OR #7-#9} 110121
#11 "Alcohol Use Disorders Identification Test":ti,ab,kw 685
#12 AUDIT-C:ti,ab,kw 346
#13 "Alcohol Smoking and Substance Involvement Screening Test":ti,ab,kw 118
#14 SASQ:ti,ab,kw 15
#15 "Single Alcohol Screening" NEXT Question*:ti,ab,kw 11
#16 (("National Institute on Alcohol Abuse and Alcoholism" or NIAAA) and "Single Item"):ti,ab,kw 2
#17 "Cut down Annoyed Guilty Eye-opener":ti,ab,kw 3
#18 "Brief Screener for Tobacco Alcohol and other Drugs":ti,ab,kw 0
#19 BSTAD:ti,ab,kw 1

#20 "Comorbidity Alcohol Risk Evaluation Tool":ti,ab,kw 6
#21 "Tolerance Annoyed Cut down Eye opener":ti,ab,kw 1
#22 "Tolerance Worried Eye-opener Amnesia Kut down":ti,ab,kw 0
#23 (((timeline or time line) NEAR/1 (followback or follow back)) and (alcohol* or drink*)):ti,ab,kw 631
#24 {OR #11-#23} 1586
#25 #6 and (#10 or #24) 5233
#26 (sensitivit* or specificit*):ti,ab,kw 77178
#27 "predictive value":ti,ab,kw 17515
#28 accuracy:ti,ab,kw 29375
#29 (false NEXT (negativ* or positiv*)):ti,ab,kw 3956
#30 ((miss or error) NEXT rate*):ti,ab,kw 1900
#31 (advice or advise*):ti,ab,kw 19172
#32 (ROC NEXT curve*):ti,ab,kw 4121
#33 (receiver NEXT operat*):ti,ab,kw 7029
#34 {OR #26-#33} 132725
#35 ((#6 and #10) or #24) AND #34 758
#36 (alcohol NEAR/1 reduc*):ti,ab,kw 2069
#37 (alcohol NEAR/1 (therap* or treatment*)):ti,ab,kw 854
#38 (controlled NEXT drink*):ti,ab,kw 67
#39 (advice or advise*):ti,ab,kw 19172
#40 counsel*:ti,ab,kw 29860
#41 (behavio?r* NEXT chang*):ti,ab,kw 11908
#42 (behavio?r* NEXT intervention*):ti,ab,kw 7887
#43 (behavio?r* NEXT modification*):ti,ab,kw 1616
#44 (motivational NEXT interview*):ti,ab,kw 5431
#45 ((cognitive NEXT behavio*) or (behavio* NEXT therapy) or cbt):ti,ab,kw 36233
#46 (brief NEXT intervention*):ti,ab,kw 3050
#47 "self help":ti,ab,kw 4908
#48 (text NEXT messag*):ti,ab,kw 6077
#49 (web or website):ti,ab,kw 21605
#50 (computer NEXT (based or mediated or assisted)):ti,ab,kw 24054
#51 "12 step":ti,ab,kw 233
#52 "twelve step":ti,ab,kw 96
#53 "alcoholics anonymous":ti,ab,kw 159
#54 (intervention* or psychosocial):ti 85636
#55 {OR #36-#54} 202976
#56 #6 and #55 8645
#57 #25 or #35 or #56 with Cochrane Library publication date from Oct 2017 to present, in Trials 6772
#58 #57 NOT conference:pt 5743
#59 #58 NOT (clinicaltrials or trialsearch):so 2690

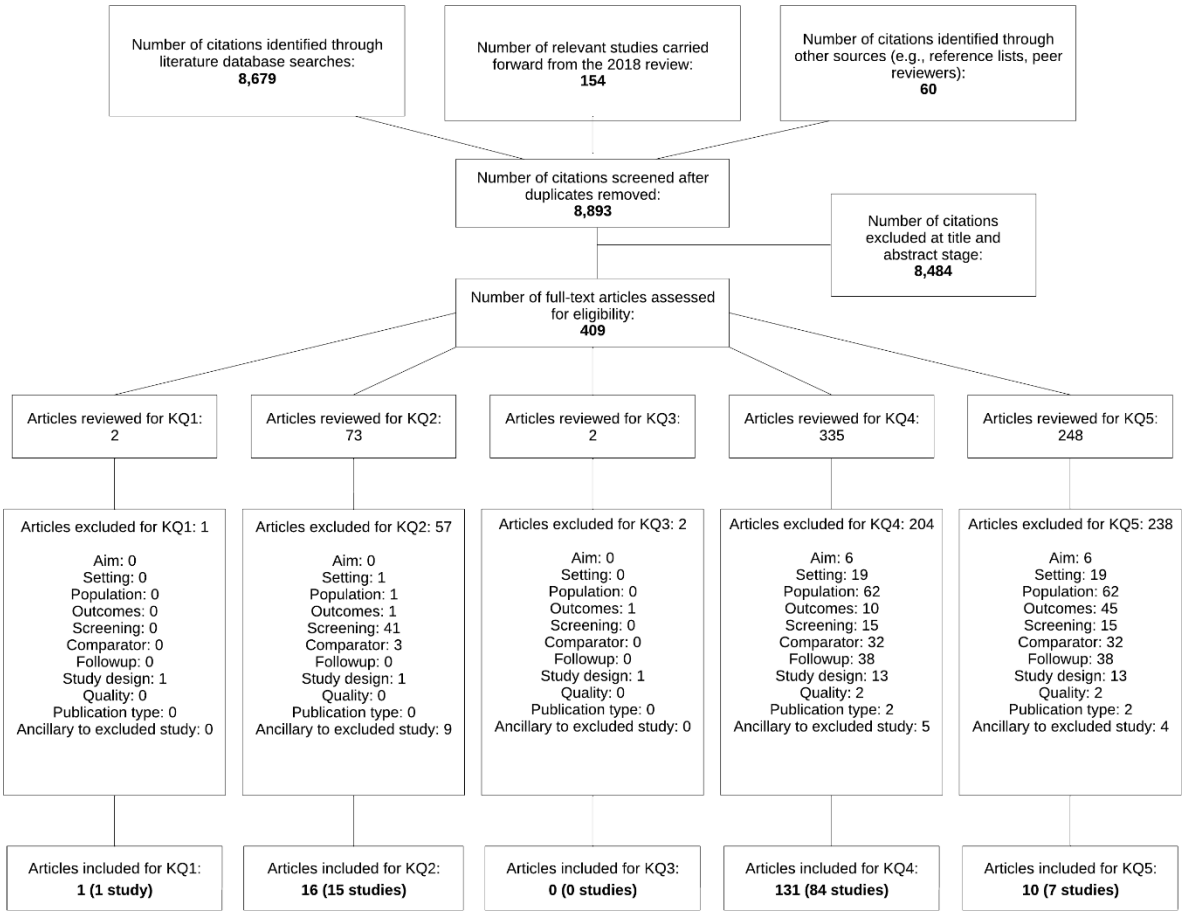
Cochrane Central Register of Controlled Clinical Trials (CENTRAL) via Wiley – main review search

Date Run: 05/12/2024 00:12:40

ID	Search Hits
#1	(alcohol* NEAR/2 (use* or abuse* or misuse* or depend* or addict* or excess* or exceed* or harmful or risk* or hazardous or problem* or unhealthy or heavy or chronic or quit or disorder*)):ti,ab,kw 15992
#2	((harmful* or risk* or hazardous or problem* or binge* or heavy or unhealthy or excess* or exceed*) NEAR/1 drink*):ti,ab,kw 4870
#3	heavy episodic:ti,ab,kw 258
#4	maximum drinks:ti,ab,kw 311
#5	(alcoholism or alcoholic*):ti,ab,kw 16906
#6	{OR #1-#5} 26826
#7	screen*:ti,ab,kw 109759
#8	(assessment NEAR/1 (tool* or instrument*)):ti,ab,kw 8620
#9	(alcohol* NEAR/5 (scale* or inventor* or questionnaire* or survey* or index* or checklist* or interview*)):ti,ab,kw 2413
#10	{OR #7-#9} 119343
#11	"Alcohol Use Disorders Identification Test":ti,ab,kw 740
#12	AUDIT-C:ti,ab,kw 381
#13	"Alcohol Smoking and Substance Involvement Screening Test":ti,ab,kw 125
#14	SASQ:ti,ab,kw 15
#15	"Single Alcohol Screening" NEXT Question*:ti,ab,kw 12
#16	(("National Institute on Alcohol Abuse and Alcoholism" or NIAAA) and "Single Item"):ti,ab,kw 2
#17	"Cut down Annoyed Guilty Eye-opener":ti,ab,kw 3
#18	"Brief Screener for Tobacco Alcohol and other Drugs":ti,ab,kw 0
#19	BSTAD:ti,ab,kw 2
#20	"Comorbidity Alcohol Risk Evaluation Tool":ti,ab,kw 6
#21	"Tolerance Annoyed Cut down Eye opener":ti,ab,kw 1
#22	"Tolerance Worried Eye-opener Amnesia Kut down":ti,ab,kw 0
#23	(((timeline or time line) NEAR/1 (followback or follow back)) and (alcohol* or drink*)):ti,ab,kw 661
#24	{OR #11-#23} 1690
#25	#6 and (#10 or #24) 5551
#26	(sensitivit* or specificit*):ti,ab,kw 80619
#27	"predictive value":ti,ab,kw 17979
#28	accuracy:ti,ab,kw 31055
#29	(false NEXT (negativ* or positiv*)):ti,ab,kw 4087
#30	((miss or error) NEXT rate*):ti,ab,kw 2038
#31	(advice or advise*):ti,ab,kw 20674
#32	(ROC NEXT curve*):ti,ab,kw 4302
#33	(receiver NEXT operat*):ti,ab,kw 7374
#34	{OR #26-#33} 139626
#35	((#6 and #10) or #24) AND #34 805
#36	(alcohol NEAR/1 reduc*):ti,ab,kw 2176
#37	(alcohol NEAR/1 (therap* or treatment*)):ti,ab,kw 884
#38	(controlled NEXT drink*):ti,ab,kw 71

#39 (advice or advise*):ti,ab,kw 20674
#40 counsel*:ti,ab,kw 31517
#41 (behavio?r* NEXT chang*):ti,ab,kw 12748
#42 (behavio?r* NEXT intervention*):ti,ab,kw 8352
#43 (behavio?r* NEXT modification*):ti,ab,kw 1692
#44 (motivational NEXT interview*):ti,ab,kw 5768
#45 ((cognitive NEXT behavio*) or (behavio* NEXT therapy) or cbt):ti,ab,kw 38414
#46 (brief NEXT intervention*):ti,ab,kw 3192
#47 "self help":ti,ab,kw 5218
#48 (text NEXT messag*):ti,ab,kw 6564
#49 (web or website):ti,ab,kw 23360
#50 (computer NEXT (based or mediated or assisted)):ti,ab,kw 24882
#51 "12 step":ti,ab,kw 238
#52 "twelve step":ti,ab,kw 98
#53 "alcoholics anonymous":ti,ab,kw 160
#54 (intervention* or psychosocial):ti 92495
#55 {OR #36-#54} 216958
#56 #6 and #55 9094
#57 #25 or #35 or #56 with Cochrane Library publication date from Jan 2024 to present, in Trials 785
#58 #57 NOT conference:pt 744
#59 #58 NOT (clinicaltrials or trialsearch):so 388

Appendix A, Figure 1. Literature Flow Diagram



Abbreviations: KQ = Key question

Appendix A, Table 1. Inclusion and Exclusion Criteria

Category	Included	Excluded
Aim	Screening for unhealthy alcohol use and interventions for unhealthy alcohol use, with or without addressing other substances or behaviors. See "Condition" for the definition of unhealthy alcohol use.	Studies in which the only aim is targeting another behavior (e.g., drug or tobacco use) such that change in alcohol use is not a stated aim, even if it is a reported outcome
Condition	Unhealthy alcohol use, including: • Risky or hazardous use: consumption of alcohol above recommended daily, weekly, or per occasion amounts; consumption levels that increase the risk for health consequences (e.g., according to national guidelines or relevant professional societies) • Harmful use: a pattern of drinking that is already causing damage to health; damage may be either physical (e.g., liver damage from chronic drinking) or mental (e.g., depressive episodes secondary to drinking) • A diagnosis of an alcohol use disorder (e.g., according to Diagnostic and Statistical Manual of Mental Disorders [DSM] or International Classification of Diseases [ICD] diagnostic systems)	
Population	**All KQs:** Adolescents and adults (age ≥12 years), including those who are pregnant **KQs 1–3:** Studies whose participants are not selected on the basis of alcohol use or a related behavior or condition **KQs 4, 5:** Studies in which at least 50% of the enrolled sample is recruited via population-based screening, and at least 50% do not meet criteria for severe alcohol use disorder or alcohol dependence	Studies in which >50% of participants are: • Treatment-seeking individuals (including those responding to recruitment advertising) • Persons with concomitant psychotic disorders (e.g., schizophrenia) • Persons presenting in an emergency setting for alcohol-related issues (e.g., motor vehicle injury) • Other groups not generalizable to primary care (e.g., psychiatric inpatients, persons who are court-mandated to treatment, and incarcerated persons) • **KQs 4, 5:** Persons with severe alcohol use disorder or dependent alcohol abuse (or >50% of the enrolled sample)
Screening	**KQs 1, 3, 4, 5:** Screening for alcohol use using a brief standardized instrument or set of questions that is conducted in person or via telephone, mail, or electronically (not limited to the tools listed for KQ2) **KQ 2:** Accuracy of screening instruments will be limited to the following instruments, which include the most widely used and feasible for application in primary care in adolescents, and new versions of previously established instruments adapted to standard drink size and hazardous drinking guidelines in the United States: • All populations: U.S. Alcohol Use Disorders Identification Test (USAUDIT), USAUDIT-Concise (USAUDIT-C), version optimized for the United States • Adolescents: National Institute on Alcohol Abuse and Alcoholism (NIAAA) two-item screening test, Screening to	• Studies without any screening instruments or question(s) • Laboratory tests • For KQ2 only, other screening tests (including the AUDIT, AUDIT-C using traditional drink size guidelines); the previous review determined that screening tools in adults have adequate accuracy to detect unhealthy alcohol use with high strength of evidence; however, the USAUDIT and USAUDIT-C were under development at the time of the previous review

Category	Included	Excluded
	Brief Intervention (S2BI), Brief Screener for Tobacco, Alcohol, and other Drugs (BSTAD) or comparable	
Interventions	Counseling to reduce unhealthy alcohol use, with or without referral. Counseling interventions can vary in their approach (e.g., 12-step program, cognitive behavioral therapy, or motivational enhancement therapy), specific strategies, delivery method (e.g., face-to-face, electronic, individual, group-based, or telemedicine), duration of contact, and the number of contacts. Interventions may address other substances in addition to alcohol, but alcohol use reduction must be a primary aim of the study.	• Financial incentive • Vocational rehabilitation • Community-based media or policy interventions • Interventions to prevent initiation of use among those who did not use alcohol or are without unhealthy alcohol use • Pharmacotherapy • Interventions conducted among peers with preexisting relationships (e.g., students at the same high school)
Comparators	**KQs 1, 3:** No screening or usual care **KQ 2:** Comparison with reference standard (i.e., structured or semistructured clinical interview) **KQs 4, 5:** • No intervention • Usual care • Waitlist • Attention control (e.g., intervention is similar in format and intensity but on a different content area) • Minimal intervention (e.g., no more than one single brief contact per year, brief written materials such as pamphlets)	Active intervention (e.g., comparators with a reasonable expectation of affecting change in alcohol consumption)
Setting	**KQs 1–3:** Broad-based, general settings, including: primary care; prenatal or obstetrics/gynecology; geriatric ambulatory care; subspecialty medical settings other than addiction or mental health (e.g., orthopedic, allergy); research clinics; broad community or school settings (e.g., Special Supplemental Nutrition Program for Women, Infants, and Children [WIC] or college freshman orientation); may include electronic or computer-based screening **KQs 4, 5:** Broad-based, general settings as described above, or mental health, addiction, or substance specialty settings. Screening to identify eligible participants must take place in broad-based, general settings as described above	Screening that takes place in: • Behavioral/mental health clinic • Substance abuse treatment center • Emergency department/trauma center • Worksites • Inpatient/residential facilities • Other institutions (e.g., correctional facility) Interventions that take place in: • Worksites • Inpatient/residential facilities

Category	Included	Excluded
		• Other institutions (e.g., correctional facility) • Classrooms, or target the school environment (interventions that are conducted in school-based health clinics, entirely online, or in the community but participants are recruited from schools are *included*)

Outcomes	**KQs 1a, 4a:**
	• Alcohol use (**required**), self-report and/or biologic measures, including:
	  ○ Frequency and/or quantity of alcohol use
	  ○ Abstinence (use/no use)
	  ○ Severity of alcohol use disorder (reported as an index measured by a standardized questionnaire, such as the Short Inventory of Problems, Addiction Severity Index, or the Severity of Dependence Scale)
	  ○ Meeting criteria for alcohol use disorder
	• Other risky behaviors (e.g., other illicit drug use, risky sexual behaviors, perpetuating or experiencing violence)
	
	KQs 1b, 4b:
	• All-cause mortality
	• Alcohol-related mortality (intentional and unintentional)
	• Symptoms and conditions associated with unhealthy alcohol use (e.g., mental health symptoms/disorders; alcohol-related liver problems, including fatty liver disease, alcoholic hepatitis, and alcoholic cirrhosis; cancer; cardiovascular disease, such as cardiomyopathy; neuropathy; cognitive impairment; gastritis; gastric ulcers; pancreatitis; anemia; and injuries, assaults, and accidents)
	• Acute healthcare use: visits to emergency department and inpatient stays
	• Obstetrical/perinatal/neonatal outcomes (e.g., perinatal mortality, preterm labor/delivery, low birth weight, placental abruption, intrauterine growth restriction, preeclampsia, antepartum or postpartum hemorrhage, gestational hypertension, decreased neonate length/head circumference, neonate neurobehavioral effects, congenital anomalies, neonatal abstinence syndrome, neonatal intensive care unit admission, decreased length of neonate hospitalization, and fetal alcohol spectrum disorders)
	• Quality of life
	• Alcohol-related problems, such as legal problems (arrests or DUI citations), social and family relations, employment, and school/educational outcomes
	
	KQ 2: Sensitivity and specificity or data to calculate them
	
	KQs 3, 5:
	• Serious harms at any time point after the screening or intervention began (e.g., death, seizure, cardiovascular event, or other medical issue requiring urgent medical treatment; serious obstetrical/perinatal/neonatal complication)
	• Demoralization due to failed quit attempt
	• Psychological harms (e.g., stigma, shame, labeling, and/or discrimination)
		• Attitudes, knowledge, and beliefs related to alcohol use
		• Intention to change behavior
		• Intervention participation/compliance
		• Alcohol use initiation among adolescents who have not used alcohol

Category	Included	Excluded
	• Privacy issues (e.g., insurability status) • Job loss • Lack of trust or interference with the doctor-patient relationship	
Outcome assessment timing	At least 6 months after baseline measurement (except for studies in pregnant women, for which shorter followup times will be included)	
Study design	**KQs 1, 3:** Studies that compare individuals who receive screening with those receiving no screening or usual care, including randomized, controlled trials and nonrandomized controlled trials (i.e., longitudinal studies with concurrent comparisons groups) **KQ 2:** Studies of screening accuracy reporting sensitivity and specificity compared with a structured or semistructured clinical interview **KQs 4, 5:** Randomized, controlled trials	Other study designs
Country	Studies conducted in countries categorized as "Very High" on the 2021 Human Development Index (as defined by the United Nations Development Programme)	Studies conducted in countries that are not categorized as "Very High" on the 2021 Human Development Index
Publication date	Studies whose primary results were published from 1985 to present	Studies whose primary results were published prior to 1985
Publication language	English	Languages other than English
Quality	Fair or good quality	Poor quality (according to design-specific USPSTF criteria)

Abbreviations: DUI = driving under the influence; KQ =key question; USPSTF = U.S. Preventive Services Task Force

Appendix A, Table 2: Quality assessment criteria*

Study Design	Adapted Quality Criteria
Randomized and non-randomized controlled trials, adapted from the U.S. Preventive Services Task Force methods[1]	**Bias arising in the randomization process or due to confounding** • Valid random assignment/random sequence generation method used • Allocation concealed • Balance in baseline characteristics **Bias in selecting participants into the study** • CCT only: No evidence of biased selection of sample **Bias due to departures from intended interventions** • Fidelity to the intervention protocol • Low risk of contamination between groups • Participants were analyzed as originally allocated **Bias from missing data** • No, or minimal, post-randomization exclusions • Outcome data are reasonably complete and comparable between groups • Reasons for missing data are similar across groups • Missing data are unlikely to bias results **Bias in measurement of outcomes** • Blinding of outcome assessors • Outcomes are measured using consistent and appropriate procedures and instruments across treatment groups • No evidence of inferential statistics **Bias in reporting results selectively** • No evidence that the measures, analyses, or subgroup analyses are selectively reported
Test accuracy studies, adapted from QUADAS-2[2, 3]	**Patient Selection** • Was a consecutive or random sample of patients enrolled? • Did the study avoid inappropriate exclusions? **Index Test** • Were the index test results interpreted without knowledge of the reference standard results? • If a threshold was used, was it prespecified or was a range of values presented? **Reference Standard** • Is the reference standard likely to correctly classify the target condition? • Were the reference standard results interpreted without knowledge of the index test? • Were staff trained in the use of the reference standard? • Was fidelity of the reference standard monitored or reported? **Flow and Timing** • Was there an appropriate interval between the index test and reference standard? • Did all patients receive a reference standard? • Did all patients receive the same reference standard? • Were all patients included in the analysis?

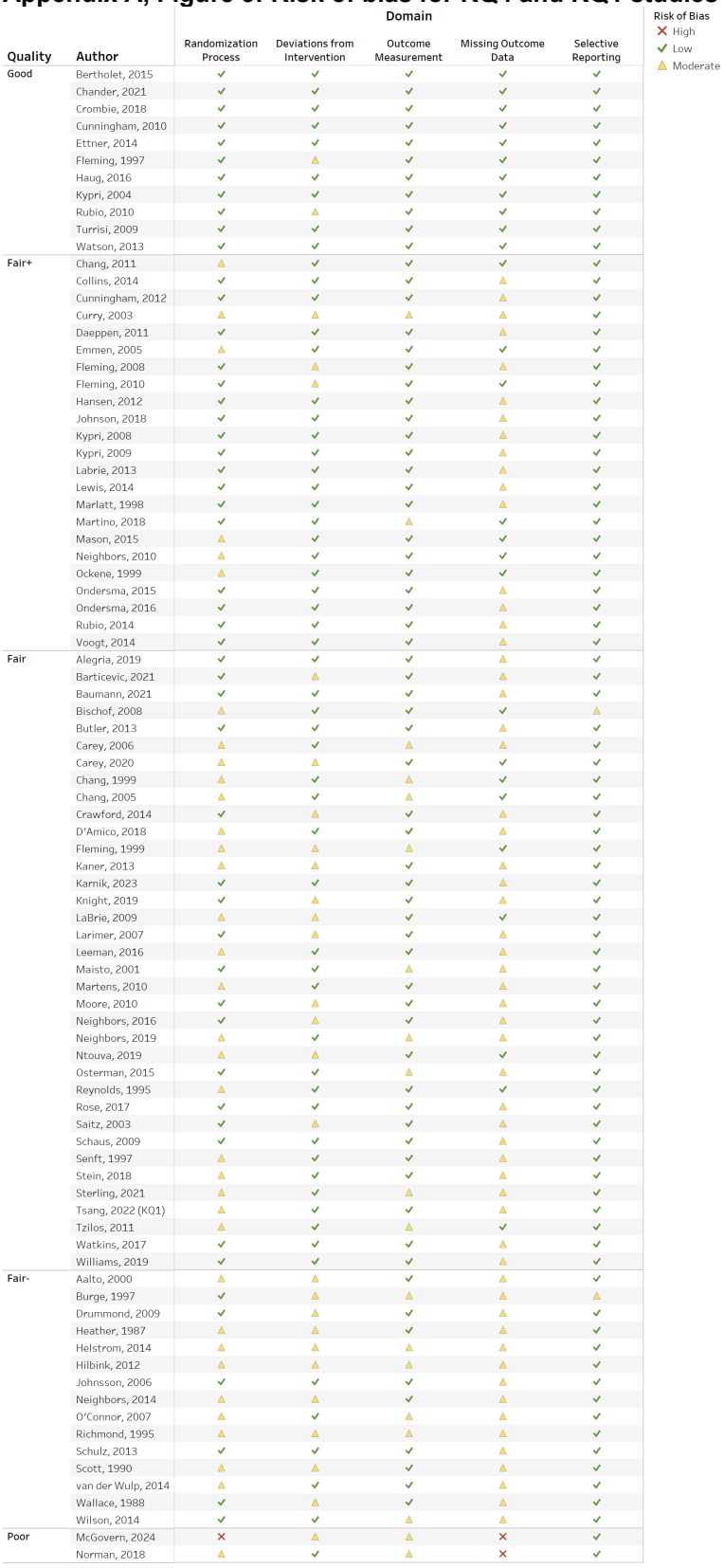
* Good quality studies generally meet all quality criteria. Fair quality studies do not meet all the criteria but do not have critical limitations that could invalidate study findings. Poor quality studies have a single fatal flaw or multiple important limitations that could invalidate study findings. Critical appraisal of studies using *a priori* quality criteria are conducted independently by at least two reviewers. Disagreements in final quality assessment are resolved by consensus, and, if needed, consultation with a third independent reviewer.

Appendix A, Figure 2: Risk of bias for test accuracy studies (Key Question 2)

Quality	Author	Domain			
		Patient Selection	Index Test	Reference Standard	Patient Flow
Good	Chung, 2012	✓	✓	✓	✓
	Clark, 2016	✓	✓	✓	✓
	D'Amico, 2016	✓	✓	✓	✓
	Harris, 2016	✓	✓	✓	✓
	Knight, 2003	✓	✓	✓	✓
	Levy, 2023	✓	✓	✓	✓
Fair	Cortes-Tomas, 2017	✓	✓	△	✓
	Kelly, 2014	△	△	△	✓
	Levy, 2016	✓	△	✓	✓
	Levy, 2021	△	✓	△	△
	Liskola, 2018	△	△	✓	△
	McCabe, 2019	△	✓	△	✓
	Rumpf, 2013	✓	✓	△	△
	Santis, 2009	✓	✓	△	△
	Villarosa-Hurlocker, 2020	△	✓	△	✓

Risk of Bias
✓ Low
△ Moderate

Appendix A, Figure 3: Risk of bias for KQ4 and KQ1 studies



Quality	Author	Domain: Randomization Process	Deviations from Intervention	Outcome Measurement	Missing Outcome Data	Selective Reporting
Good	Bertholet, 2015	✓	✓	✓	✓	✓
	Chander, 2021	✓	✓	✓	✓	✓
	Crombie, 2018	✓	✓	✓	✓	✓
	Cunningham, 2010	✓	✓	✓	✓	✓
	Ettner, 2014	✓	✓	✓	✓	✓
	Fleming, 1997	✓	△	✓	✓	✓
	Haug, 2016	✓	✓	✓	✓	✓
	Kypri, 2004	✓	✓	✓	✓	✓
	Rubio, 2010	✓	△	✓	✓	✓
	Turrisi, 2009	✓	✓	✓	✓	✓
	Watson, 2013	✓	✓	✓	✓	✓
Fair+	Chang, 2011	△	✓	✓	✓	✓
	Collins, 2014	✓	✓	✓	△	✓
	Cunningham, 2012	✓	✓	✓	△	✓
	Curry, 2003	△	△	△	△	✓
	Daeppen, 2011	✓	✓	✓	△	✓
	Emmen, 2005	△	✓	✓	✓	✓
	Fleming, 2008	✓	△	✓	△	✓
	Fleming, 2010	✓	△	✓	✓	✓
	Hansen, 2012	✓	✓	✓	△	✓
	Johnson, 2018	✓	✓	✓	△	✓
	Kypri, 2008	✓	✓	✓	△	✓
	Kypri, 2009	✓	✓	✓	△	✓
	Labrie, 2013	✓	✓	✓	△	✓
	Lewis, 2014	✓	✓	✓	△	✓
	Marlatt, 1998	✓	✓	✓	△	✓
	Martino, 2018	✓	✓	△	✓	✓
	Mason, 2015	△	✓	✓	✓	✓
	Neighbors, 2010	△	✓	✓	✓	✓
	Ockene, 1999	△	✓	✓	✓	✓
	Ondersma, 2015	✓	✓	✓	△	✓
	Ondersma, 2016	✓	✓	✓	△	✓
	Rubio, 2014	✓	✓	✓	△	✓
	Voogt, 2014	✓	✓	✓	△	✓
Fair	Alegria, 2019	✓	✓	✓	△	✓
	Barticevic, 2021	✓	△	✓	△	✓
	Baumann, 2021	✓	✓	✓	△	✓
	Bischof, 2008	△	✓	✓	✓	△
	Butler, 2013	✓	✓	✓	△	✓
	Carey, 2006	△	✓	△	△	✓
	Carey, 2020	△	△	✓	✓	✓
	Chang, 1999	△	✓	△	✓	✓
	Chang, 2005	△	✓	△	✓	✓
	Crawford, 2014	✓	△	✓	△	✓
	D'Amico, 2018	△	✓	✓	△	✓
	Fleming, 1999	△	△	△	✓	✓
	Kaner, 2013	△	△	✓	△	✓
	Karnik, 2023	✓	✓	✓	△	✓
	Knight, 2019	✓	△	✓	△	✓
	LaBrie, 2009	△	△	✓	✓	✓
	Larimer, 2007	✓	△	✓	△	✓
	Leeman, 2016	△	✓	✓	△	✓
	Maisto, 2001	✓	✓	△	△	✓
	Martens, 2010	△	✓	✓	△	✓
	Moore, 2010	✓	△	✓	△	✓
	Neighbors, 2016	✓	△	✓	△	✓
	Neighbors, 2019	△	✓	△	△	✓
	Ntouva, 2019	△	△	✓	✓	✓
	Osterman, 2015	✓	✓	△	△	✓
	Reynolds, 1995	△	✓	✓	✓	✓
	Rose, 2017	✓	✓	✓	△	✓
	Saitz, 2003	✓	△	✓	△	✓
	Schaus, 2009	✓	✓	✓	△	✓
	Senft, 1997	△	✓	✓	△	✓
	Stein, 2018	△	✓	✓	△	✓
	Sterling, 2021	△	✓	△	△	✓
	Tsang, 2022 (KQ1)	△	✓	✓	△	✓
	Tzilos, 2011	△	✓	△	✓	✓
	Watkins, 2017	✓	✓	✓	△	✓
	Williams, 2019	✓	✓	✓	△	✓
Fair-	Aalto, 2000	△	△	✓	△	✓
	Burge, 1997	✓	△	△	△	△
	Drummond, 2009	✓	△	✓	△	✓
	Heather, 1987	△	△	✓	△	✓
	Helstrom, 2014	△	△	△	△	✓
	Hilbink, 2012	△	△	△	△	✓
	Johnsson, 2006	✓	✓	✓	△	✓
	Neighbors, 2014	△	△	✓	△	✓
	O'Connor, 2007	△	✓	△	△	✓
	Richmond, 1995	△	△	△	△	✓
	Schulz, 2013	✓	✓	✓	△	✓
	Scott, 1990	△	△	✓	△	✓
	van der Wulp, 2014	△	✓	✓	△	✓
	Wallace, 1988	✓	△	✓	△	✓
	Wilson, 2014	✓	✓	△	△	✓
Poor	McGovern, 2024	✗	△	△	✗	✓
	Norman, 2018	△	✓	△	✗	✓

Appendix B. Recommendations of Others

Appendix B, Table 1. Recommendations of Other Organizations, by Year

Organization	Year	Recommendation
American College of Physicians[4]	2024	Primary care clinicians and other health care providers play an important role in screening, diagnosing, and treating unhealthy alcohol use. ACP supports comprehensive coverage of evidence-based screening, diagnosis, and treatment of adults with alcohol use disorder and excessive alcohol use. ACP also recommends that medical education include training on screening and treatment of substance use disorders, including alcohol use disorder.
National Institute on Alcohol Abuse and Alcoholism[5]	2023	Any healthcare professional in medical or mental health fields can easily screen for heavy drinking as part of a comprehensive assessment or health history. In primary care, teams that include nurses and other non-physician providers are increasingly used for alcohol screening. Patient self-reporting on paper, a tablet, or online (such as through a patient portal) may provide more accurate answers than asking directly. Regardless of how screening is administered, entering the results into the patient's medical chart or electronic health record (EHR) can facilitate collaborative care. In primary care settings, use a brief screener (e.g., AUDIT-C or SASQ) and ask follow-up questions as needed. After assessing patients for AUD, advise and assist them toward cutting back and quitting. For patients who drink heavily and do not have AUD: offer brief advice to cut back or quit if medically indicated. For patients who have AUD: advise abstinence and emphasize that it's important to cut down gradually. Consider the need for medically managed withdrawal and consider referral to specialty care, especially for patients with mental health comorbidities or more severe AUD.
Department of Veterans Health Affairs[6]	2021	For patients in general medical and mental health care settings, screening for unhealthy alcohol annually using the three-item Alcohol Use Disorders Identification Test-Consumption (AUDIT-C) or Single Item Alcohol Screening Questionnaire (SASQ) is recommended. For patients without documented alcohol use disorder who screen positive for unhealthy alcohol use, physicians should provide a single, initial brief intervention regarding alcohol-related risks and advice to abstain or drink within nationally established age and sex-specific limits for daily and weekly consumption. For patients with alcohol use disorder, we suggest one or more of the following interventions, considering patient preference and availability: Behavioral couples therapy, Cognitive behavioral therapy, Community reinforcement approach, Motivational enhancement therapy, 12-step facilitation.
American Academy of Pediatrics (AAP)[7]	2019	The AAP supports the following: • Sending a clear message against the use of alcohol by adolescents and young adults under the age of 21 years. • Existing state laws that dictate a minimum purchase age of 21 years for alcohol. • Existing state laws granting graduated driver licensing over the course of adolescence, in addition to best practices for screening and intervention when there is concern for potential alcohol use by teenage drivers. • Advocacy for continued research on the impact of alcohol use on the developing brain. • Continued work for evidence-based policy to target social media in addition to traditional marketing of alcohol to youth. • Advocacy for taxes on alcohol products.

Organization	Year	Recommendation
		• Continued support for the role of schools in providing general health education, community programming, and focused screening and education regarding alcohol use. • State legislation to ban the sale and distribution of powdered alcohol and upholding existing state legislation. • Continued awareness, knowledge, and skill development so that pediatricians screen for alcohol use, implement brief interventions targeting use, and provide education to adolescents and their families about hazards, consequences, and interventions around alcohol use. • Pediatricians' support for increased investment in treatment services for adolescents and young adults that target substance use disorders.
	2016	Pediatricians should increase their capacity in substance use detection, assessment, and intervention. Pediatricians should become familiar with adolescent SBIRT practices and their potential to be incorporated into universal screening and comprehensive care of adolescents in the medical home.
	2011 (Reaffirmed 2014)	Providers should regularly screen all adolescent patients for alcohol use with validated screening tools and respond to screening results with the appropriate brief intervention.
United States Surgeon General[8]	2016	Routinely screen for alcohol and other substance use in primary care settings, especially among those with known risk factors. Evidence indicates that alcohol misuse and alcohol use disorders among adults can be reliably and easily identified through screening, and that less severe forms of these conditions often respond positively to brief physician advice and other brief interventions that can be delivered in general health care settings such as primary care or emergency departments. Coordinated implementation of recent health reform and parity laws will help ensure increased access to services for people with substance use disorders.
Centers for Disease Control & Prevention[9]	2014	Because drinking patterns change over time, patients should be screened at least annually for unhealthy alcohol use. Exceptions include children under 9 years of age, who are not likely to drink alcohol and Patients who are too ill to answer screening questions at a particular visit. Brief screeners are recommended, specifically the Single Question Alcohol Screen and AUDIT (US). Patients who screen positive for risky drinking should be offered a brief intervention.
World Health Organization[10]	2014	Healthcare providers should use a validated screening instrument to ask all pregnant women about their use of alcohol as early as possible in pregnancy and at every antenatal visit. Offer a brief intervention to all pregnant women who report using alcohol.
American College of Obstetricians and Gynecologists[11]	2011 (Reaffirmed 2021)	All women should be screened for alcohol use both before pregnancy and in their first trimester of pregnancy, using validated tools such as T-ACE. If unhealthy alcohol use is identified, brief counseling should be provided with referral to treatment if deemed necessary.
National Institute for Health and Care Excellence (NICE)[12]	2011 (Reaffirmed 2019)	Health and social care staff should receive alcohol awareness training that promotes respectful, non-judgmental care of people who misuse alcohol. Health and social care staff opportunistically carry out screening and brief interventions for hazardous and harmful drinking as an integral part of practice.

Organization	Year	Recommendation
		Adults who misuse alcohol are offered evidence-based psychological interventions, and those with alcohol dependence that is moderate or severe can in addition access relapse prevention medication in accordance with NICE guidance. Children and young people accessing specialist services for alcohol use are offered individual cognitive behavioural therapy, or if they have significant comorbidities or limited social support, a multicomponent program of care including family or systems therapy.

Abbreviations: AUD = alcohol use disorder; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; EHR = electronic health record; SASQ = Single Alcohol Screening Question; SBIRT = screening, brief intervention, referral to treatment; T-ACE = tolerance, annoyed, cut down, eye opener

Appendix C. Included Studies

Below is a list of included studies and their ancillary publications (indented below main results publication):

Key Question 1

1. Tsang, T. W.,Kingsland, M.,Doherty, E.,Wiggers, J.,Attia, J.,Wolfenden, L.,Dunlop, A.,Tully, B.,Symonds, I.,Rissel, C.,Lecathelinais, C.,Elliott, E. J.. Effectiveness of a practice change intervention in reducing alcohol consumption in pregnant women attending public maternity services. Substance Abuse Treatment, Prevention, & Policy. 2022. 17:63.

Key Question 2

2. Chung, T.,Smith, G. T.,Donovan, J. E.,Windle, M.,Faden, V. B.,Chen, C. M.,Martin, C. S.. Drinking frequency as a brief screen for adolescent alcohol problems. Pediatrics. 2012. 129:205-12
3. Clark, D. B.,Martin, C. S.,Chung, T.,Gordon, A. J.,Fiorentino, L.,Tootell, M.,Rubio, D. M.. Screening for Underage Drinking and Diagnostic and Statistical Manual of Mental Disorders, 5th Edition Alcohol Use Disorder in Rural Primary Care Practice. Journal of Pediatrics. 2016. 173:214-20
4. Cortes-Tomas, Maria-Teresa,Gimenez-Costa, Jose-Antonio,Motos-Selles, Patricia,Sancerni-Beitia, Maria-Dolores. Revision of AUDIT consumption items to improve the screening of youth binge drinking. Frontiers in Psychology Vol 8, 2017, ArtID 910. 2017. 8:
5. D'Amico, E. J.,Parast, L.,Meredith, L. S.,Ewing, B. A.,Shadel, W. G.,Stein, B. D.. Screening in Primary Care: What Is the Best Way to Identify At-Risk Youth for Substance Use?. Pediatrics. 2016. 138
    a. Parast, L.,Meredith, L. S.,Stein, B. D.,Shadel, W. G.,D'Amico, E. J.. Identifying adolescents with alcohol use disorder: Optimal screening using the National Institute on Alcohol Abuse and Alcoholism screening guide. Psychology of Addictive Behaviors. 2018. 32:508-516
6. Harris, S. K.,Knight, J. R., Jr.,Van Hook, S.,Sherritt, L.,Brooks, T. L.,Kulig, J. W.,Nordt, C. A.,Saitz, R.. Adolescent substance use screening in primary care: Validity of computer self-administered versus clinician-administered screening. Substance Abuse. 2016. 37:197-203
7. Kelly, S. M.,Gryczynski, J.,Mitchell, S. G.,Kirk, A.,O'Grady, K. E.,Schwartz, R. P.. Validity of brief screening instrument for adolescent tobacco, alcohol, and drug use. Pediatrics. 2014. 133:819-26
8. Knight, JR,Sherritt, L,Harris, SK,Gates, EC,Chang, G. Validity of brief alcohol screening tests among adolescents: a comparison of the AUDIT, POSIT, CAGE, and CRAFFT. Alcohol Clin Exp Res. 2003. 27:67-73
9. Levy, S.,Brogna, M.,Minegishi, M.,Subramaniam, G.,McCormack, J.,Kline, M.,Menzin, E.,Allende-Richter, S.,Fuller, A.,Lewis, M.,Collins, J.,Hubbard, Z.,Mitchell, S. G.,Weiss, R.,Weitzman, E.. Assessment of Screening Tools to Identify Substance Use Disorders Among Adolescents. JAMA Network Open. 2023. 6:e2314422
10. Levy, S.,Dedeoglu, F.,Gaffin, J. M.,Garvey, K. C.,Harstad, E.,MacGinnitie, A.,Rufo, P. A.,Huang, Q.,Ziemnik, R. E.,Wisk, L. E.,Weitzman, E. R.. A Screening Tool for Assessing Alcohol Use Risk among Medically Vulnerable Youth. PLoS ONE [Electronic Resource]. 2016. 11:e0156240

11. Levy, S.,Weitzman, E. R.,Marin, A. C.,Magane, K. M.,Wisk, L. E.,Shrier, L. A.. Sensitivity and specificity of S2BI for identifying alcohol and cannabis use disorders among adolescents presenting for primary care. Substance Abuse. 2021. 42:388-395
12. Liskola, Joni,Haravuori, Henna,Lindberg, Nina,Niemela, Solja,Karlsson, Linnea,Kiviruusu, Olli,Marttunen, Mauri. AUDIT and AUDIT-C as screening instruments for alcohol problem use in adolescents. Drug & Alcohol Dependence. 2018. 188:266-273
13. MC Villarosa-Hurlocker, JW Schutts, MB Madson, HR Jordan, RB Whitley, RC Mohn. Screening for alcohol use disorders in college student drinkers with the AUDIT and the USAUDIT: a receiver operating characteristic curve analysis.. The American journal of drug and alcohol abuse. 2020. 46:
14. McCabe, B. E.,Brincks, A. M.,Halstead, V.,Munoz-Rojas, D.,Falcon, A.. Optimizing the US-AUDIT for Alcohol Screening in U.S. College Students. Journal of Substance Use. 2019. 24:954-963
15. Rumpf, H. J.,Wohlert, T.,Freyer-Adam, J.,Grothues, J.,Bischof, G.. Screening questionnaires for problem drinking in adolescents: performance of AUDIT, AUDIT-C, CRAFFT and POSIT. European Addiction Research. 2013. 19:121-7
16. Santis, R.,Garmendia, M. L.,Acuna, G.,Alvarado, M. E.,Arteaga, O.. The Alcohol Use Disorders Identification Test (AUDIT) as a screening instrument for adolescents. Drug & Alcohol Dependence. 2009. 103:155-8

Key Question 3

No included studies for Key Question 3

Key Question 4

17. Aalto, M.,Saksanen, R.,Laine, P.,Forsstrom, R.,Raikaa, M.,Kiviluoto, M.,Seppa, K.,Sillaukee, P.. Brief intervention for female heavy drinkers in routine general practice: a 3-year randomized, controlled study. Alcohol Clin Exp Res. 2000. 24:1680-6
    a. Aalto, M.,Seppa, K.,Mattila, P.,Mustonen, H.,Ruuth, K.,Hyvarinen, H.,Pulkkinen, H.,Alho, H.,Sillanaukee, P.. Brief intervention for male heavy drinkers in routine general practice: a three-year randomized controlled study. Alcohol Alcohol. 2001. 36:224-30
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19. Barticevic, N. A.,Poblete, F.,Zuzulich, S. M.,Rodriguez, V.,Quevedo, D.,Se, B. F.,Bradshaw, L.. A Health Technician-delivered Brief Intervention linked to AUDIT for reduction of alcohol use in Chilean primary care: a randomized controlled trial. Addiction Science & Clinical Practice. 2021. 16:39
20. Baumann, S.,Staudt, A.,Freyer-Adam, J.,Bischof, G.,Meyer, C.,John, U.. Effects of a brief alcohol intervention addressing the full spectrum of drinking in an adult general population sample: a randomized controlled trial. Addiction. 2021. 116:2056-2066

a. Baumann, S.,Staudt, A.,Freyer-Adam, J.,Zeiser, M.,Bischof, G.,Meyer, C.,John, U.. Three-year trajectories of alcohol use among at-risk and among low-risk drinkers in a general population sample of adults: A latent class growth analysis of a brief intervention trial. Frontiers in Public Health. 2022. 10:1027837

b. Staudt, A.,Freyer-Adam, J.,Meyer, C.,Bischof, G.,John, U.,Baumann, S.. The Moderating Effect of Educational Background on the Efficacy of a Computer-Based Brief Intervention Addressing the Full Spectrum of Alcohol Use: Randomized Controlled Trial. JMIR Public Health and Surveillance. 2022. 8:e33345

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    a. Grothues, J. M.,Bischof, G.,Reinhardt, S.,Meyer, C.,John, U.,Rumpf, H. J.. Effectiveness of brief alcohol interventions for general practice patients with problematic drinking behavior and comorbid anxiety or depressive disorders. Drug Alcohol Depend. 2008. 94:214-20

    b. Reinhardt, S.,Bischof, G.,Grothues, J.,John, U.,Meyer, C.,Rumpf, H. J.. Gender differences in the efficacy of brief interventions with a stepped care approach in general practice patients with alcohol-related disorders. Alcohol Alcohol. 2008. 43:334-40

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Key Question 5

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Appendix D. Excluded Studies

Appendix D, Table 1. Exclusion codes

Code	Reason for Exclusion
E1	Ineligible study aim
E2	Ineligible setting: Not in a country rated "very high" on the UN's Human Development Index
E2b	Ineligible setting: Not conducted in, recruited from, or feasible for primary care
E2c	Ineligible setting: Emergency department or urgent care setting
E3a	Ineligible population: For screening, participants selected on the basis of alcohol/drug use or a related behavior/condition. For interventions, not among a screen-detected or among those with addiction/dependence
E3b	Ineligible population: Out-of-scope population (e.g., psychotic disorder, persons on chronic opioid therapy, court-mandated, incarcerated)
E3c	Ineligible population: Children <12 years
E4	Ineligible outcome
E5a	Ineligible screening tool (KQ1, 2, 3): Assessment for alcohol use does not include a brief standardized instrument or set of questions that is conducted in person or via telephone, mail, or electronically
E5b	Ineligible screening tool instrument (KQ2)
E5c	Ineligible intervention (e.g., medication, vocational rehabilitation, financial incentive)
E5e	Ineligible intervention (focused on prevention)
E6	Ineligible comparator
E7	Ineligible condition
E8	Ineligible follow-up
E9	Ineligible study design
E9b	Ineligible study design (development sample only)
E10	Poor study quality
E11	Ineligible publication type or main results published prior to review start date
E12	Ancillary study with primary study excluded

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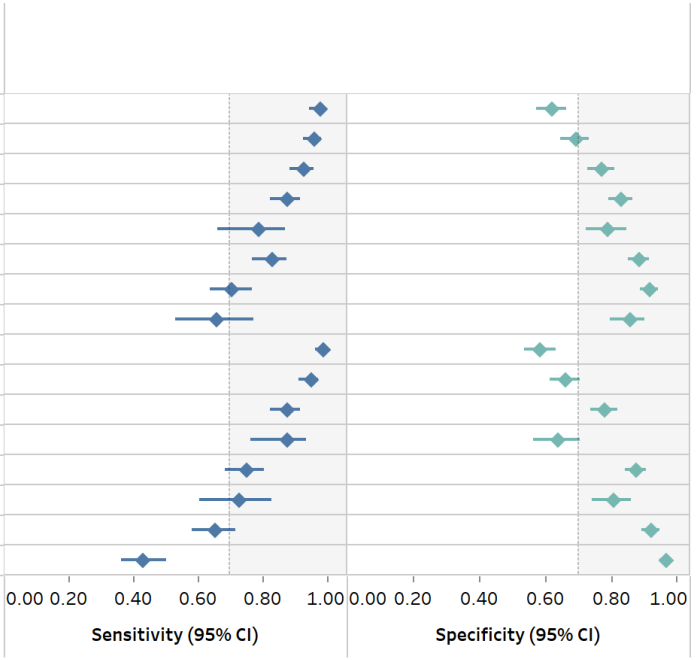
Appendix E. Additional Figures and Tables

Figures

Appendix E, Figure 1. Detection of Unhealthy Alcohol Use in Adolescents (KQ2)

Screening instrument	Cutoff	Author, year	N screened	Prevalence, %	Sensitivity (95% CI)	Specificity (95% CI)
AUDIT	≥3	Liskola, 2018	595	31.6	0.98 (0.95, 0.99)	0.62 (0.57, 0.67)
	≥4	Liskola, 2018	595	31.6	0.96 (0.93, 0.98)	0.69 (0.65, 0.74)
	≥5	Liskola, 2018	595	31.6	0.93 (0.89, 0.96)*	0.77 (0.73, 0.81)*
	≥6	Liskola, 2018	595	31.6	0.88 (0.82, 0.92)	0.83 (0.79, 0.87)
		Rumpf, 2013	225	24.9	0.79 (0.66, 0.87)*	0.79 (0.73, 0.85)*
	≥7	Liskola, 2018	595	31.6	0.83 (0.77, 0.88)	0.89 (0.85, 0.91)
	≥8	Liskola, 2018	595	31.6	0.71 (0.64, 0.77)	0.92 (0.89, 0.94)
		Rumpf, 2013	225	24.9	0.66 (0.53, 0.77)	0.86 (0.80, 0.90)
AUDIT-C	≥2	Liskola, 2018	595	31.6	0.99 (0.96, 1.00)	0.59 (0.54, 0.63)
	≥3	Liskola, 2018	595	31.6	0.95 (0.91, 0.97)*	0.66 (0.62, 0.71)*
	≥4	Liskola, 2018	595	31.6	0.88 (0.82, 0.92)	0.78 (0.74, 0.82)
		Rumpf, 2013	225	24.9	0.88 (0.76, 0.94)	0.64 (0.56, 0.71)
	≥5	Liskola, 2018	595	31.6	0.75 (0.68, 0.81)	0.88 (0.84, 0.91)
		Rumpf, 2013	225	24.9	0.73 (0.60, 0.83)*	0.81 (0.74, 0.86)*
	≥6	Liskola, 2018	595	31.6	0.65 (0.58, 0.72)	0.92 (0.89, 0.95)
	≥7	Liskola, 2018	595	31.6	0.43 (0.36, 0.50)	0.97 (0.95, 0.98)



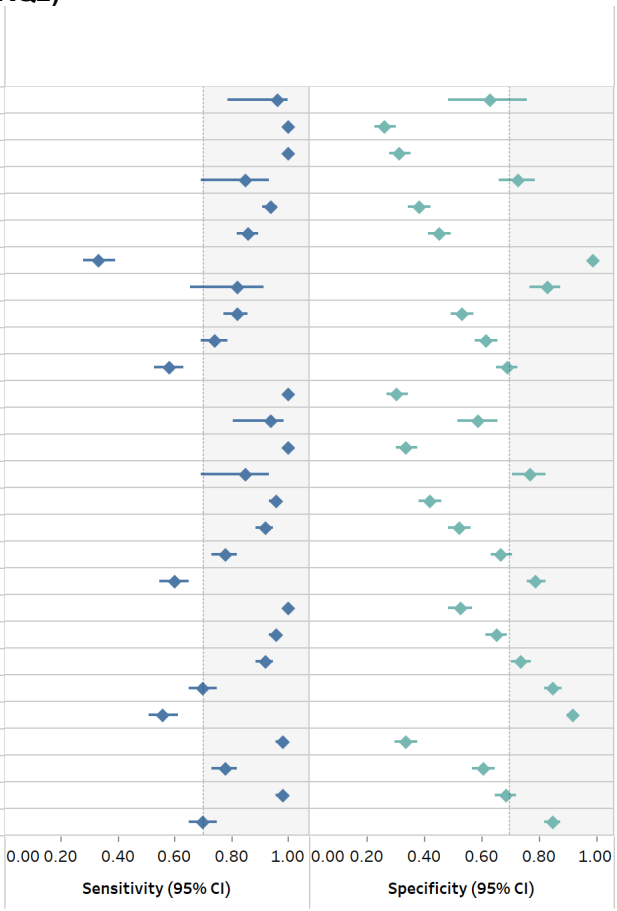
* Author-reported optimal cutoff

Abbreviations: AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; CI = confidence interval; KQ = key question; N = number of participants

Appendix E, Figure 2. Detection of Heavy Episodic Drinking/Heavy Use in Adolescents (KQ2)

Appendix E, Figure 2. Detection of Heavy Episodic Drinking/Heavy Use in Adolescents (KQ2)

Screening instrument	Cutoff	Author, year	N screened	Prevalence, %	Sensitivity (95% CI)	Specificity (95% CI)
AUDIT	≥3	Santis, 2009	95	34.7	0.96 (0.78, 1.00)	0.63 (0.48, 0.76)
	≥5	Cortes-Tomas, 2017	906	36.1	1.00 (0.99, 1.00)	0.26 (0.23, 0.30)
	≥6	Cortes-Tomas, 2017	906	36.1	1.00 (0.99, 1.00)	0.32 (0.28, 0.36)
		Rumpf, 2013	225	14.7	0.85 (0.69, 0.93)*	0.73 (0.66, 0.79)*
	≥7	Cortes-Tomas, 2017	906	36.1	0.94 (0.91, 0.96)	0.38 (0.34, 0.42)
	≥8	Cortes-Tomas, 2017	906	36.1	0.86 (0.82, 0.89)	0.46 (0.41, 0.49)
		D'Amico, 2016	1569	22.1	0.33 (0.28, 0.39)	0.99 (0.98, 0.99)
		Rumpf, 2013	225	14.7	0.82 (0.66, 0.91)	0.83 (0.77, 0.87)
	≥9	Cortes-Tomas, 2017	906	36.1	0.82 (0.77, 0.86)	0.54 (0.49, 0.58)
	≥10	Cortes-Tomas, 2017	906	36.1	0.74 (0.69, 0.78)	0.62 (0.58, 0.66)
	≥11	Cortes-Tomas, 2017	906	36.1	0.58 (0.53, 0.63)	0.69 (0.65, 0.73)
AUDIT-C	≥4	Cortes-Tomas, 2017	906	36.1	1.00 (0.99, 1.00)	0.31 (0.27, 0.34)
		Rumpf, 2013	225	14.7	0.94 (0.80, 0.98)	0.59 (0.52, 0.66)
	≥5	Cortes-Tomas, 2017	906	36.1	1.00 (0.99, 1.00)	0.34 (0.30, 0.38)
		Rumpf, 2013	225	14.7	0.85 (0.69, 0.93)*	0.77 (0.71, 0.82)*
	≥6	Cortes-Tomas, 2017	906	36.1	0.96 (0.93, 0.98)	0.42 (0.38, 0.46)
	≥7	Cortes-Tomas, 2017	906	36.1	0.92 (0.89, 0.95)	0.52 (0.48, 0.57)
	≥8	Cortes-Tomas, 2017	906	36.1	0.78 (0.73, 0.82)	0.67 (0.63, 0.71)
	≥9	Cortes-Tomas, 2017	906	36.1	0.60 (0.55, 0.65)	0.79 (0.76, 0.82)
AUDIT-CR	≥5	Cortes-Tomas, 2017	906	36.1	1.00 (0.99, 1.00)	0.53 (0.49, 0.57)
	≥6	Cortes-Tomas, 2017	906	36.1	0.96 (0.93, 0.98)	0.65 (0.61, 0.69)
	≥7	Cortes-Tomas, 2017	906	36.1	0.92 (0.89, 0.95)	0.74 (0.70, 0.77)
	≥8	Cortes-Tomas, 2017	906	36.1	0.70 (0.65, 0.75)	0.85 (0.82, 0.88)
NIAAA Youth Screen	Moderate-high risk	D'Amico, 2016	1573	22.1	0.56 (0.51, 0.61)	0.92 (0.90, 0.93)
6+ drinks	≥1	Cortes-Tomas, 2017	906	36.1	0.98 (0.96, 0.99)	0.34 (0.30, 0.38)
	≥2	Cortes-Tomas, 2017	906	36.1	0.78 (0.73, 0.82)	0.61 (0.57, 0.65)
7/6+ drinks	≥1	Cortes-Tomas, 2017	906	36.1	0.98 (0.96, 0.99)	0.69 (0.65, 0.72)
	≥2	Cortes-Tomas, 2017	906	36.1	0.70 (0.65, 0.75)	0.85 (0.82, 0.88)



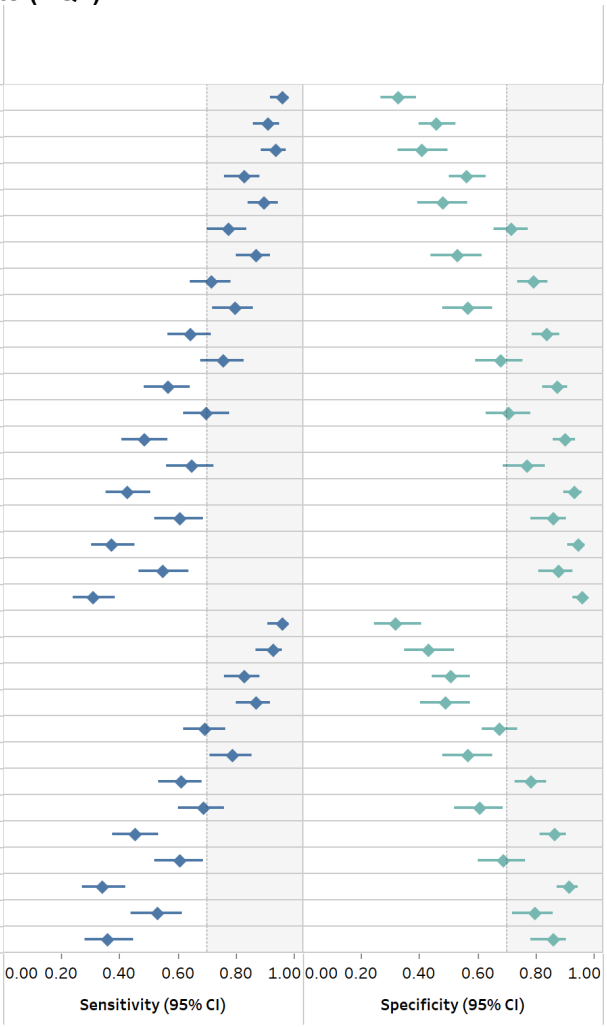
* Author-reported optimal cutoff

Abbreviations: AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; AUDIT-CR = Alcohol Use Disorders Identification Test-Concise Revised; CI = confidence interval; KQ = key question; N = number of participants; NIAAA = National Institute on Alcohol Abuse and Alcoholism

Appendix E, Figure 3. Detection of Likely Alcohol Use Disorder in Young Adults (KQ2)

Appendix E, Figure 3. Detection of Likely Alcohol Use Disorder in Young Adults (KQ2)

Screening instrument	Cutoff	Author, year	N screened	Prevalence, %	Sensitivity (95% CI)	Specificity (95% CI)
USAUDIT	≥4	Villarosa-Hurlocker, 2020	382	39.8	0.96 (0.92, 0.98)	0.33 (0.27, 0.39)
	≥5	Villarosa-Hurlocker, 2020	382	39.8	0.91 (0.86, 0.95)	0.46 (0.40, 0.53)
	≥6	McCabe, 2019	250	50.0	0.94 (0.89, 0.98)	0.41 (0.33, 0.50)
		Villarosa-Hurlocker, 2020	382	39.8	0.83 (0.76, 0.88)	0.56 (0.50, 0.63)
	≥7	McCabe, 2019	250	50.0	0.90 (0.84, 0.94)	0.48 (0.39, 0.57)
		Villarosa-Hurlocker, 2020	382	39.8	0.78 (0.70, 0.84)	0.72 (0.66, 0.77)
	≥8	McCabe, 2019	250	50.0	0.87 (0.80, 0.92)	0.53 (0.44, 0.61)
		Villarosa-Hurlocker, 2020	382	39.8	0.72 (0.64, 0.78)*	0.80 (0.74, 0.84)*
	≥9	McCabe, 2019	250	50.0	0.80 (0.72, 0.86)	0.57 (0.48, 0.65)*
		Villarosa-Hurlocker, 2020	382	39.8	0.64 (0.57, 0.72)	0.84 (0.79, 0.88)
	≥10	McCabe, 2019	250	50.0	0.76 (0.68, 0.83)	0.68 (0.59, 0.76)
		Villarosa-Hurlocker, 2020	382	39.8	0.57 (0.49, 0.64)	0.87 (0.82, 0.91)
	≥11	McCabe, 2019	250	50.0	0.70 (0.62, 0.78)	0.71 (0.63, 0.78)
		Villarosa-Hurlocker, 2020	382	39.8	0.49 (0.41, 0.57)	0.90 (0.86, 0.94)
	≥12	McCabe, 2019	250	50.0	0.65 (0.56, 0.73)	0.77 (0.69, 0.83)
		Villarosa-Hurlocker, 2020	382	39.8	0.43 (0.35, 0.51)	0.94 (0.90, 0.96)
	≥13	McCabe, 2019	250	50.0	0.61 (0.52, 0.69)*	0.86 (0.78, 0.91)*
		Villarosa-Hurlocker, 2020	382	39.8	0.38 (0.30, 0.45)	0.95 (0.91, 0.97)
	≥14	McCabe, 2019	250	50.0	0.55 (0.46, 0.64)	0.88 (0.81, 0.93)
		Villarosa-Hurlocker, 2020	382	39.8	0.31 (0.24, 0.39)	0.96 (0.93, 0.98)
USAUDIT-C	≥4	McCabe, 2019	250	50.0	0.96 (0.91, 0.98)	0.32 (0.24, 0.41)
	≥5	McCabe, 2019	250	50.0	0.93 (0.87, 0.96)	0.43 (0.35, 0.52)
		Villarosa-Hurlocker, 2020	382	39.8	0.83 (0.76, 0.88)	0.51 (0.44, 0.57)
	≥6	McCabe, 2019	250	50.0	0.87 (0.80, 0.92)	0.49 (0.40, 0.57)
		Villarosa-Hurlocker, 2020	382	39.8	0.70 (0.62, 0.76)	0.68 (0.62, 0.74)
	≥7	McCabe, 2019	250	50.0	0.79 (0.71, 0.85)*	0.57 (0.48, 0.65)*
		Villarosa-Hurlocker, 2020	382	39.8	0.61 (0.53, 0.69)*	0.79 (0.73, 0.83)*
	≥8	McCabe, 2019	250	50.0	0.69 (0.60, 0.76)	0.61 (0.52, 0.69)
		Villarosa-Hurlocker, 2020	382	39.8	0.45 (0.38, 0.53)	0.87 (0.82, 0.90)
	≥9	McCabe, 2019	250	50.0	0.61 (0.52, 0.69)*	0.69 (0.60, 0.76)
		Villarosa-Hurlocker, 2020	382	39.8	0.34 (0.27, 0.42)	0.92 (0.87, 0.95)
	≥10	McCabe, 2019	250	50.0	0.53 (0.44, 0.61)	0.80 (0.72, 0.86)
	≥11	McCabe, 2019	250	50.0	0.36 (0.28, 0.45)	0.86 (0.78, 0.91)*



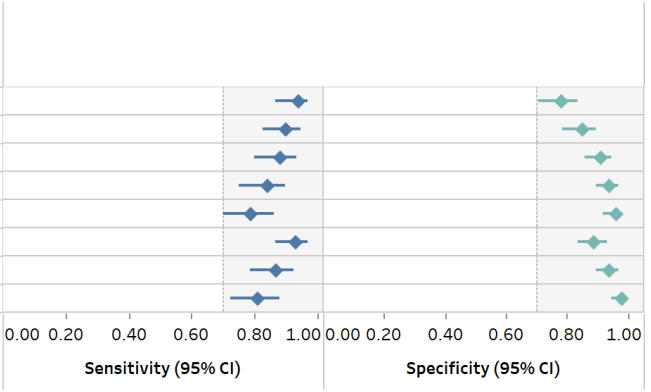
* Author-reported optimal cutoff

Abbreviations: CI = confidence interval; KQ = key question; N = number of participants; USAUDIT = US Alcohol Use Disorders Identification Test; USAUDIT-C = US Alcohol Use Disorders Identification Test-Concise

Appendix E, Figure 4. Detection of Heavy Episodic Drinking in Young Adults (KQ2)

Appendix E, Figure 4. Detection of Heavy Episodic Drinking in Young Adults (KQ2)

Screening instrument	Cutoff	Author, year	N screened	Prevalence, %	Sensitivity (95% CI)	Specificity (95% CI)
USAUDIT	≥4	McCabe, 2019	250	37	0.94 (0.86, 0.97)	0.78 (0.71, 0.84)
	≥5	McCabe, 2019	250	37	0.90 (0.82, 0.95)	0.85 (0.78, 0.90)
	≥6	McCabe, 2019	250	37	0.88 (0.80, 0.93)*	0.91 (0.86, 0.95)*
	≥7	McCabe, 2019	250	37	0.84 (0.75, 0.90)	0.94 (0.90, 0.97)
	≥8	McCabe, 2019	250	37	0.79 (0.70, 0.86)	0.96 (0.92, 0.98)
USAUDIT-C	≥4	McCabe, 2019	250	37	0.93 (0.86, 0.97)*	0.89 (0.83, 0.93)*
	≥5	McCabe, 2019	250	37	0.87 (0.79, 0.92)	0.94 (0.90, 0.97)
	≥6	McCabe, 2019	250	37	0.81 (0.72, 0.88)	0.98 (0.95, 0.99)

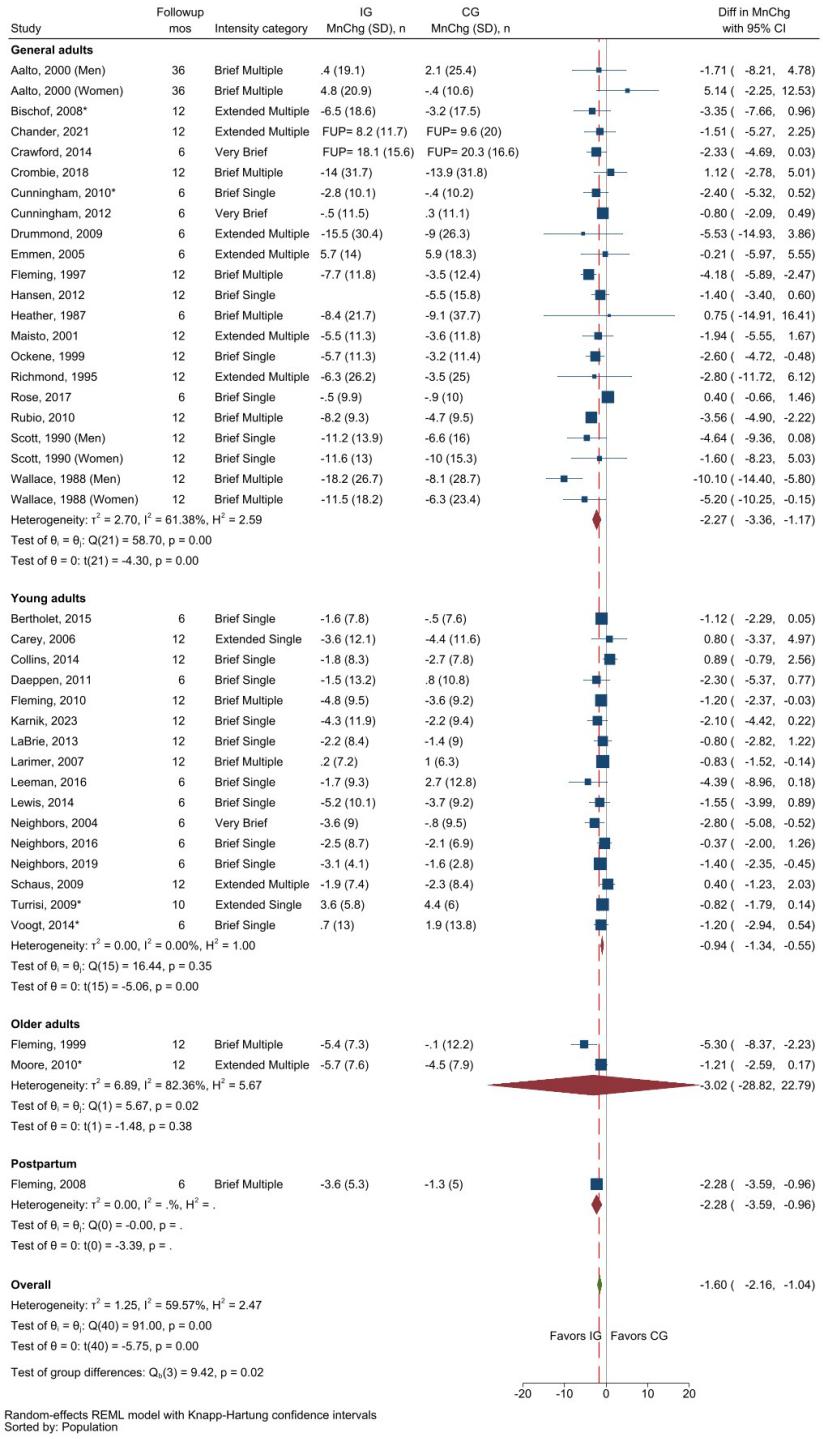


* Author-reported optimal cutoff

Abbreviations: CI = confidence interval; KQ = key question; N = number of participants; USAUDIT = US Alcohol Use Disorders Identification Test; USAUDIT-C = US Alcohol Use Disorders Identification Test-Concise

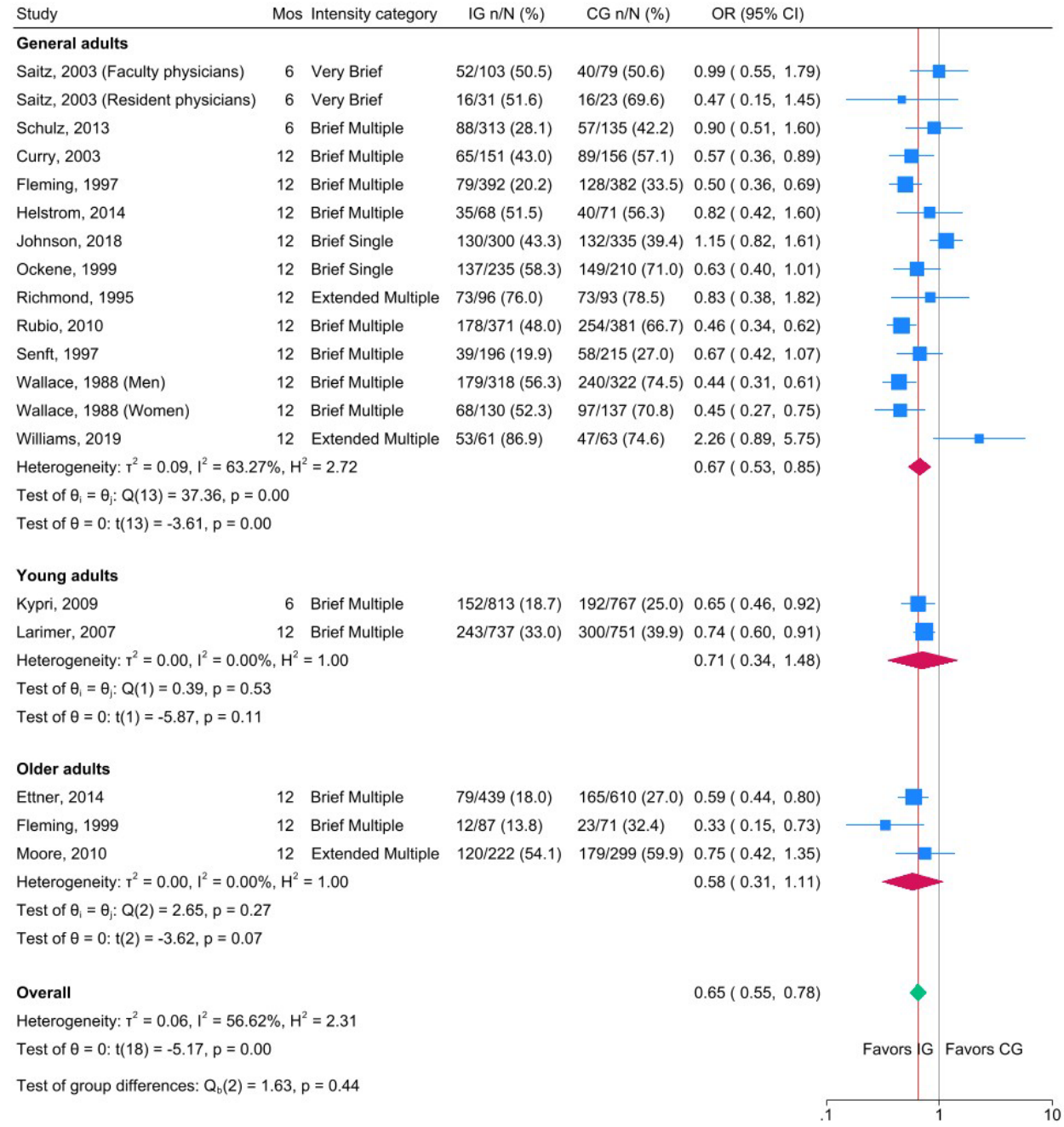
Appendix E, Figure 5. Effects of Interventions on Drinks per Week (KQ4)

Appendix E, Figure 5. Effects of Interventions on Drinks per Week (KQ4)



Abbreviations: CG = control group; CI = confidence interval; Diff = difference; IG = intervention group; KQ = key question; MnChg = mean change; mos = months; n = number of participants; REML = restricted maximum likelihood; SD = standard deviation

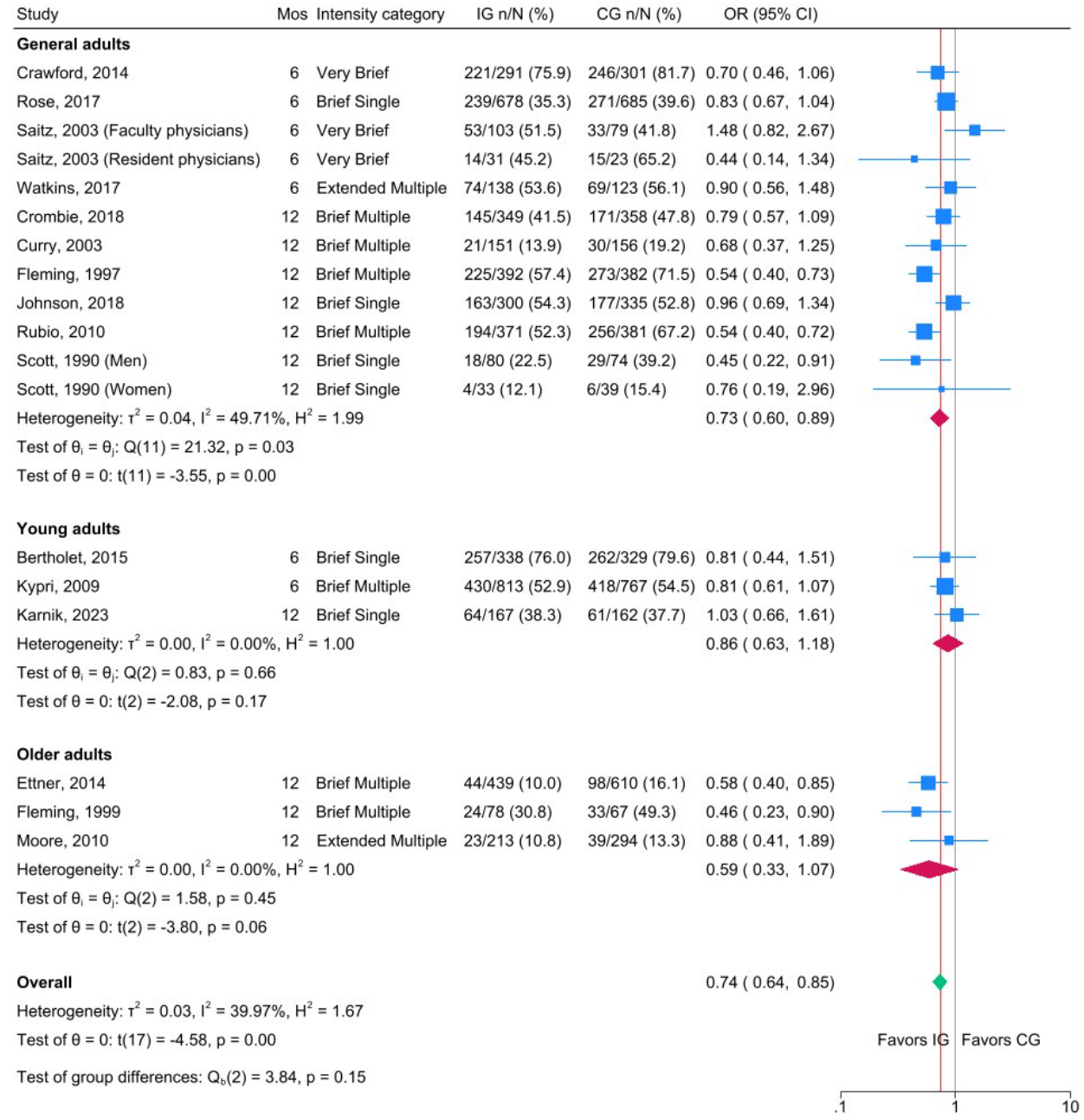
Appendix E, Figure 6. Effects of Interventions on Exceeding Recommended Drinking Limits (KQ4)



Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; KQ = key question; mos = months; n/N = number of participants out of total number in group; OR = odds ratio

Appendix E, Figure 7. Effects of Interventions on Any Heavy Episodic Drinking (KQ4)

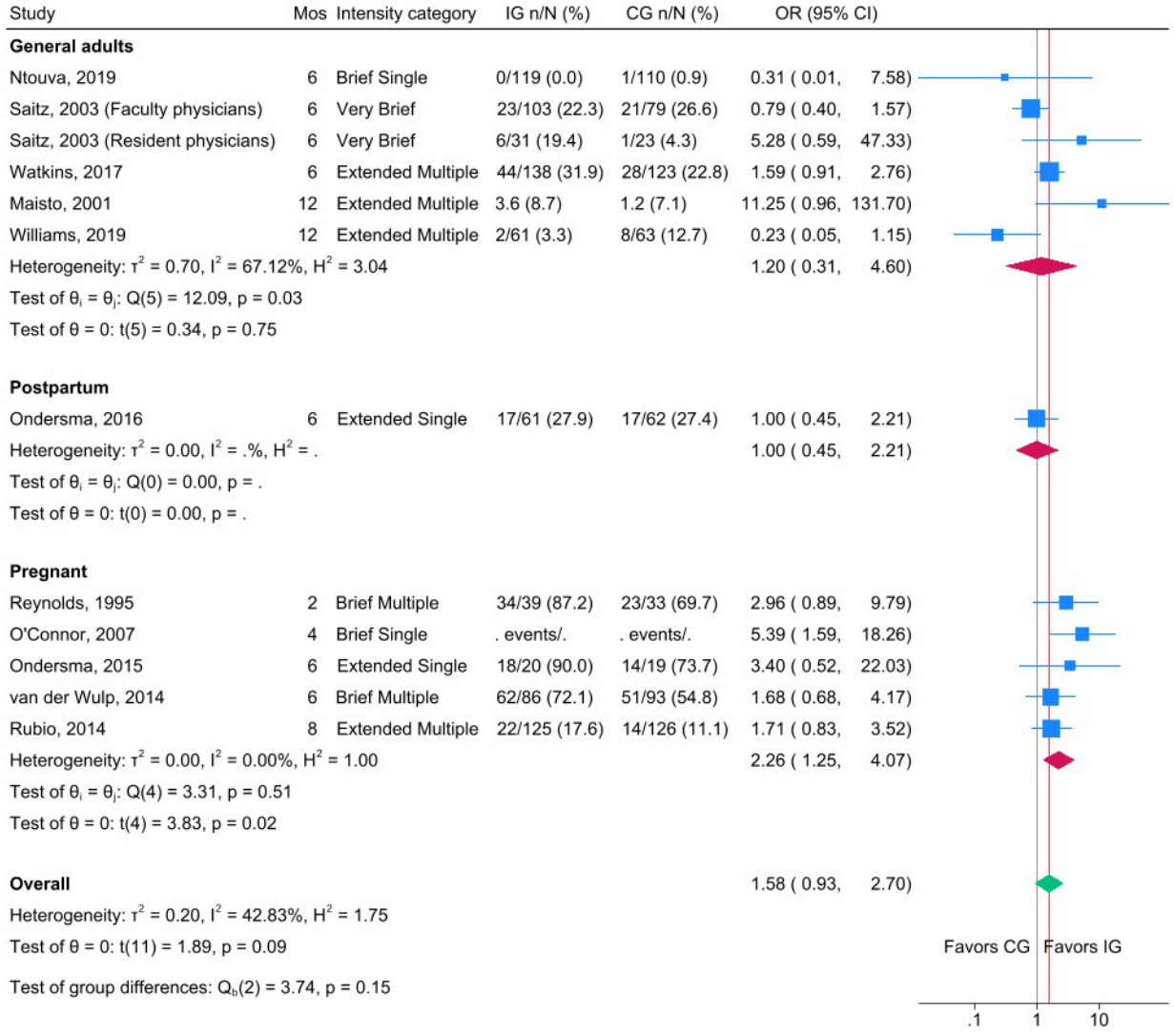
Appendix E, Figure 7. Effects of Interventions on Any Heavy Episodic Drinking (KQ4)



Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; KQ = key question; mos = months; n/N = number of participants out of total number in group; OR = odds ratio

Appendix E, Figure 8. Effects of Interventions on Likelihood of Abstinence (KQ4).

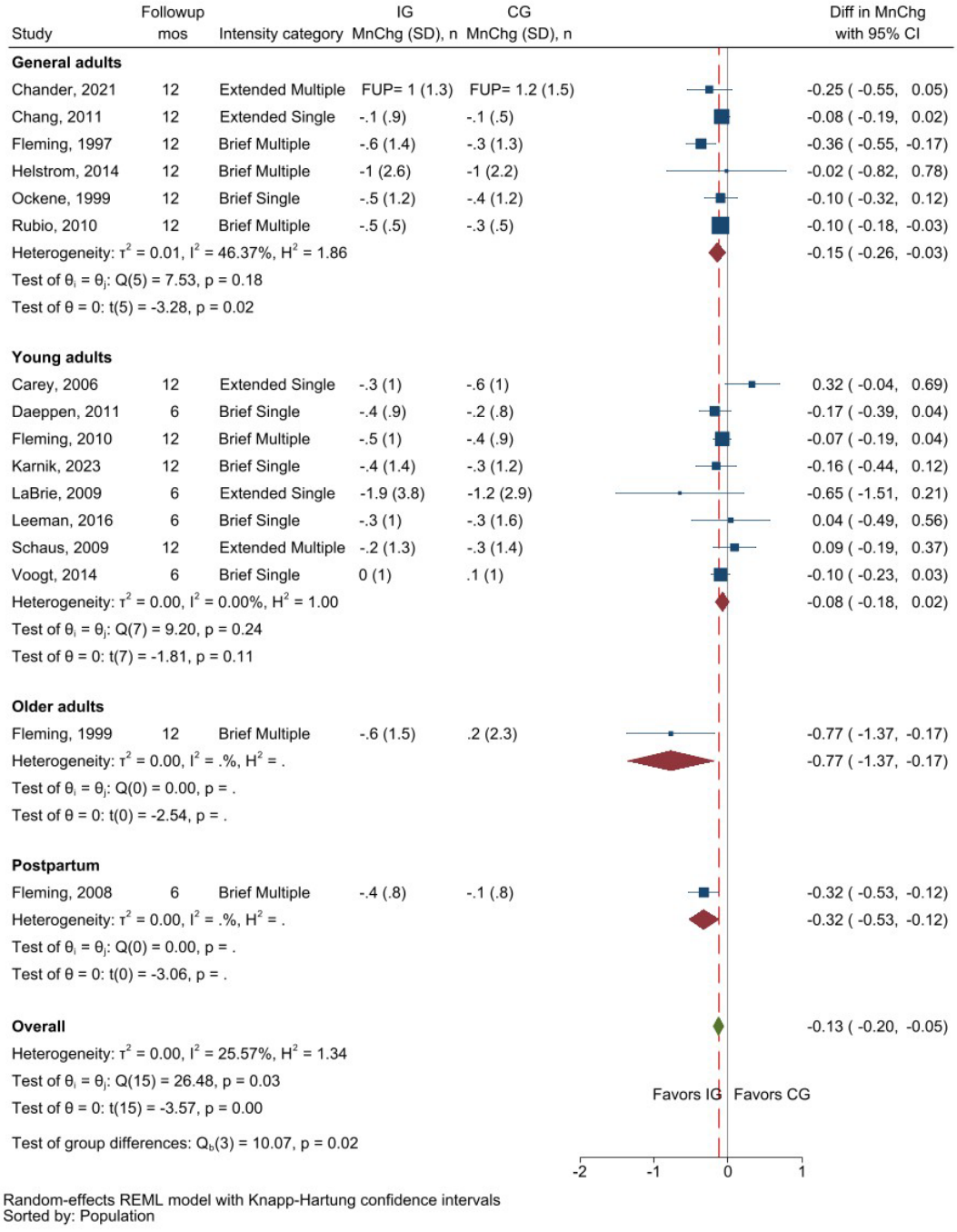
Appendix E, Figure 8. Effects of Interventions on Likelihood of Abstinence (KQ4).



Abbreviations: CG = control group; CI = confidence interval; IG = intervention group; KQ = key question; mos = months; n/N = number of participants out of total number in group; OR = odds ratio

Appendix E, Figure 9. Effects of Interventions on Heavy Episodic Drinking Episodes per Week (KQ4)

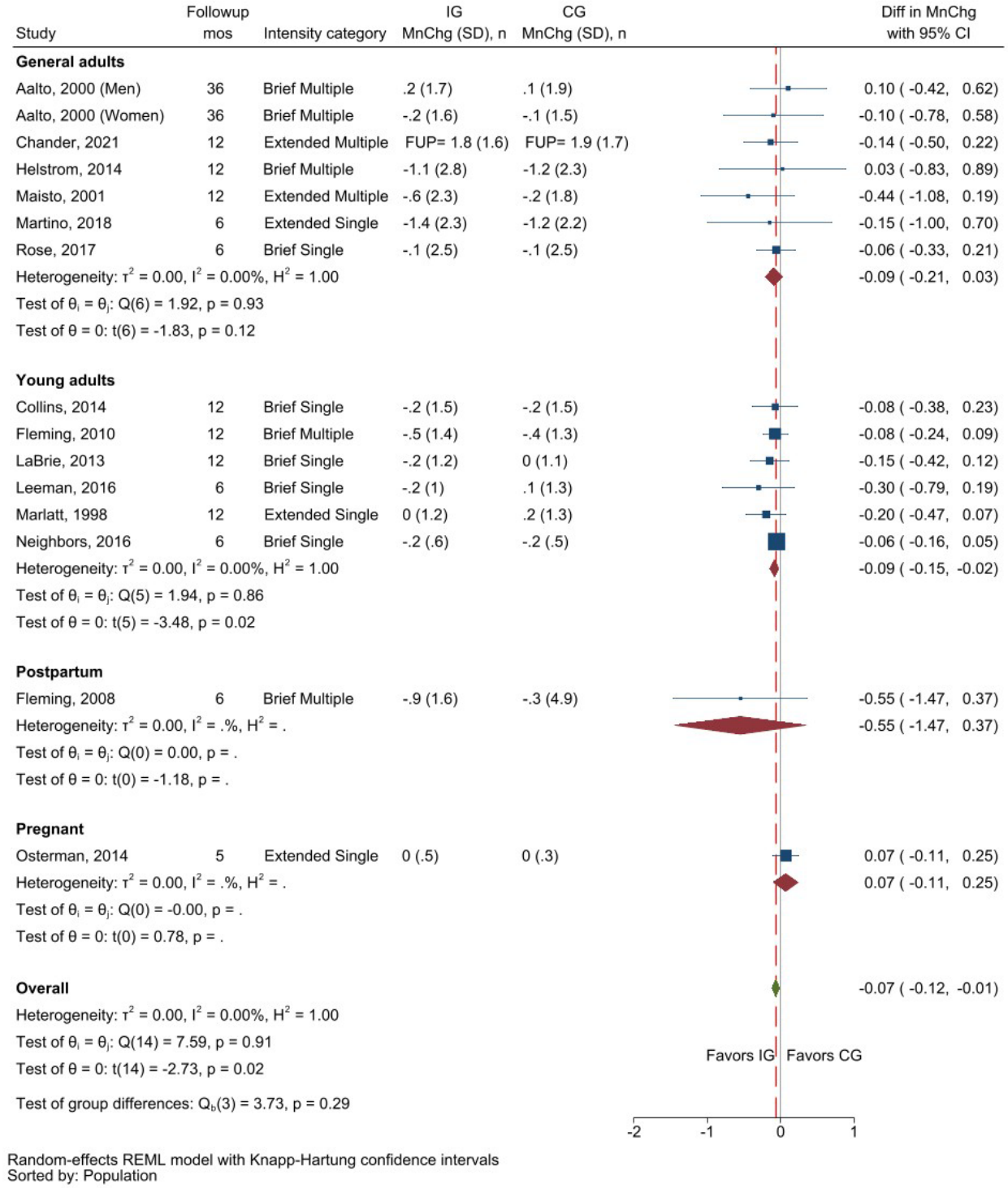
Appendix E, Figure 9. Effects of Interventions on Heavy Episodic Drinking Episodes per Week (KQ4)



Abbreviations: CG = control group; CI = confidence interval; Diff = difference; IG = intervention group; KQ = key question; MnChg = mean change; mos = months; n = number of participants; REML = restricted maximum likelihood; SD = standard deviation

Appendix E, Figure 10. Effects of Interventions on Drinking Days per Week (KQ4)

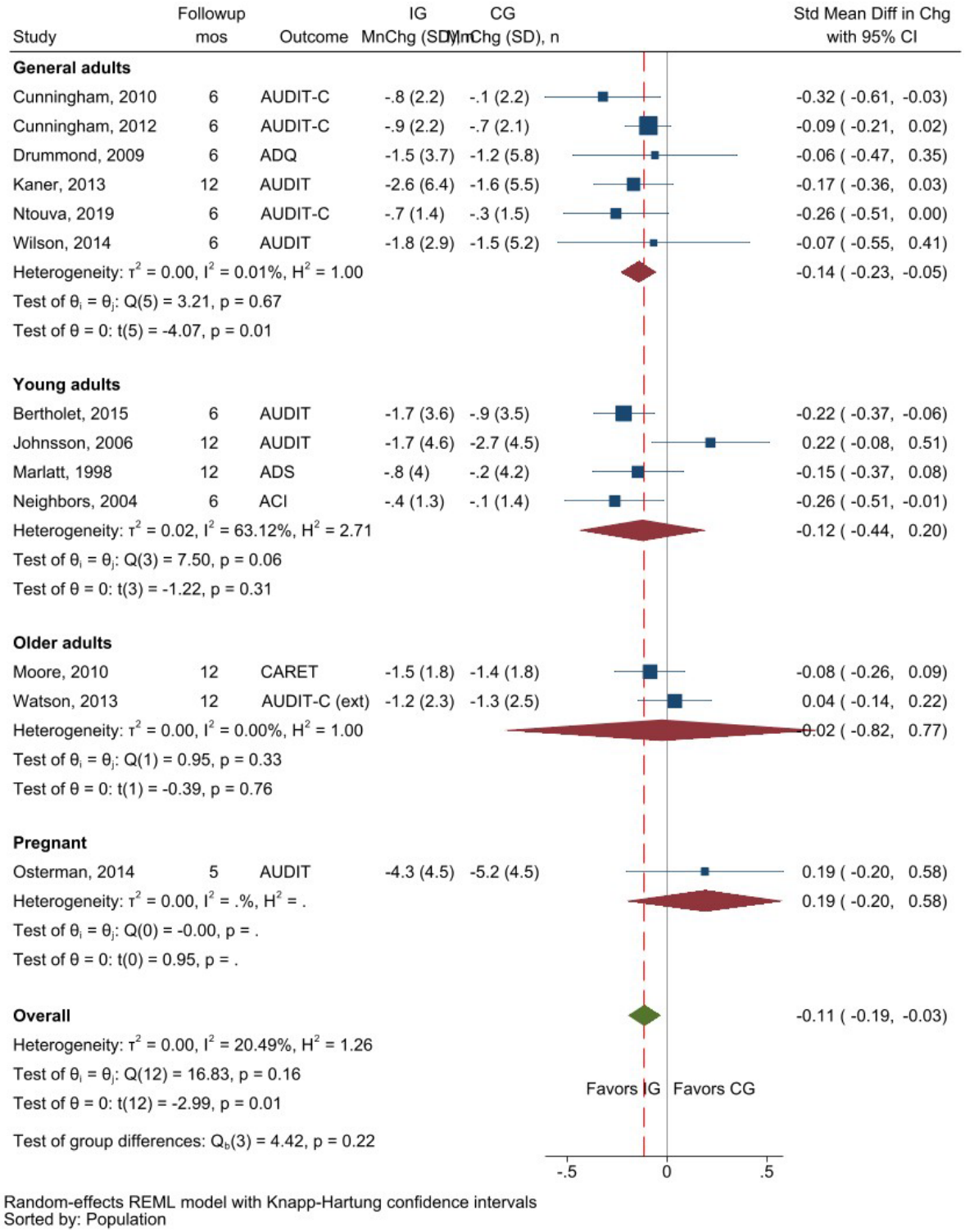
Appendix E, Figure 10. Effects of Interventions on Drinking Days per Week (KQ4)



Abbreviations: CG = control group; CI = confidence interval; Diff = difference; IG = intervention group; KQ = key question; MnChg = mean change; mos = months; n = number of participants; REML = restricted maximum likelihood; SD = standard deviation

Appendix E, Figure 11. Effects of Interventions on Alcohol Use Severity Scale Scores (KQ4)

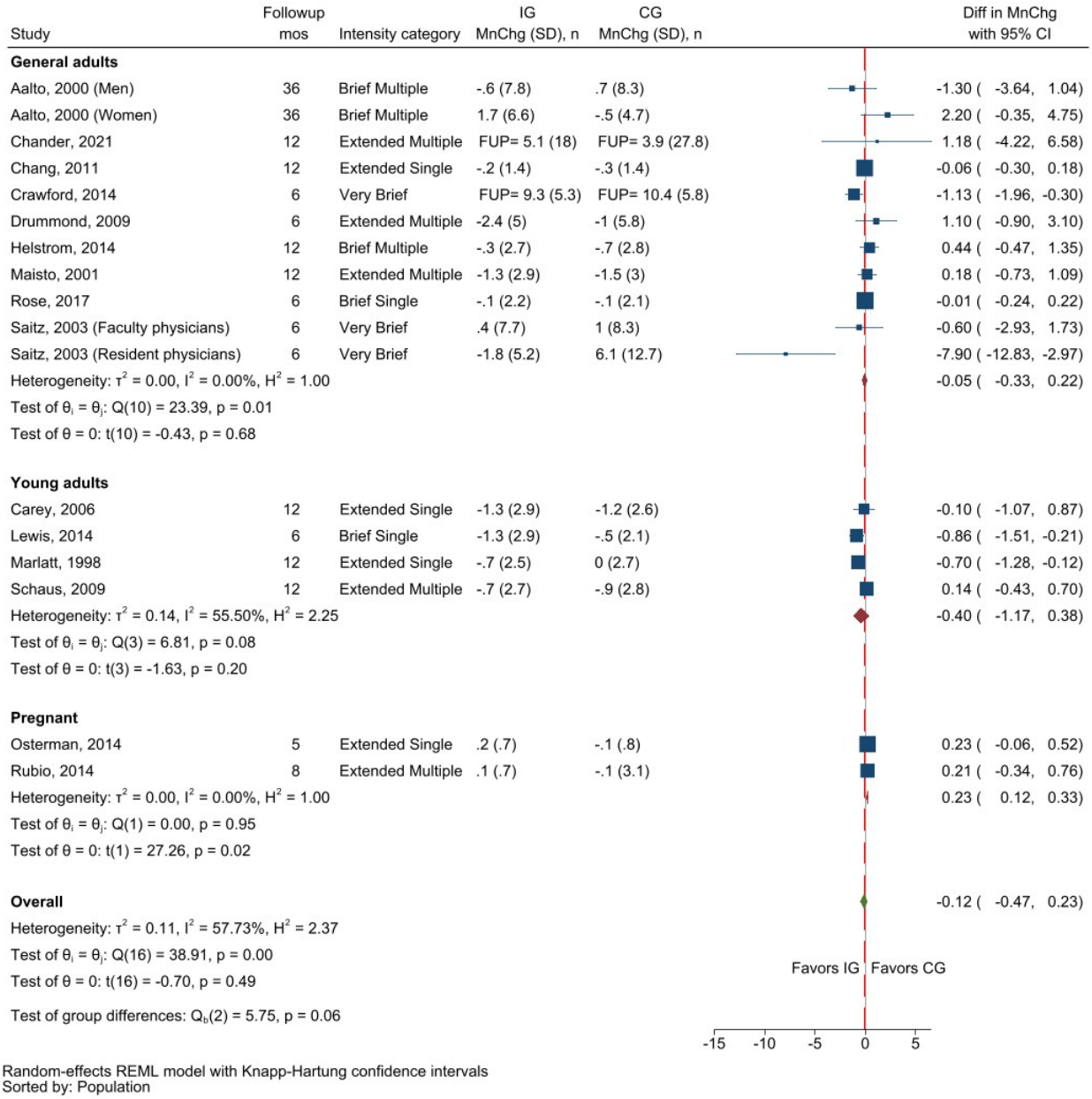
Appendix E, Figure 11. Effects of Interventions on Alcohol Use Severity Scale Scores (KQ4)



Abbreviations: ACI = Alcohol Consumption Index; ADQ = Alcohol Dependence Questionnaire; ADS = Alcohol Dependence Scale; AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; CARET = Comorbidity Alcohol Risk Evaluation Tool; CG = control group; CI = confidence interval; IG = intervention group; KQ = key question; MnChg = mean change; mos = months; n = number of participants; REML = restricted maximum likelihood; SD = standard deviation; Std Mean Diff in Chg = standardized mean difference in change

Appendix E, Figure 12. Effects of Interventions on Drinks per Drinking Day (KQ4)

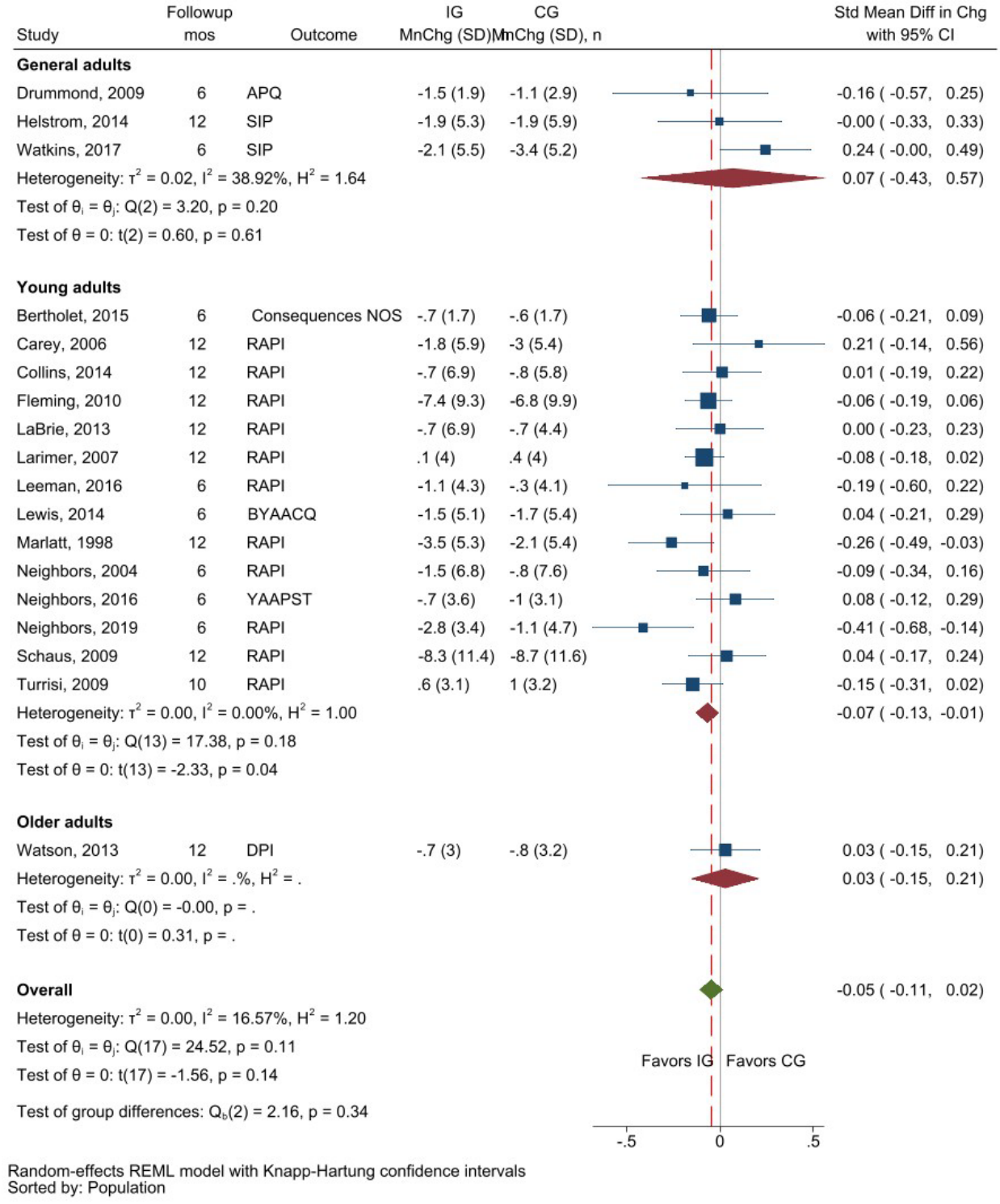
Appendix E, Figure 12. Effects of Interventions on Drinks per Drinking Day (KQ4)



Abbreviations: CG = control group; CI = confidence interval; Diff = difference; IG = intervention group; KQ = key question; MnChg = mean change; mos = months; n = number of participants; REML = restricted maximum likelihood; SD = standard deviation

Appendix E, Figure 13. Effects of Interventions on Alcohol-Related Problems or Consequences (KQ4)

Appendix E, Figure 13. Effects of Interventions on Alcohol-Related Problems or Consequences (KQ4)



Random-effects REML model with Knapp-Hartung confidence intervals
Sorted by: Population

Appendix E, Figure 13. Effects of Interventions on Alcohol-Related Problems or Consequences (KQ4)

Abbreviations: APQ = Alcohol Problems Questionnaire; BYAACQ = Brief Young Adult Alcohol Consequences Questionnaire; CG = control group; CI = confidence interval; DPI = Drinking Problems Index; IG = intervention group; KQ = key question; MnChg = mean change; mos = months; n = number of participants; NOS = not otherwise specified; RAPI = Rutgers Alcohol Problems Index; REML = restricted maximum likelihood; SD = standard deviation; SIP = Short Inventory of Problems; Std Mean Diff in Chg = standardized mean difference in change; YAAPST = Young Adult Alcohol Problems Screening Test

Tables

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
AC-OK	**Mental health questions** 1. Have you experienced serious depression (felt sadness, hopelessness, loss of interest, change of appetite or sleep pattern, difficulty going about your daily activities)? 2. Have you experienced thoughts of harming yourself? 3. Have you experienced a period of time when your thinking speeds up and you have trouble keeping up with your thoughts? 4. Have you attempted suicide? 5. Have you had periods of time where you felt that you could not trust family or friends? 6. Have you been prescribed medication for any psychological or emotional problem? 7. Have you experienced hallucinations (heard or seen things others do not hear or see)? **Trauma questions** 8. Have you ever been hit, slapped, kicked, emotionally or sexually hurt, or threatened by someone? 9. Have you experienced a traumatic event and since had repeated nightmares/dreams and/or anxiety which interferes with you leading a normal life? **Substance use questions** 10. Have you been preoccupied with drinking alcohol and/or using other drugs? 11. Have you experienced problems caused by drinking alcohol and/or using other drugs, and you kept using? 12. Do you, at times, drink alcohol and/or use other drugs more than you intended? 13. Have you needed to drink more alcohol and/or use more drugs to get the same effect you used to get with less? 14. Do you, at times, drink alcohol and/or use other drugs to alter the way you feel? 1. 15. Have you tried to stop drinking alcohol and/or using other drugs, but couldn't?	15 5 min	One (1) "Yes" answer on any of the three (3) domains (Mental Health, Trauma Related Mental Health Issues, and Substance Abuse) indicates that an additional assessment(s) is needed in that domain.

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
ASSIST	Instrument is a brief interview about alcohol, tobacco products, and other drugs; alcoholic beverages (beer, wine, spirits, etc.) are a subset of each questionnaire item, which each lists a series of substances for potential abuse screening. **01. Lifetime use** No (0) Yes (3) **2. Use in past 3 months** Never (0) Once or Twice (2) Monthly (3) Weekly (4) Daily or Almost Daily (6) **3. During the past 3 months, strong desire or urge to use** Never (0) Once or Twice (3) Monthly (4) Weekly (5) Daily or Almost Daily (6) **4. During the past 3 months, how often use led to health, social, legal or financial problems** Never (0) Once or Twice (4) Monthly (5) Weekly (6) Daily or Almost Daily (7) **5. During the past 3 months, how often failed to do what was normally expected because of use** Never (0) Once or Twice (5) Monthly (6) Weekly (7) Daily or Almost Daily (8) **6. Friend or relative or anyone else expressed concern about use**	8 2-4 min	Add up the scores received for questions 2 through 7 inclusive. Does not include the results from either Q1 or Q8. Score 0-10: no intervention; risk level low Score 11-26: receive brief intervention; risk level moderate Score 27+ more intensive treatment; risk level high. Further assessment and more intensive treatment may be provided by the health professional(s) within primary care setting, or, by a specialist drug and alcohol treatment service when available.

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	No, Never (0) Yes, but not in the past 3 months (3) Yes, in the past 3 months (6) **7. Ever tried and failed to control, cut down or stop using** No, Never (0) Yes, but not in the past 3 months (3) Yes, in the past 3 months (6) **8. Ever used any drug by injection** No, Never (0) Yes, but not in the past 3 months (1) Yes, in the past 3 months (2)		
AUDIT	**1. How often do you have a drink containing alcohol?** Never (0) Monthly or less (1) Two to four times a month (2) Two to three times a week (3) Four or more times a week (4) **2. How many drinks containing alcohol do you have on a typical day when you are drinking**? 1 or 2 (0) 3 or 4 (1) 5 or 6 (2) 7 to 9 (3) 10 or more (4) **3. How often do you have six* or more drinks on one occasion?** Never (0) Less than monthly (1) Monthly (2) Weekly (3) Daily or almost daily (4) **4. How often during the last year have you found that you were not able to stop drinking once you had started?** *(same options as #3)*	10 2-5 min	Scoring: ≥8 considered a positive screen for hazardous or harmful drinking. <u>In general:</u> Scores between 8 and 15 are most appropriate for simple advice focused on the reduction of hazardous drinking; Scores between 16 and 19 suggest brief counseling and continued monitoring; Scores of 20 and above clearly warrant further diagnostic evaluation for alcohol dependence.

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	5. How often during the last year have you failed to do what was normally expected from you because of drinking? *(same options as #3)* **6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?** *(same options as #3)* **7. How often during the last year have you had a feeling of guilt or remorse after drinking?** *(same options as #3)* **8. How often during the last year have you been unable to remember what happened the night before because you have been drinking?** *(same options as #3)* **9. Have you or someone else been injured as a result of your drinking?** No (0) Yes, but not in the last year (2) Yes, during the last year (4) **10. Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?** *(same options as #9)*		

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
AUDIT-C	**1. How often do you have a drink containing alcohol?** Never (0) Monthly or less (1) Two to four times a month (2) Two to three times a week (3) Four or more times a week (4) **2. How many drinks containing alcohol do you have on a typical day when you are drinking?** 1 or 2 (0) 3 or 4 (1) 5 or 6 (2) 7 to 9 (3) 10 or more (4) **3. How often do you have six* or more drinks on one occasion?** Never (0) Less than monthly (1) Monthly (2) Weekly (3) Daily or almost daily (4)	3 1-2 min	In men, ≥4 points is considered positive for alcohol misuse; in women, ≥3 points is considered positive.
BSTAD	**In the PAST YEAR, on how many days did you smoke cigarettes or use other tobacco products?** **In the PAST YEAR, on how many days did you have more than a few sips of beer, wine, or any drink containing alcohol?** **In the PAST YEAR, on how many days did you use marijuana (weed; blunts)?** **In the PAST YEAR, which of the following substances have you used? (check all that apply)** Cocaine or crack Heroin Amphetamines or methamphetamines (non-medication) Hallucinogen (e.g., magic mushrooms, LSD, etc.) Inhalants (e.g., huffing gasoline, glue, nitrous oxide, etc.) None of the above	5 5 min	0 days = No Reported Use 1 day = Lower Risk 2+ days (alcohol or other drugs) and/or 6+ days (tobacco) = Higher Risk Affirmative responses to tobacco, alcohol, or marijuana use prompts further questions about additional substances used.

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	In the PAST YEAR, which of the following medications have you used that were not prescribed for you or which you took more of than you were supposed to take? Prescription pain relievers (e.g., morphine, percocet, vicodin, oxycontin, dilaudid, methadone, buprenorphine, etc.) Prescription sedatives (e.g., valium, xanax, klonopin, ativan, etc.) Prescription stimulants (e.g., adderall, ritalin, etc.) Over-the-counter medications (e.g., nyquil, benadryl, cough medicine, sleeping pills) None of the above		
CAGE	C: have you ever felt you should cut down on your drinking? A: have people annoyed you by criticizing your drinking? G: have you ever felt bad or guilty about your drinking? E: eye-opener: have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover?	4 1 min	Score 1 point for each 'yes' response; range 0–4. Positive score ≥2.
CARET	1. How often do you drink and how many drinks do you consume? 2. Have you driven within 2 hours of drinking ≥ 3 drinks? 3. Have people been concerned about your alcohol use in the last 12 months? 4. Have people been concerned about your alcohol use more than 12 months ago? 5. Are you currently taking medications that may cause bleeding, dizziness, or sedation at least 3-4 times per week? 6. Are you currently taking medications used for gastrointestinal reflux, ulcer disease, depression or hypertension at least 3-4 times per week? 7. In the past 12 months have you been diagnosed with liver disease, pancreatitis, gout, or depression? 8. In the past 12 months have you been diagnosed with high blood pressure or diabetes? 9. Do you sometimes have problems with sleeping, falling, memory, heartburn, stomach pain, nausea, vomiting, or feeling sad/blue? 10. Have you often had problems with sleeping, falling, memory, heartburn, stomach pain, nausea, vomiting, or feeling sad/blue?	10 2 min	Uses a complex algorithm to identify patients deemed "at risk"

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
CRAFFT	C: Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs? R: Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in? A: Do you ever use alcohol or drugs while you are by yourself, or ALONE? F: Do you ever FORGET things you did while using alcohol or drugs? F: Do your family or FRIENDS ever tell you that you should cut down on your drinking or drug use? T: Have you ever gotten into TROUBLE while you were using alcohol or drugs?	6 2-5 min	Each "Yes" response to the CRAFFT questions is scored 1 point. A score of 2 or greater is a "positive" screen and indicates that the adolescent is at high-risk for having an alcohol or drug-related disorder and requires further assessment
FAST	1. How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year? Never Less than monthly Monthly Weekly Daily or almost daily *Only answer the following questions if the answer above is Less than monthly (1) or Monthly (2). Stop here if the answer is Never (0), Weekly (3) or Daily (4).* 2. How often during the last year have you failed to do what was normally expected from you because of your drinking? Never Less than monthly Monthly Weekly Daily or almost daily 3. How often during the last year have you been unable to remember what happened the night before because you had been drinking? Never Less than monthly Monthly Weekly Daily or almost daily 4. Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down? No	4 1-2 min	An overall total score of 3 or more on the first or all 4 questions is FAST positive

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	Yes, but not in the last year Yes, during the last year		
NIAAA Youth Guide Screening Questions	**Do you have any friends who drank beer, wine, or any drink containing alcohol in the past year?** *(Ages 9-14 years, this question first. Ages 14-18 users, this question second)* **In the past year, on how many days have you had more than a few sips of beer, wine, or any drink containing alcohol?†**	2 1 min	Identify lower, moderate, or highest risk level using an age-specific chart
NIDA Quick Screen	**In the past year, how often have you used alcohol (for men, 5 or more drinks per day; for women, 4 or more drinks per day)** Never Once or twice Monthly Weekly Daily or almost daily *Parallel questions for tobacco products, prescription drugs for non-medical reasons, and illegal drugs*	1 (alcohol); 4 (all substances) 1-2 min	If the patient says "Yes" to one or more days of heavy drinking, patient is an at-risk drinker.
S2BI	**In the past year, how many times have you used tobacco?** Never *(options for all questions)* Once or twice Monthly Weekly or more **In the past year, how many times have you used alcohol?** **In the past year, how many times have you used marijuana?** **In the past year, how many times have you used prescription drugs that were not prescribed for you (such as pain medication or Adderall)?**	7 1-2 min	For each substance, responses are categorized into levels of risk (no risk, lower risk, higher risk). Affirmative responses to tobacco, alcohol, or marijuana use prompts further questions about additional substances used.

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	In the past year, how many times have you used illegal drugs (such as cocaine or Ecstasy)? **In the past year, how many times have you used inhalants (such as nitrous oxide)?** **In the past year, how many times have you used herbs or synthetic drugs (such as salvia, "K2," or bath salts)?**		
Single question: 12 months (NIAAA-recommended)	**How many times in the past year have you had 5/4 (men/women) or more drinks in a day?**	1 1 min	≥1 is a positive screen
Single question: 3 months (often called SASQ)	**When was the last time you had more than 5/4 (men/women) drinks in 1 day?** Alternate wording: "On any single occasion during the past 3 months, have you had more than 5 drinks containing alcohol?"	1 1 min	Positive if answer is within past 3 months. Positive if answer is yes.
T-ACE	T: tolerance: how many drinks does it take to make you feel high? (>2 indicates tolerance) A: have people annoyed you by criticizing your drinking? C: have you ever felt you should cut down on your drinking? E: eye-opener: have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover?	4 1 min	Score 2 points for tolerance; 1 point for others; range 0–5; threshold for positive score ≥2
TAPS	**1. In the PAST 12 MONTHS, how often have you used tobacco or any other nicotine delivery product (i.e., e-cigarette, vaping or chewing tobacco)?** Daily or almost daily Weekly Monthly Less than monthly Never **2. In the PAST 12 MONTHS, how often have you had 5 or more drinks (men)/4 or more drinks (women) containing alcohol in one day?**	4 (TAPS-1) Followup questions for substances endorsed (TAPS-2) 5 min	0 = No use in past 3 months 1 = Problem Use ≥2 = Higher Risk

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	Daily or almost daily Weekly Monthly Less than monthly Never **3. In the PAST 12 MONTHS, how often have you used any prescription medications just for the feeling, more than prescribed or that were not prescribed for you?** Daily or almost daily Weekly Monthly Less than monthly Never **4. In the PAST 12 MONTHS, how often have you used any drugs including marijuana, cocaine or crack, heroin, methamphetamine (crystal meth), hallucinogens, ecstasy/MDMA?** Daily or almost daily Weekly Monthly Less than monthly Never		
USAUDIT	**1. How often do you have a drink containing alcohol?** Never (0) Less than monthly (1) Monthly (2) Weekly (3) 2-3 times a week (4) 4-6 times a week (5) Daily (6) **2. How many drinks containing alcohol do you have on a typical day you are drinking?** 1 drink (0) 2 drinks (1) 3 drinks (2) 4 drinks (3)	10 2-5 min	Scores of 7 for women (and men ages 66 and older) and 8 for men ages 65 and younger represent the thresholds beyond which drinking begins to entail health risks as endorsed by NIAAA. A score of 1 or more by pregnant women are grounds for discussing health risks. <u>In general:</u>

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	5-6 drinks (4) 7-9 drinks (5) 10 or more drinks (6) **3. How often do you have 5/4 (men/women & men over age 65) or more drinks on one occasion?** *(same options as #1)* **4. How often during the last year have you found that you were not able to stop drinking once you had started?** Never (0) Less than monthly (1) Monthly (2) Weekly (3) Daily or almost daily (4) **5. How often during the past year have you failed to do what was expected of you because of drinking?** *(same options as #4)* **6. How often during the past year have you needed a drink first thing in the morning to get yourself going after a heavy drinking session?** *(same options as #4)* **7. How often during the past year have you had a feeling of guilt or remorse after drinking?** *(same options as #4)* **8. How often during the past year have you been unable to remember what happened the night before because you had been drinking?** *(same options as #4)* **9. Have you or someone else been injured because of your drinking?** No (0) Yes, but not in the past year (2) Yes, during the past year (4) **10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking and suggested you cut down?**		Scores between 7/8-15 (M/F) are most appropriate for feedback and brief intervention; Scores between 16-24 are most appropriate for feedback, monitoring, and brief outpatient treatment; Scores 25 or higher warrant referral to evaluation and treatment.

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

Instrument name	Description	No. items/ questions Estimated Time to administer	Scoring notes
	(same options as #9)		
USAUDIT-C	**1. How often do you have a drink containing alcohol?** Never (0) Less than monthly (1) Monthly (2) Weekly (3) 2-3 times a week (4) 4-6 times a week (5) Daily (6) **2. How many drinks containing alcohol do you have on a typical day you are drinking?** 1 drink (0) 2 drinks (1) 3 drinks (2) 4 drinks (3) 5-6 drinks (4) 7-9 drinks (5) 10 or more drinks (6) **3. How often do you have X (5 for men; 4 for women and men over age 65) or more drinks on one occasion?** Never (0) Less than monthly (1) Monthly (2) Weekly (3) 2-3 times a week (4) 4-6 times a week (5) Daily (6)	3 1-2 min	A total of 7 or more for women and men over age 65, and 8 or more for younger males is a positive risk indicator.

*The U.S. version asks about five or more drinks, reflecting standard drink sizes in the United States.

† This question is used in the Brief Screener for Tobacco, Alcohol, and other Drugs (BSTAD) to screen for alcohol use

Abbreviations: AC-OK = Andrew Cherry, Oklahoma screening tool; ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; BSTAD = Brief Screener for Tobacco, Alcohol, and other Drugs; CAGE = Cut down, Annoyed, Guilty, Eye-opener; CARET = Comorbidity Alcohol Risk Evaluation Tool; CRAFFT = Car, Relax, Alone, Forget, Friends, Trouble; FAST = Fast Alcohol Screening Test; LSD = lysergic acid diethylamide; MDMA = 3,4-methylenedioxymethamphetamine; min = minute; NIAAA = National Institute on Alcohol Abuse and Alcoholism; NIDA =

Appendix E, Table 1. Screening Instruments to Identify Unhealthy Alcohol Use

National Institute on Drug Abuse; No. = number; S2BI = Screening to Brief Intervention; SASQ = Single Alcohol Screening Question; T-ACE = Tolerance, Annoyed, Cut down, Eye opener; TAPS = Tobacco, Alcohol, Prescription medication, and other Substance use; USAUDIT = US Alcohol Use Disorders Identification Test; USAUDIT-C = US Alcohol Use Disorders Identification Test-Concise

Appendix E, Table 2. Reference Standards for Studies Included in Key Question 2

Population	Author, year	Reference Standard (language if not English)	Screening Test(s)	Condition
Adolescents	Chung, 2012[13]	NSDUH interview	5+ drinks Frequency Quantity	Dependence Meets criterion for any AUD symptom
	Clark, 2016[14]	NSDUH interview	Frequency Quantity Quantity x Frequency	Use Disorder Moderate Use Disorder Severe Use Disorder
	Cortes-Tomas, 2017[15]	Self-report alcohol use diary	AUDIT AUDIT-C AUDIT-CR 6+ drinks (AUDIT-3) 7/6+ drinks (AUDIT-3R)	Heavy or binge drinking
	D'Amico, 2016[16]	DISC-IV	AUDIT NIAAA Youth Screen	Use Disorder Heavy use Use
	Harris, 2016[17]	ADI	Frequency	Abuse or dependence
		Timeline followback	Frequency	Use
	Kelly, 2014[18]	CIDI	BSTAD	Use Disorder
	Knight, 2003[19]	ADI	AUDIT	Abuse or dependence Dependence Any problem
	Levy, 2016[20]	DISC-IV	NIAAA Youth Screen	Use Disorder Any criterion Use
	Levy, 2021[21]	CIDI	S2BI	Use Disorder Moderate-severe use disorder
	Levy, 2023[22]	CIDI	S2BI BSTAD TAPS	Use Disorder
	Liskola, 2018[23]	SADS-PL (Finnish)	AUDIT AUDIT-C	Problem or Disorder
	Rumpf, 2013[24]	CIDI (German)	AUDIT AUDIT-C	Abuse, dependence, or heavy drinking Abuse or dependence Heavy use
	Santis, 2009[25]	CIDI	AUDIT	Dependence Hazardous Use Harmful Use
Young adults	McCabe, 2019[26]	NIAAA guideline questions	USAUDIT	At-risk drinking

Appendix E, Table 2. Reference Standards for Studies Included in Key Question 2

			USAUDIT-C	
		DSM-5 Checklist	USAUDIT USAUDIT-C	Potential AUD
	Villarosa-Hurlocker, 2020[27]	DSM-5 Checklist	USAUDIT USAUDIT-C	Potential AUD

Abbreviations: ADI = Adolescent Drinking Index; AUD = Alcohol Use Disorder; AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; AUDIT-CR = Alcohol Use Disorders Identification Test-Concise Revised; BSTAD = Brief Screener for Tobacco, Alcohol, and other Drugs; CIDI = Composite International Diagnostic Interview; DISC-IV = Diagnostic Interview Schedule for Children Version IV; DSM-5 = Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition; NIAAA = National Institute on Alcohol Abuse and Alcoholism; NSDUH = National Survey on Drug Use and Health; S2BI = Screening to Brief Intervention; SADS-PL = Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime; TAPS = Tobacco, Alcohol, Prescription medication, and other Substance use

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
5+ drinks	Chung, 2012[13]	Meets criterion for any AUD symptom	Females age 18	10069	26.8	NR	≥1 day*	0.67 (0.65, 0.69)	0.88 (0.87, 0.89)	0.67 (0.65, 0.69)	0.88 (0.87, 0.89)
			Males age 18	10311	33.3	NR	≥1 day*	0.76 (0.75, 0.77)	0.83 (0.82, 0.84)	0.69 (0.68, 0.70)	0.87 (0.87, 0.88)
			Females age 17	11554	23.8	NR	≥1 day*	0.60 (0.58, 0.62)	0.91 (0.90, 0.92)	0.68 (0.66, 0.69)	0.88 (0.87, 0.89)
			Males age 17	11966	26.2	NR	≥1 day*	0.71 (0.69, 0.73)	0.88 (0.87, 0.89)	0.68 (0.66, 0.69)	0.90 (0.89, 0.90)
			Males age 16	12481	20.2	NR	≥1 day*	0.66 (0.64, 0.68)	0.92 (0.91, 0.93)	0.68 (0.66, 0.69)	0.91 (0.91, 0.92)
			Females age 16	11942	20.2	NR	≥1 day*	0.56 (0.54, 0.58)	0.93 (0.92, 0.93)	0.67 (0.65, 0.69)	0.89 (0.89, 0.90)
			Males age 15	12590	13.2	NR	≥1 day*	0.55 (0.53, 0.57)	0.95 (0.95, 0.95)	0.63 (0.60, 0.65)	0.93 (0.93, 0.94)
			Females age 15	12161	15.5	NR	≥1 day*	0.52 (0.50, 0.54)	0.95 (0.95, 0.95)	0.66 (0.63, 0.68)	0.92 (0.91, 0.92)
			Females age 14	12135	9.2	NR	≥1 day*	0.45 (0.42, 0.48)	0.97 (0.97, 0.97)	0.60 (0.57, 0.64)	0.95 (0.94, 0.95)
			Males age 14	12696	6.7	NR	≥1 day*	0.47 (0.44, 0.50)	0.97 (0.97, 0.97)	0.53 (0.49, 0.56)	0.96 (0.96, 0.97)
			Females age 13	12164	4.6	NR	≥1 day*	0.35 (0.31, 0.39)	0.99 (0.99, 0.99)	0.63 (0.58, 0.68)	0.97 (0.97, 0.97)
			Males age 13	12796	3.4	NR	≥1 day*	0.33 (0.29, 0.38)	0.99 (0.99, 0.99)	0.54 (0.48, 0.60)	0.98 (0.97, 0.98)
			Males age 12	11822	1.3	NR	≥1 day*	0.37 (0.30, 0.45)	0.99 (0.99, 0.99)	0.33 (0.26, 0.40)	0.99 (0.99, 0.99)
			Females age 12	11478	0.6	NR	≥1 day*	0.30 (0.21, 0.42)	0.99 (0.99, 0.99)	0.16 (0.10, 0.23)	1.00 (0.99, 1.00)
		Dependence	Females age 18	10069	4.9	NR	≥1 day*	0.83 (0.79, 0.86)	0.76 (0.75, 0.77)	0.15 (0.14, 0.17)	0.99 (0.99, 0.99)
			Males age 18	10311	5.6	NR	≥2 days*	0.77 (0.73, 0.80)	0.76 (0.75, 0.77)	0.16 (0.15, 0.17)	0.98 (0.98, 0.99)
			Females age 17	11554	4.4	NR	≥1 day*	0.76 (0.72, 0.79)	0.82 (0.81, 0.83)	0.16 (0.15, 0.18)	0.99 (0.98, 0.99)
			Males age 17	11966	4.6	NR	≥1 day*	0.81 (0.78, 0.84)	0.75 (0.74, 0.76)	0.14 (0.12, 0.15)	0.99 (0.99, 0.99)
			Females age 16	11942	3.5	NR	≥1 day*	0.71 (0.67, 0.75)	0.86 (0.85, 0.87)	0.16 (0.14, 0.17)	0.99 (0.99, 0.99)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
			Males age 16	12481	3.1	NR	≥1 day*	0.76 (0.71, 0.80)	0.83 (0.82, 0.84)	0.13 (0.11, 0.14)	0.99 (0.99, 0.99)
			Females age 15	12161	3.3	NR	≥1 day*	0.66 (0.61, 0.71)	0.90 (0.89, 0.91)	0.18 (0.16, 0.20)	0.99 (0.99, 0.99)
			Males age 15	12590	1.9	NR	≥1 day*	0.72 (0.66, 0.77)	0.90 (0.89, 0.91)	0.12 (0.11, 0.14)	0.99 (0.99, 1.00)
			Females age 14	12135	1.5	NR	≥1 day*	0.59 (0.52, 0.66)	0.94 (0.94, 0.94)	0.13 (0.11, 0.15)	0.99 (0.99, 0.99)
			Males age 14	12696	1.1	NR	≥1 day*	0.71 (0.63, 0.78)	0.95 (0.95, 0.95)	0.14 (0.11, 0.16)	1.00 (1.00, 1.00)
			Females age 13	12164	0.7	NR	≥1 day*	0.51 (0.40, 0.61)	0.97 (0.97, 0.97)	0.10 (0.08, 0.14)	1.00 (1.00, 1.00)
			Males age 13	12796	0.5	NR	≥1 day*	0.42 (0.31, 0.54)	0.98 (0.98, 0.98)	0.10 (0.07, 0.14)	1.00 (1.00, 1.00)
			Females age 12	11478	0.2	NR	≥1 day*	0.44 (0.26, 0.63)	0.99 (0.99, 0.99)	0.08 (0.04, 0.14)	1.00 (1.00, 1.00)
			Males age 12	11822	0.3	NR	≥1 day*	0.65 (0.49, 0.79)	0.99 (0.99, 0.99)	0.16 (0.11, 0.23)	1.00 (1.00, 1.00)
6+ drinks	Cortes-Tomas, 2017[15]	Exceeding Limits (heavy or binge drinking)	All	906	36.1	0.752 (0.696, 0.808)	≥1	0.98 (0.96, 0.99)	0.34 (0.30, 0.38)	0.46 (0.42, 0.49)	0.97 (0.93, 0.99)
							≥2	0.78 (0.73, 0.82)	0.61 (0.57, 0.65)	0.53 (0.49, 0.57)	0.83 (0.79, 0.86)
7/6+ drinks	Cortes-Tomas, 2017[15]	Exceeding Limits (heavy or binge drinking)	All	906	36.1	0.883 (0.854, 0.913)	≥1	0.98 (0.96, 0.99)	0.69 (0.65, 0.72)	0.64 (0.60, 0.68)	0.98 (0.96, 0.99)
							≥2	0.70 (0.65, 0.75)	0.85 (0.82, 0.88)	0.73 (0.67, 0.77)	0.83 (0.80, 0.86)
AUDIT	Cortes-Tomas, 2017[15]	Exceeding Limits (heavy or binge drinking)	All	906	36.1	0.741 (0.681, 0.801)	≥8	0.86 (0.82, 0.89)	0.46 (0.41, 0.49)	0.47 (0.43, 0.51)	0.85 (0.81, 0.89)
							≥9	0.82 (0.77, 0.86)	0.54 (0.49, 0.58)	0.50 (0.46, 0.54)	0.84 (0.80, 0.87)
							≥10	0.74 (0.69, 0.78)	0.62 (0.58, 0.66)	0.52 (0.48, 0.57)	0.81 (0.77, 0.84)
							≥5	1.00 (0.99, 1.00)	0.26 (0.23, 0.30)	0.43 (0.40, 0.47)	1.00 (0.98, 1.00)
							≥6	1.00 (0.99, 1.00)	0.32 (0.28, 0.36)	0.45 (0.42, 0.49)	1.00 (0.98, 1.00)
							≥7	0.94 (0.91, 0.96)	0.38 (0.34, 0.42)	0.46 (0.42, 0.50)	0.92 (0.88, 0.95)
							≥11	0.58 (0.53, 0.63)	0.69 (0.65, 0.73)	0.51 (0.46, 0.57)	0.74 (0.71, 0.78)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
	D'Amico, 2016[16]	Use	All	1569	41.7	NR	≥8	0.19 (0.16, 0.22)	0.99 (0.98, 1.00)	0.94 (0.88, 0.97)	0.63 (0.61, 0.66)
		Exceeding Limits (heavy use)	All	1569	22.1	NR	≥8	0.33 (0.28, 0.39)	0.99 (0.98, 0.99)	0.89 (0.82, 0.94)	0.84 (0.82, 0.86)
		Use Disorder	All	1569	3.9	NR	≥8	0.70 (0.57, 0.81)	0.94 (0.93, 0.96)	0.34 (0.26, 0.43)	0.99 (0.98, 0.99)
	Knight, 2003[19]	Any problem	All	538	28.4	0.92 (0.89, 0.94)	≥8	0.24 (0.18, 0.31)	1.00 (0.99, 1.00)	0.90 (0.77, 0.96)	0.77 (0.73, 0.80)
							≥3	0.72 (0.65, 0.79)	0.89 (0.86, 0.92)	0.72 (0.65, 0.79)	0.89 (0.85, 0.92)
							≥5	0.50 (0.43, 0.58)	0.97 (0.95, 0.99)	0.87 (0.78, 0.92)	0.83 (0.79, 0.86)
							≥2*	0.88 (0.83, 0.93)	0.81 (0.77, 0.85)	0.65 (0.58, 0.71)	0.95 (0.92, 0.97)
		Dependence	All	538	2.2	0.95 (0.91, 0.99)	≥2	1.00 (0.76, 1.00)	0.63 (0.59, 0.67)	0.06 (0.03, 0.10)	1.00 (0.99, 1.00)
							≥5	0.83 (0.57, 1.00)	0.85 (0.82, 0.88)	0.11 (0.06, 0.19)	1.00 (0.98, 1.00)
							≥3*	1.00 (0.76, 1.00)	0.73 (0.70, 0.77)	0.07 (0.04, 0.12)	1.00 (0.99, 1.00)
							≥8	0.75 (0.46, 1.00)	0.94 (0.92, 0.96)	0.22 (0.12, 0.37)	0.99 (0.98, 1.00)
		Use Disorder	All	538	7.6	0.91 (0.87, 0.95)	≥5	0.73 (0.58, 0.87)	0.88 (0.85, 0.91)	0.33 (0.24, 0.44)	0.98 (0.96, 0.99)
							≥2	0.93 (0.84, 1.00)	0.66 (0.62, 0.70)	0.18 (0.14, 0.24)	0.99 (0.97, 1.00)
							≥8	0.54 (0.38, 0.69)	0.97 (0.95, 0.98)	0.59 (0.43, 0.74)	0.96 (0.94, 0.98)
							≥3*	0.88 (0.76, 0.97)	0.77 (0.73, 0.80)	0.24 (0.18, 0.31)	0.99 (0.97, 0.99)
	Liskola, 2018[23]	Unhealthy use	All	595	31.6	0.934 (0.911, 0.953)	≥3	0.98 (0.95, 0.99)	0.62 (0.57, 0.67)	0.54 (0.49, 0.60)	0.98 (0.96, 0.99)
							≥4	0.96 (0.93, 0.98)	0.69 (0.65, 0.74)	0.59 (0.54, 0.65)	0.98 (0.95, 0.99)
							≥5*	0.93 (0.89, 0.96)	0.77 (0.73, 0.81)	0.65 (0.59, 0.71)	0.96 (0.93, 0.98)
							≥6	0.88 (0.82, 0.92)	0.83 (0.79, 0.87)	0.71 (0.65, 0.76)	0.94 (0.91, 0.96)
							≥7	0.83 (0.77, 0.88)	0.89 (0.85, 0.91)	0.77 (0.71, 0.82)	0.92 (0.89, 0.94)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
							≥8	0.71 (0.64, 0.77)	0.92 (0.89, 0.94)	0.80 (0.73, 0.85)	0.87 (0.84, 0.90)
			Female	488	NR	0.938 (0.913, 0.958)	≥3	0.99 (NR)	0.61 (NR)	0.54 (NR)	0.99 (NR)
							≥4	0.97 (NR)	0.68 (NR)	0.59 (NR)	0.98 (NR)
							≥5	0.95 (NR)	0.77 (NR)	0.66 (NR)	0.97 (NR)
							≥6	0.90 (NR)	0.83 (NR)	0.72 (NR)	0.95 (NR)
							≥7	0.85 (NR)	0.89 (NR)	0.78 (NR)	0.93 (NR)
							≥8	0.73 (NR)	0.92 (NR)	0.81 (NR)	0.88 (NR)
			Male	133	NR	0.918 (0.855, 0.959)	≥3	0.95 (NR)	0.67 (NR)	0.57 (NR)	0.97 (NR)
							≥4	0.95 (NR)	0.72 (NR)	0.61 (NR)	0.97 (NR)
							≥5	0.87 (NR)	0.77 (NR)	0.63 (NR)	0.93 (NR)
							≥6	0.80 (NR)	0.83 (NR)	0.68 (NR)	0.90 (NR)
							≥7	0.77 (NR)	0.88 (NR)	0.75 (NR)	0.89 (NR)
							≥8	0.62 (NR)	0.91 (NR)	0.78 (NR)	0.89 (NR)
	Rumpf, 2013[24]	Exceeding Limits (heavy use)	All	225	14.7	0.855 (0.784, 0.927)	≥8	0.82 (0.66, 0.91)	0.83 (0.77, 0.87)	0.45 (0.33, 0.58)	0.96 (0.92, 0.98)
							≥6*	0.85 (0.69, 0.93)	0.73 (0.66, 0.79)	0.35 (0.25, 0.46)	0.97 (0.92, 0.99)
		Unhealthy use	All	225	24.9	0.848 (0.791, 0.904)	≥8	0.66 (0.53, 0.77)	0.86 (0.80, 0.90)	0.61 (0.48, 0.72)	0.88 (0.83, 0.92)
							≥6*	0.79 (0.66, 0.87)	0.79 (0.73, 0.85)	0.55 (0.44, 0.65)	0.92 (0.87, 0.96)
		Use Disorder	All	225	20.0	0.857 (0.805, 0.908)	≥8	0.71 (0.57, 0.82)	0.84 (0.78, 0.89)	0.52 (0.40, 0.64)	0.92 (0.87, 0.95)
							≥6*	0.84 (0.71, 0.92)	0.77 (0.71, 0.83)	0.48 (0.37, 0.59)	0.95 (0.90, 0.98)
	Santis, 2009[25]	Harmful Use	All	58	27.6	0.78 (0.64, 0.93)	≥5*	0.75 (0.43, 0.93)	0.64 (0.45, 0.80)	0.45 (0.24, 0.68)	0.87 (0.65, 0.97)
		Dependence	All	58	25.9	0.76 (0.60, 0.92)	≥7*	0.64 (0.32, 0.88)	0.75 (0.56, 0.88)	0.47 (0.22, 0.73)	0.86 (0.64, 0.95)
		Exceeding Limits (hazardous use)	All	95	34.7	0.90 (0.84, 0.97)	≥3*	0.96 (0.78, 1.00)	0.63 (0.48, 0.76)	0.58 (0.42, 0.73)	0.97 (0.82, 1.00)
AUDIT-C		Exceeding Limits (heavy	All	906	36.1		≥4	1.00 (0.99, 1.00)	0.31 (0.27, 0.34)	0.45 (0.41, 0.48)	1.00 (0.98, 1.00)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
	Cortes-Tomas, 2017[15]	or binge drinking)				0.801 (0.751, 0.852)	≥5	1.00 (0.99, 1.00)	0.34 (0.30, 0.38)	0.46 (0.42, 0.50)	1.00 (0.98, 1.00)
							≥6	0.96 (0.93, 0.98)	0.42 (0.38, 0.46)	0.48 (0.44, 0.52)	0.95 (0.92, 0.97)
							≥9	0.60 (0.55, 0.65)	0.79 (0.76, 0.82)	0.62 (0.57, 0.67)	0.78 (0.74, 0.81)
							≥7	0.92 (0.89, 0.95)	0.52 (0.48, 0.57)	0.52 (0.48, 0.56)	0.92 (0.89, 0.95)
							≥8	0.78 (0.73, 0.82)	0.67 (0.63, 0.71)	0.57 (0.53, 0.62)	0.84 (0.81, 0.87)
	Liskola, 2018[23]	Unhealthy use	All	595	31.6	0.912 (0.886, 0.933)	≥2	0.99 (0.96, 1.00)	0.59 (0.54, 0.63)	0.53 (0.47, 0.58)	0.99 (0.97, 1.00)
							≥3*	0.95 (0.91, 0.97)	0.66 (0.62, 0.71)	0.57 (0.51, 0.62)	0.97 (0.94, 0.98)
							≥4	0.88 (0.82, 0.92)	0.78 (0.74, 0.82)	0.65 (0.59, 0.71)	0.93 (0.90, 0.95)
							≥5	0.75 (0.68, 0.81)	0.88 (0.84, 0.91)	0.74 (0.67, 0.80)	0.88 (0.85, 0.91)
							≥6	0.65 (0.58, 0.72)	0.92 (0.89, 0.95)	0.81 (0.73, 0.85)	0.85 (0.82, 0.88)
							≥7	0.43 (0.36, 0.50)	0.97 (0.95, 0.98)	0.86 (0.78, 0.92)	0.79 (0.75, 0.82)
			Female	488	NR	NR	≥2	0.99 (NR)	0.57 (NR)	0.52 (NR)	0.99 (NR)
							≥3	0.96 (NR)	0.65 (NR)	0.56 (NR)	0.97 (NR)
							≥4	0.87 (NR)	0.78 (NR)	0.65 (NR)	0.93 (NR)
							≥5	0.75 (NR)	0.89 (NR)	0.76 (NR)	0.88 (NR)
							≥6	0.63 (NR)	0.93 (NR)	0.82 (NR)	0.85 (NR)
							≥7	0.40 (NR)	0.97 (NR)	0.87 (NR)	0.78 (NR)
			Male	133	NR	NR	≥2	1.00 (NR)	0.65 (NR)	0.56 (NR)	1.00 (NR)
							≥3	0.92 (NR)	0.70 (NR)	0.58 (NR)	0.95 (NR)
							≥4	0.92 (NR)	0.77 (NR)	0.64 (NR)	0.96 (NR)
							≥5	0.77 (NR)	0.83 (NR)	0.67 (NR)	0.89 (NR)
							≥6	0.74 (NR)	0.88 (NR)	0.74 (NR)	0.88 (NR)
							≥7	0.54 (NR)	0.95 (NR)	0.84 (NR)	0.82 (NR)
	Rumpf, 2013[24]		All	225	14.7		≥4	0.94 (0.80, 0.98)	0.59 (0.52, 0.66)	0.28 (0.21, 0.37)	0.98 (0.94, 1.00)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
		Exceeding Limits (heavy use)				0.872 (0.797, 0.946)	≥5*	0.85 (0.69, 0.93)	0.77 (0.71, 0.82)	0.39 (0.28, 0.50)	0.97 (0.93, 0.99)
		Unhealthy use	All	225	24.9	0.853 (0.795, 0.911)	≥4	0.88 (0.76, 0.94)	0.64 (0.56, 0.71)	0.45 (0.36, 0.54)	0.94 (0.88, 0.97)
							≥5*	0.73 (0.60, 0.83)	0.81 (0.74, 0.86)	0.56 (0.45, 0.67)	0.90 (0.84, 0.94)
		Use Disorder	All	225	20.0	0.850 (0.796, 0.905)	≥4	0.89 (0.77, 0.95)	0.66 (0.59, 0.73)	0.40 (0.31, 0.49)	0.96 (0.91, 0.98)
							≥5*	0.76 (0.61, 0.86)	0.78 (0.71, 0.83)	0.46 (0.35, 0.57)	0.93 (0.87, 0.96)
AUDIT-CR	Cortes-Tomas, 2017[15]	Exceeding Limits (heavy or binge drinking)	All	906	36.1	0.888 (0.856, 0.920)	≥5	1.00 (0.99, 1.00)	0.53 (0.49, 0.57)	0.54 (0.50, 0.58)	1.00 (0.99, 1.00)
							≥6	0.96 (0.93, 0.98)	0.65 (0.61, 0.69)	0.61 (0.57, 0.65)	0.97 (0.94, 0.98)
							≥7	0.92 (0.89, 0.95)	0.74 (0.70, 0.77)	0.67 (0.62, 0.71)	0.94 (0.92, 0.96)
							≥8	0.70 (0.65, 0.75)	0.85 (0.82, 0.88)	0.73 (0.68, 0.78)	0.83 (0.80, 0.86)
BSTAD	Kelly, 2014[18]	Use Disorder	All	525	4.6	0.90	≥2 days*	0.96 (0.83, 1.00)	0.85 (0.82, 0.88)	0.23 (0.16, 0.33)	1.00 (0.99, 1.00)
	Levy, 2023[22]	Use Disorder	All	258	1.9	0.93	≥2 days*	1.00 (0.48, 1.00)	0.88 (0.84, 0.92)	0.14 (0.05, 0.30)	1.00 (0.98, 1.00)
Frequency	Chung, 2012[13]	Any criterion	Females age 18	10069	26.8	NR	≥12 days*	0.93 (0.92, 0.94)	0.77 (0.76, 0.78)	0.60 (0.58, 0.61)	0.97 (0.96, 0.97)
			Males age 18	10311	33.3	NR	≥12 days*	0.94 (0.93, 0.95)	0.74 (0.73, 0.75)	0.64 (0.63, 0.66)	0.96 (0.96, 0.97)
			Females age 17	11554	23.8	NR	≥6 days*	1.00 (1.00, 1.00)	0.78 (0.77, 0.79)	0.59 (0.57, 0.60)	1.00 (1.00, 1.00)
			Males age 17	11966	26.2	NR	≥6 days*	1.00 (1.00, 1.00)	0.77 (0.76, 0.78)	0.61 (0.59, 0.62)	1.00 (1.00, 1.00)
			Females age 16	11942	20.2	NR	≥6 days*	1.00 (1.00, 1.00)	0.83 (0.82, 0.84)	0.60 (0.58, 0.61)	1.00 (1.00, 1.00)
			Males age 16	12481	20.2	NR	≥6 days*	0.99 (0.99, 0.99)	0.83 (0.82, 0.84)	0.60 (0.58, 0.61)	1.00 (1.00, 1.00)
			Females age 15	12161	15.5	NR	≥1 day*	1.00 (1.00, 1.00)	0.66 (0.65, 0.67)	0.35 (0.34, 0.36)	1.00 (1.00, 1.00)
			Males age 15	12590	13.2	NR	≥1 day*	1.00 (1.00, 1.00)	0.70 (0.69, 0.71)	0.34 (0.32, 0.35)	1.00 (1.00, 1.00)
			Females age 14	12135	9.2	NR	≥1 day*	1.00 (1.00, 1.00)	0.77 (0.76, 0.78)	0.31 (0.29, 0.32)	1.00 (1.00, 1.00)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
			Males age 14	12696	6.7	NR	≥1 day*	1.00 (1.00, 1.00)	0.80 (0.79, 0.81)	0.27 (0.25, 0.28)	1.00 (1.00, 1.00)
			Females age 13	12164	4.6	NR	≥1 day*	1.00 (0.99, 1.00)	0.87 (0.86, 0.88)	0.27 (0.25, 0.29)	1.00 (1.00, 1.00)
			Males age 13	12796	3.4	NR	≥1 day*	1.00 (0.99, 1.00)	0.88 (0.87, 0.89)	0.23 (0.21, 0.24)	1.00 (1.00, 1.00)
			Females age 12	11478	1.5	NR	≥1 day*	1.00 (0.98, 1.00)	0.95 (0.95, 0.95)	0.24 (0.21, 0.27)	1.00 (1.00, 1.00)
			Males age 12	11822	1.3	NR	≥1 day*	1.00 (0.98, 1.00)	0.94 (0.94, 0.94)	0.18 (0.16, 0.21)	1.00 (1.00, 1.00)
		Dependence	Females age 18	10069	4.9	NR	≥52 days*	0.81 (0.77, 0.84)	0.81 (0.80, 0.82)	0.18 (0.16, 0.20)	0.99 (0.99, 0.99)
			Males age 18	10311	5.6	NR	≥52 days*	0.85 (0.82, 0.88)	0.75 (0.74, 0.76)	0.17 (0.15, 0.18)	0.99 (0.99, 0.99)
			Females age 17	11554	4.4	NR	≥24 days*	0.87 (0.84, 0.90)	0.75 (0.74, 0.76)	0.14 (0.13, 0.15)	0.99 (0.99, 0.99)
			Males age 17	11966	4.6	NR	≥24 days*	0.94 (0.92, 0.96)	0.71 (0.70, 0.72)	0.14 (0.12, 0.15)	1.00 (0.99, 1.00)
			Females age 16	11942	3.5	NR	≥12 days*	0.95 (0.92, 0.97)	0.74 (0.73, 0.75)	0.12 (0.11, 0.13)	1.00 (1.00, 1.00)
			Males age 16	12481	3.1	NR	≥12 days*	0.97 (0.95, 0.98)	0.74 (0.73, 0.75)	0.11 (0.10, 0.12)	1.00 (1.00, 1.00)
			Females age 15	12161	3.3	NR	≥6 days*	0.99 (0.97, 1.00)	0.77 (0.76, 0.78)	0.13 (0.12, 0.14)	1.00 (1.00, 1.00)
			Males age 15	12590	1.9	NR	≥6 days*	1.00 (0.98, 1.00)	0.78 (0.77, 0.79)	0.08 (0.07, 0.09)	1.00 (1.00, 1.00)
			Females age 14	12135	1.5	NR	≥6 days*	0.99 (0.96, 1.00)	0.85 (0.84, 0.86)	0.09 (0.08, 0.10)	1.00 (1.00, 1.00)
			Males age 14	12696	1.1	NR	≥6 days*	0.99 (0.96, 1.00)	0.87 (0.86, 0.88)	0.08 (0.07, 0.09)	1.00 (1.00, 1.00)
			Females age 13	12164	0.7	NR	≥6 days*	0.99 (0.94, 1.00)	0.92 (0.92, 0.92)	0.08 (0.07, 0.10)	0.99 (1.00, 1.00)
			Males age 13	12796	0.5	NR	≥6 days*	1.00 (0.94, 1.00)	0.93 (0.93, 0.93)	0.07 (0.05, 0.08)	1.00 (1.00, 1.00)
			Females age 12	11478	0.2	NR	≥6 days*	1.00 (0.86, 1.00)	0.97 (0.97, 0.97)	0.06 (0.04, 0.09)	1.00 (1.00, 1.00)
			Males age 12	11822	0.3	NR	≥6 days*	1.00 (0.90, 1.00)	0.97 (0.97, 0.97)	0.09 (0.07, 0.12)	1.00 (1.00, 1.00)
	Clark, 2016[14]	Severe Use Disorder	Age 12-18 years	NR	NR	NR	Moderate risk	1.00 (NR)	0.80 (NR)	0.05 (NR)	1.00 (NR)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
			Age 12-18 years	NR	NR	NR	High risk	0.91 (NR)	0.93 (NR)	0.12 (NR)	1.00 (NR)
		Dependence	Age 12-18 years	NR	NR	NR	Moderate risk	1.00 (NR)	0.81 (NR)	0.10 (NR)	1.00 (NR)
			Age 12-18 years	NR	NR	NR	High risk	0.57 (NR)	0.94 (NR)	0.15 (NR)	0.99 (NR)
		Use Disorder	Age 12-17 years	942	5.6	NR	≥3 days	0.91 (0.80, 0.96)	0.92 (0.90, 0.94)	0.41 (0.32, 0.50)	0.99 (0.99, 1.00)
			Age 12-18 years	NR	NR	NR	High risk	0.65 (NR)	0.96 (NR)	0.51 (NR)	0.98 (NR)
			Age 18-20 years	251	10.0	NR	≥12 days*	0.88 (0.70, 0.96)	0.80 (0.74, 0.85)	0.32 (0.23, 0.45)	0.98 (0.95, 0.99)
			Age 15-17 years	463	9.5	NR	≥3 days*	0.91 (0.79, 0.96)	0.89 (0.86, 0.92)	0.50 (0.36, 0.57)	0.99 (0.97, 1.00)
			Age 12-14 years	479	1.9	NR	≥3 days*	0.89 (0.57, 0.98)	0.95 (0.93, 0.97)	0.37 (0.13, 0.42)	1.00 (0.99, 1.00)
			Age 12-18 years	NR	NR	NR	Moderate risk	0.92 (NR)	0.84 (NR)	0.28 (NR)	0.99 (NR)
	Harris, 2016[17]	Use	All	136	21.3	NR	12-month use	0.62 (0.44, 0.78)	0.98 (0.93, 1.00)	0.90 (0.70, 0.97)	0.91 (0.84, 0.95)
		Use Disorder	All	136	2.9	NR	3-month use	1.00 (0.51, 1.00)	0.92 (0.85, 0.95)	0.27 (0.11, 0.52)	1.00 (0.97, 1.00)
							12-month use	1.00 (0.51, 1.00)	0.88 (0.81, 0.93)	0.20 (0.08, 0.42)	1.00 (0.97, 1.00)
							>=Monthly	1.00 (0.51, 1.00)	0.95 (0.89, 0.97)	0.36 (0.15, 0.65)	1.00 (0.97, 1.00)
NIAAA Youth Screen	D'Amico, 2016[16]	Use	All	1573	41.6	NR	Moderate or high risk (NIAAA)	0.40 (0.37, 0.44)	0.97 (0.95, 0.98)	0.90 (0.86, 0.93)	0.69 (0.67, 0.72)
		Exceeding Limits (heavy use)	All	1573	22.1	NR	Moderate or high risk (NIAAA)	0.56 (0.51, 0.61)	0.92 (0.90, 0.93)	0.66 (0.60, 0.71)	0.88 (0.86, 0.90)
		Use Disorder	All	1573	3.9	NR	Moderate or high risk (NIAAA)	0.87 (0.76, 0.94)	0.84 (0.82, 0.86)	0.19 (0.14, 0.24)	0.99 (0.99, 1.00)
							Moderate or high risk (Study)*	0.89 (0.78, 0.95)	0.84 (0.82, 0.86)	0.18 (0.14, 0.23)	0.99 (0.99, 1.00)
	Levy, 2016[20]	Any criterion	All	388	2.1	0.962	≥6*	1.00 (0.68, 1.00)	0.91 (0.88, 0.94)	0.19 (0.10, 0.33)	1.00 (0.99, 1.00)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
		Use	All	388	26.3	0.903	≥1*	0.83 (0.76, 0.90)	0.94 (0.91, 0.97)	0.83 (0.75, 0.89)	0.94 (0.91, 0.96)
		Use Disorder	All	388	2.1	0.980	≥13*	1.00 (0.68, 1.00)	0.94 (0.92, 0.97)	0.26 (0.14, 0.43)	1.00 (0.99, 1.00)
Quant x Freq	Clark, 2016[14]	Use Disorder	Age 12-17 years	942	5.6	NR	≥3 drinks/year	1.00 (0.93, 1.00)	0.91 (0.89, 0.92)	0.39 (0.31, 0.47)	1.00 (1.00, 1.00)
			Age 18-20 years	251	10.0	NR	≥12 drinks per year*	0.92 (0.75, 0.98)	0.75 (0.69, 0.80)	0.31 (0.20, 0.39)	0.99 (0.96, 1.00)
			Age 15-17 years	463	9.5	NR	≥3 drinks/year*	1.00 (0.92, 1.00)	0.86 (0.82, 0.89)	0.48 (0.34, 0.52)	1.00 (0.99, 1.00)
			Age 12-14 years	479	1.9	NR	≥3 drinks/year*	1.00 (0.70, 1.00)	0.95 (0.93, 0.97)	0.36 (0.15, 0.44)	1.00 (0.99, 1.00)
Quantity	Chung, 2012[13]	Any criterion	Females age 18	10069	26.8	NR	≥2 drinks*	0.77 (0.75, 0.79)	0.82 (0.81, 0.83)	0.61 (0.59, 0.63)	0.91 (0.90, 0.91)
			Males age 18	10311	33.3	NR	≥2 drinks*	0.80 (0.79, 0.81)	0.79 (0.78, 0.80)	0.66 (0.64, 0.67)	0.89 (0.88, 0.90)
			Females age 17	11554	23.8	NR	≥2 drinks*	0.68 (0.66, 0.70)	0.87 (0.86, 0.88)	0.62 (0.60, 0.64)	0.90 (0.89, 0.90)
			Males age 17	11966	26.2	NR	≥2 drinks*	0.73 (0.71, 0.75)	0.86 (0.85, 0.87)	0.65 (0.63, 0.67)	0.90 (0.89, 0.91)
			Females age 16	11942	20.2	NR	≥2 drinks*	0.64 (0.62, 0.66)	0.90 (0.89, 0.91)	0.62 (0.60, 0.64)	0.91 (0.90, 0.91)
			Males age 16	12481	20.2	NR	≥2 drinks*	0.67 (0.65, 0.69)	0.91 (0.90, 0.92)	0.65 (0.63, 0.67)	0.92 (0.91, 0.92)
			Females age 15	12161	15.5	NR	≥1 drink*	1.00 (1.00, 1.00)	0.68 (0.67, 0.69)	0.36 (0.35, 0.38)	1.00 (1.00, 1.00)
			Males age 15	12590	13.2	NR	≥1 drink*	1.00 (1.00, 1.00)	0.72 (0.71, 0.73)	0.35 (0.34, 0.37)	1.00 (1.00, 1.00)
			Females age 14	12135	9.2	NR	≥1 drink*	1.00 (1.00, 1.00)	0.78 (0.77, 0.79)	0.32 (0.30, 0.33)	1.00 (1.00, 1.00)
			Males age 14	12696	6.7	NR	≥1 drink*	1.00 (1.00, 1.00)	0.81 (0.80, 0.82)	0.28 (0.26, 0.29)	1.00 (1.00, 1.00)
			Females age 13	12164	4.6	NR	≥1 drink*	1.00 (0.99, 1.00)	0.89 (0.88, 0.90)	0.31 (0.29, 0.33)	1.00 (1.00, 1.00)
			Males age 13	12796	3.4	NR	≥1 drink*	1.00 (0.99, 1.00)	0.89 (0.88, 0.90)	0.24 (0.22, 0.26)	1.00 (1.00, 1.00)
			Males age 12	11822	1.3	NR	≥1 drink*	1.00 (0.98, 1.00)	0.95 (0.95, 0.95)	0.21 (0.18, 0.24)	1.00 (1.00, 1.00)
			Females age 12	11478	1.5	NR	≥1 drink*	1.00 (0.98, 1.00)	0.95 (0.95, 0.95)	0.24 (0.21, 0.27)	1.00 (1.00, 1.00)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
	Chung, 2012[13]	Dependence	Females age 18	10069	4.9	NR	≥3 drinks*	0.80 (0.76, 0.83)	0.76 (0.75, 0.77)	0.15 (0.13, 0.16)	0.99 (0.98, 0.99)
			Males age 18	10311	5.6	NR	≥3 drinks*	0.81 (0.78, 0.84)	0.68 (0.67, 0.69)	0.13 (0.12, 0.14)	0.98 (0.98, 0.99)
			Females age 17	11554	4.4	NR	≥2 drinks*	0.79 (0.75, 0.82)	0.77 (0.76, 0.78)	0.14 (0.12, 0.15)	0.99 (0.99, 0.99)
			Males age 17	11966	4.6	NR	≥3 drinks*	0.75 (0.71, 0.79)	0.77 (0.76, 0.78)	0.14 (0.12, 0.15)	0.98 (0.98, 0.99)
			Females age 16	11942	3.5	NR	≥2 drinks*	0.74 (0.70, 0.78)	0.82 (0.81, 0.83)	0.13 (0.12, 0.14)	0.99 (0.99, 0.99)
			Males age 16	12481	3.1	NR	≥2 drinks*	0.78 (0.74, 0.82)	0.82 (0.81, 0.83)	0.12 (0.11, 0.14)	0.99 (0.99, 0.99)
			Females age 15	12161	3.3	NR	≥2 drinks*	0.68 (0.63, 0.72)	0.88 (0.87, 0.89)	0.16 (0.15, 0.18)	0.99 (0.99, 0.99)
			Males age 15	12590	1.9	NR	≥2 drinks*	0.70 (0.64, 0.75)	0.89 (0.88, 0.90)	0.11 (0.09, 0.13)	0.99 (0.99, 0.99)
			Females age 14	12135	1.5	NR	≥1 drink*	1.00 (0.98, 1.00)	0.73 (0.72, 0.74)	0.05 (0.05, 0.06)	1.00 (1.00, 1.00)
			Males age 14	12696	1.1	NR	≥1 drink*	1.00 (0.97, 1.00)	0.77 (0.76, 0.78)	0.05 (0.04, 0.05)	1.00 (1.00, 1.00)
			Females age 13	12164	0.7	NR	≥1 drink*	1.00 (0.96, 1.00)	0.85 (0.84, 0.86)	0.04 (0.04, 0.06)	1.00 (1.00, 1.00)
			Males age 13	12796	0.5	NR	≥1 drink*	1.00 (0.94, 1.00)	0.87 (0.86, 0.88)	0.04 (0.03, 0.05)	1.00 (1.00, 1.00)
			Females age 12	11478	0.2	NR	≥1 drink*	1.00 (0.86, 1.00)	0.94 (0.94, 0.94)	0.03 (0.02, 0.05)	1.00 (1.00, 1.00)
			Males age 12	11822	0.3	NR	≥1 drink*	1.00 (0.90, 1.00)	0.94 (0.94, 0.94)	0.05 (0.03, 0.06)	1.00 (1.00, 1.00)
	Clark, 2016[14]	Use Disorder	Age 12-14 years	479	1.9	NR	≥2 drinks*	1.00 (0.70, 1.00)	0.98 (0.96, 0.99)	0.46 (0.29, 0.71)	1.00 (0.99, 1.00)
			Age 15-17 years	463	9.5	NR	≥2 drinks*	0.94 (0.82, 0.98)	0.88 (0.85, 0.91)	0.44 (0.35, 0.55)	0.99 (0.98, 1.00)
			Age 18-20 years	251	10.0	NR	≥2 drinks	0.90 (0.75, 0.98)	0.66 (0.62, 0.74)	0.26 (0.17, 0.34)	0.98 (0.95, 1.00)
			Age 18-20 years	251	10.0	NR	≥3 drinks	0.81 (0.61, 0.91)	0.76 (0.70, 0.81)	0.31 (0.18, 0.38)	0.95 (0.94, 0.99)
			Age 12-17 years	942	5.6	NR	≥2 drinks	0.94 (0.85, 0.98)	0.93 (0.92, 0.95)	0.46 (0.37, 0.55)	1.00 (0.99, 1.00)
S2BI	Levy, 2021[21]	Dependence	All	517	0.8	NR	≥monthly*	1.00 (0.51, 1.00)	0.94 (0.91, 0.95)	0.11 (0.04, 0.25)	1.00 (0.99, 1.00)

Appendix E, Table 3. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Adolescents (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
		Use Disorder	All	517	2.9	NR	≥monthly	0.53 (0.30, 0.75)	0.94 (0.92, 0.96)	0.22 (0.11, 0.37)	0.99 (0.97, 0.99)
	Levy, 2023[22]	Use Disorder	All	253	1.6	0.97	≥monthly*	0.50 (0.07, 0.93)	0.95 (0.92, 0.97)	0.14 (0.02, 0.43)	0.99 (0.97, 1.00)
TAPS	Levy, 2023[22]	Use Disorder	All	268	3.4	0.89	≥2*	0.78 (0.40, 0.97)	0.93 (0.90, 0.96)	0.29 (0.13, 0.51)	0.99 (0.97, 1.00)

* Author-reported optimal cutoff

Abbreviations: AUC = Area Under the Curve; AUD = Alcohol Use Disorder; AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; AUDIT-CR = Alcohol Use Disorders Identification Test-Concise Revised; BSTAD = Brief Screener for Tobacco, Alcohol, and other Drugs; CI = confidence interval; Freq = frequency; N = number of participants; NIAAA = National Institute on Alcohol Abuse and Alcoholism; NPV = negative predictive value; NR = not reported; PPV = positive predictive value; Quant = quantity; S2BI = Screening to Brief Intervention; TAPS = Tobacco, Alcohol, Prescription medication, and other Substance use; USAUDIT = U.S. Alcohol Use Disorders Identification Test; USAUDIT-C = U.S. Alcohol Use Disorders Identification Test-Concise

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
USAUDIT	McCabe, 2019[26]	Unhealthy use (at-risk drinking)	All	250	36.8	0.96 (0.93, 0.98)	≥5	0.90 (0.82, 0.95)	0.85 (0.78, 0.90)	0.78 (0.69, 0.84)	0.93 (0.88, 0.96)
							≥4	0.94 (0.86, 0.97)	0.78 (0.71, 0.84)	0.71 (0.62, 0.78)	0.95 (0.90, 0.98)
							≥6*	0.88 (0.80, 0.93)	0.91 (0.86, 0.95)	0.85 (0.77, 0.91)	0.93 (0.88, 0.96)
							≥7	0.84 (0.75, 0.90)	0.94 (0.90, 0.97)	0.89 (0.80, 0.93)	0.91 (0.86, 0.95)
							≥8	0.79 (0.70, 0.86)	0.96 (0.92, 0.98)	0.92 (0.84, 0.96)	0.89 (0.83, 0.93)
			Male	162	43.2	NR	≥4	0.96 (0.88, 0.99)	0.88 (0.80, 0.93)	0.86 (0.76, 0.92)	0.96 (0.90, 0.99)
							≥5*	0.93 (0.84, 0.97)	0.96 (0.89, 0.98)	0.94 (0.86, 0.98)	0.95 (0.88, 0.98)
							≥6	0.81 (0.71, 0.89)	0.98 (0.92, 0.99)	0.97 (0.88, 0.99)	0.87 (0.80, 0.92)
							≥7	0.73 (0.61, 0.82)	1.00 (0.96, 1.00)	1.00 (0.93, 1.00)	0.83 (0.75, 0.89)
							≥8	0.64 (0.53, 0.74)	1.00 (0.96, 1.00)	1.00 (0.92, 1.00)	0.79 (0.70, 0.85)
			Female	88	25.0	NR	≥4	0.89 (0.72, 0.97)	0.68 (0.56, 0.78)	0.49 (0.34, 0.64)	0.96 (0.86, 0.99)
							≥5	0.82 (0.61, 0.93)	0.75 (0.64, 0.85)	0.51 (0.36, 0.67)	0.94 (0.84, 0.99)
							≥6*	0.77 (0.57, 0.90)	0.86 (0.76, 0.93)	0.65 (0.46, 0.81)	0.92 (0.82, 0.97)
							≥7	0.71 (0.52, 0.87)	0.89 (0.80, 0.95)	0.70 (0.49, 0.84)	0.91 (0.81, 0.96)
							≥8	0.66 (0.47, 0.84)	0.93 (0.83, 0.97)	0.79 (0.55, 0.93)	0.88 (0.79, 0.94)
		Use Disorder (potential AUD)	All	250	50.0	0.80 (0.75, 0.86)	≥6	0.94 (0.89, 0.98)	0.41 (0.33, 0.50)	0.62 (0.55, 0.68)	0.86 (0.75, 0.93)
							≥7	0.90 (0.84, 0.94)	0.48 (0.39, 0.57)	0.63 (0.56, 0.70)	0.83 (0.73, 0.90)
							≥8	0.87 (0.80, 0.92)	0.53 (0.44, 0.61)	0.65 (0.57, 0.72)	0.80 (0.71, 0.88)
							≥9	0.80 (0.72, 0.86)	0.57 (0.48, 0.65)	0.65 (0.57, 0.72)	0.74 (0.64, 0.82)

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
							≥10	0.76 (0.68, 0.83)	0.68 (0.59, 0.76)	0.70 (0.62, 0.77)	0.74 (0.65, 0.81)
							≥11	0.70 (0.62, 0.78)	0.71 (0.63, 0.78)	0.71 (0.62, 0.78)	0.71 (0.62, 0.78)
							≥12	0.65 (0.56, 0.73)	0.77 (0.69, 0.83)	0.74 (0.65, 0.81)	0.69 (0.60, 0.76)
							≥13*	0.61 (0.52, 0.69)	0.86 (0.78, 0.91)	0.81 (0.72, 0.88)	0.69 (0.61, 0.75)
							≥14	0.55 (0.46, 0.64)	0.88 (0.81, 0.93)	0.82 (0.73, 0.89)	0.66 (0.59, 0.73)
			Male	162	51.9	NR	≥6	0.95 (0.88, 0.98)	0.27 (0.18, 0.38)	0.58 (0.50, 0.66)	0.84 (0.65, 0.94)
							≥7	0.93 (0.85, 0.97)	0.35 (0.25, 0.46)	0.60 (0.52, 0.68)	0.82 (0.66, 0.91)
							≥9	0.85 (0.75, 0.91)	0.44 (0.33, 0.55)	0.62 (0.53, 0.70)	0.72 (0.58, 0.83)
							≥8	0.88 (0.79, 0.93)	0.38 (0.28, 0.50)	0.61 (0.52, 0.69)	0.75 (0.60, 0.86)
							≥10	0.82 (0.73, 0.89)	0.59 (0.48, 0.69)	0.68 (0.59, 0.77)	0.75 (0.63, 0.84)
							≥11	0.76 (0.66, 0.84)	0.63 (0.52, 0.73)	0.69 (0.59, 0.77)	0.71 (0.59, 0.80)
							≥12	0.71 (0.61, 0.80)	0.70 (0.60, 0.79)	0.72 (0.62, 0.81)	0.70 (0.59, 0.79)
							≥13*	0.69 (0.59, 0.78)	0.81 (0.71, 0.88)	0.79 (0.69, 0.87)	0.71 (0.61, 0.79)
							≥14	0.61 (0.50, 0.70)	0.83 (0.74, 0.90)	0.78 (0.67, 0.86)	0.66 (0.57, 0.75)
			Female	88	45.5	NR	≥6	0.90 (0.77, 0.96)	0.66 (0.53, 0.78)	0.69 (0.56, 0.80)	0.89 (0.75, 0.96)
							≥7	0.85 (0.71, 0.93)	0.71 (0.57, 0.82)	0.71 (0.57, 0.82)	0.85 (0.71, 0.93)
							≥8*	0.83 (0.68, 0.91)	0.80 (0.66, 0.88)	0.77 (0.62, 0.87)	0.84 (0.71, 0.92)
							≥9	0.70 (0.55, 0.82)	0.80 (0.66, 0.88)	0.74 (0.58, 0.85)	0.76 (0.63, 0.86)
							≥10	0.65 (0.50, 0.78)	0.88 (0.75, 0.94)	0.81 (0.65, 0.91)	0.75 (0.62, 0.84)
							≥11	0.55 (0.40, 0.69)	0.86 (0.73, 0.93)	0.76 (0.58, 0.88)	0.69 (0.57, 0.80)

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
							≥12	0.50 (0.35, 0.65)	0.89 (0.78, 0.95)	0.80 (0.61, 0.91)	0.68 (0.56, 0.78)
							≥13	0.43 (0.29, 0.58)	0.94 (0.83, 0.98)	0.85 (0.64, 0.95)	0.66 (0.54, 0.76)
							≥14	0.40 (0.26, 0.55)	0.97 (0.89, 1.00)	0.94 (0.73, 0.99)	0.66 (0.55, 0.76)
	Villarosa-Hurlocker, 2020[27]	Use Disorder (potential AUD)	All	382	39.8	NR	≥4	0.96 (0.92, 0.98)	0.33 (0.27, 0.39)	0.49 (0.43, 0.54)	0.93 (0.85, 0.97)
							≥5	0.91 (0.86, 0.95)	0.46 (0.40, 0.53)	0.53 (0.47, 0.59)	0.89 (0.82, 0.94)
							≥6	0.83 (0.76, 0.88)	0.56 (0.50, 0.63)	0.56 (0.49, 0.62)	0.83 (0.77, 0.88)
							≥7	0.78 (0.70, 0.84)	0.72 (0.66, 0.77)	0.64 (0.57, 0.71)	0.83 (0.77, 0.88)
							≥8	0.72 (0.64, 0.78)	0.80 (0.74, 0.84)	0.70 (0.62, 0.77)	0.81 (0.75, 0.86)
							≥9	0.64 (0.57, 0.72)	0.84 (0.79, 0.88)	0.64 (0.65, 0.79)	0.78 (0.73, 0.83)
							≥10	0.57 (0.49, 0.64)	0.87 (0.82, 0.91)	0.75 (0.66, 0.82)	0.75 (0.70, 0.80)
							≥11	0.49 (0.41, 0.57)	0.90 (0.86, 0.94)	0.77 (0.68, 0.84)	0.73 (0.67, 0.78)
							≥12	0.43 (0.35, 0.51)	0.94 (0.90, 0.96)	0.81 (0.71, 0.88)	0.71 (0.66, 0.76)
							≥13	0.38 (0.30, 0.45)	0.95 (0.91, 0.97)	0.83 (0.72, 0.90)	0.70 (0.64, 0.74)
							≥14	0.31 (0.24, 0.39)	0.96 (0.93, 0.98)	0.84 (0.72, 0.91)	0.68 (0.63, 0.73)
			Female	263	38.4	NR	≥4	0.95 (0.89, 0.98)	0.35 (0.28, 0.43)	0.48 (0.41, 0.55)	0.92 (0.82, 0.97)
							≥5	0.90 (0.83, 0.95)	0.47 (0.40, 0.55)	0.52 (0.44, 0.59)	0.88 (0.80, 0.94)
							≥6	0.77 (0.68, 0.84)	0.59 (0.51, 0.66)	0.54 (0.46, 0.62)	0.81 (0.72, 0.87)
							≥7	0.72 (0.63, 0.80)	0.78 (0.71, 0.83)	0.67 (0.58, 0.75)	0.82 (0.75, 0.87)
							≥8*	0.65 (0.56, 0.74)	0.88 (0.82, 0.92)	0.77 (0.67, 0.84)	0.80 (0.74, 0.85)
							≥9	0.59 (0.50, 0.68)	0.90 (0.85, 0.94)	0.79 (0.69, 0.87)	0.78 (0.72, 0.83)

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
							≥10	0.49 (0.39, 0.58)	0.92 (0.87, 0.95)	0.79 (0.67, 0.87)	0.74 (0.68, 0.80)
							≥11	0.41 (0.32, 0.50)	0.94 (0.89, 0.96)	0.82 (0.69, 0.90)	0.72 (0.65, 0.77)
							≥12	0.33 (0.24, 0.42)	0.96 (0.92, 0.98)	0.85 (0.70, 0.93)	0.70 (0.63, 0.75)
							≥13	0.29 (0.21, 0.38)	0.98 (0.94, 0.99)	0.88 (0.73, 0.95)	0.69 (0.62, 0.74)
							≥14	0.22 (0.15, 0.31)	0.99 (0.96, 1.00)	0.92 (0.74, 0.98)	0.67 (0.61, 0.73)
			Male	117	42.7	NR	≥4	0.98 (0.90, 1.00)	0.27 (0.18, 0.39)	0.50 (0.40, 0.60)	0.95 (0.75, 0.99)
							≥5	0.94 (0.84, 0.98)	0.43 (0.32, 0.55)	0.55 (0.45, 0.65)	0.91 (0.76, 0.97)
							≥6	0.94 (0.84, 0.98)	0.51 (0.39, 0.62)	0.59 (0.48, 0.69)	0.92 (0.79, 0.97)
							≥7	0.88 (0.76, 0.94)	0.57 (0.45, 0.68)	0.60 (0.49, 0.71)	0.86 (0.73, 0.94)
							≥8	0.84 (0.71, 0.92)	0.60 (0.48, 0.71)	0.61 (0.49, 0.72)	0.83 (0.70, 0.91)
							≥9	0.74 (0.60, 0.84)	0.69 (0.57, 0.78)	0.64 (0.51, 0.75)	0.78 (0.66, 0.87)
							≥10	0.72 (0.58, 0.83)	0.76 (0.65, 0.85)	0.69 (0.56, 0.80)	0.79 (0.67, 0.87)
							≥11	0.64 (0.50, 0.76)	0.81 (0.70, 0.88)	0.71 (0.57, 0.82)	0.75 (0.64, 0.84)
							≥12*	0.62 (0.48, 0.74)	0.87 (0.76, 0.93)	0.77 (0.62, 0.88)	0.75 (0.65, 0.84)
							≥13	0.56 (0.42, 0.69)	0.88 (0.78, 0.94)	0.78 (0.62, 0.88)	0.73 (0.62, 0.81)
							≥14	0.50 (0.37, 0.63)	0.90 (0.80, 0.95)	0.78 (0.61, 0.89)	0.71 (0.60, 0.79)
USAUDIT-C	McCabe, 2019[26]	Unhealthy use (at-risk drinking)	All	250	36.8	0.96 (0.94, 0.99)	≥3	0.95 (0.88, 0.98)	0.78 (0.71, 0.84)	0.71 (0.63, 0.79)	0.96 (0.91, 0.98)
							≥4*	0.93 (0.86, 0.97)	0.89 (0.83, 0.93)	0.83 (0.75, 0.89)	0.96 (0.91, 0.98)
							≥5	0.87 (0.79, 0.92)	0.94 (0.90, 0.97)	0.90 (0.82, 0.95)	0.93 (0.87, 0.96)
							≥6	0.81 (0.72, 0.88)	0.98 (0.95, 0.99)	0.96 (0.89, 0.99)	0.90 (0.85, 0.94)

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
			Male	162	43.2	NR	≥3	0.96 (0.88, 0.99)	0.88 (0.80, 0.93)	0.86 (0.76, 0.92)	0.96 (0.90, 0.99)
							≥4*	0.96 (0.88, 0.99)	0.96 (0.89, 0.98)	0.94 (0.86, 0.98)	0.97 (0.91, 0.99)
							≥5	0.92 (0.83, 0.96)	0.96 (0.89, 0.98)	0.94 (0.86, 0.98)	0.94 (0.87, 0.97)
							≥6	0.86 (0.76, 0.92)	0.96 (0.89, 0.98)	0.94 (0.85, 0.98)	0.90 (0.82, 0.94)
			Female	88	25.0	NR	≥3	0.93 (0.72, 0.97)	0.68 (0.56, 0.78)	0.49 (0.34, 0.64)	0.96 (0.86, 0.99)
							≥4*	0.88 (0.67, 0.95)	0.83 (0.73, 0.90)	0.63 (0.46, 0.78)	0.95 (0.86, 0.98)
							≥5	0.75 (0.57, 0.90)	0.93 (0.83, 0.97)	0.77 (0.57, 0.90)	0.92 (0.83, 0.97)
							≥6	0.68 (0.47, 0.84)	1.00 (0.94, 1.00)	1.00 (0.80, 1.00)	0.90 (0.82, 0.95)
		Use Disorder (potential AUD)	All	250	50.0	0.75 (0.68, 0.81)	3	0.98 (0.94, 1.00)	0.24 (0.17, 0.32)	0.56 (0.50, 0.63)	0.94 (0.80, 0.98)
							≥4	0.96 (0.91, 0.98)	0.32 (0.24, 0.41)	0.59 (0.52, 0.65)	0.89 (0.77, 0.95)
							≥5	0.93 (0.87, 0.96)	0.43 (0.35, 0.52)	0.62 (0.55, 0.69)	0.86 (0.75, 0.92)
							≥6	0.87 (0.80, 0.92)	0.49 (0.40, 0.57)	0.63 (0.56, 0.70)	0.79 (0.69, 0.87)
							≥7*	0.79 (0.71, 0.85)	0.57 (0.48, 0.65)	0.65 (0.57, 0.72)	0.73 (0.64, 0.81)
							≥8	0.69 (0.60, 0.76)	0.61 (0.52, 0.69)	0.64 (0.55, 0.71)	0.66 (0.57, 0.74)
							≥9	0.61 (0.52, 0.69)	0.69 (0.60, 0.76)	0.66 (0.57, 0.74)	0.64 (0.55, 0.71)
							≥10	0.53 (0.44, 0.61)	0.80 (0.72, 0.86)	0.73 (0.63, 0.81)	0.63 (0.55, 0.70)
							≥11	0.36 (0.28, 0.45)	0.86 (0.78, 0.91)	0.71 (0.59, 0.81)	0.57 (0.50, 0.64)
			Female	88	45.5	NR	≥3	0.98 (0.87, 1.00)	0.34 (0.22, 0.47)	0.55 (0.43, 0.66)	0.94 (0.73, 0.99)
							≥4	0.93 (0.80, 0.97)	0.49 (0.36, 0.64)	0.61 (0.48, 0.72)	0.89 (0.72, 0.96)
							≥5*	0.88 (0.74, 0.95)	0.71 (0.57, 0.82)	0.71 (0.58, 0.82)	0.87 (0.73, 0.94)

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
							≥6	0.78 (0.62, 0.88)	0.77 (0.63, 0.87)	0.74 (0.59, 0.85)	0.80 (0.67, 0.89)
							≥7	0.73 (0.57, 0.84)	0.83 (0.70, 0.91)	0.78 (0.63, 0.89)	0.78 (0.65, 0.88)
							≥8	0.55 (0.40, 0.69)	0.86 (0.73, 0.93)	0.76 (0.58, 0.88)	0.69 (0.57, 0.80)
							≥9	0.40 (0.26, 0.55)	0.86 (0.73, 0.93)	0.70 (0.49, 0.84)	0.63 (0.51, 0.74)
							≥10	0.35 (0.22, 0.50)	0.94 (0.83, 0.98)	0.82 (0.59, 0.94)	0.63 (0.52, 0.74)
							≥11	0.18 (0.09, 0.32)	0.94 (0.83, 0.98)	0.70 (0.40, 0.89)	0.58 (0.47, 0.68)
			Male	162	51.9	NR	≥3	0.99 (0.94, 1.00)	0.19 (0.12, 0.29)	0.57 (0.49, 0.65)	0.94 (0.72, 0.99)
							≥4	0.98 (0.92, 0.99)	0.22 (0.14, 0.32)	0.57 (0.49, 0.65)	0.89 (0.69, 0.97)
							≥5	0.95 (0.88, 0.98)	0.27 (0.18, 0.38)	0.58 (0.50, 0.66)	0.84 (0.65, 0.94)
							≥6	0.90 (0.82, 0.95)	0.33 (0.24, 0.44)	0.59 (0.51, 0.67)	0.76 (0.60, 0.88)
							≥7	0.82 (0.73, 0.89)	0.43 (0.33, 0.55)	0.61 (0.52, 0.70)	0.69 (0.55, 0.80)
							≥8	0.75 (0.65, 0.83)	0.48 (0.37, 0.58)	0.61 (0.51, 0.69)	0.64 (0.51, 0.75)
							≥9	0.70 (0.60, 0.79)	0.60 (0.49, 0.70)	0.66 (0.55, 0.75)	0.65 (0.54, 0.75)
							≥10*	0.61 (0.50, 0.70)	0.71 (0.60, 0.79)	0.69 (0.58, 0.78)	0.62 (0.52, 0.72)
							≥11	0.44 (0.34, 0.55)	0.81 (0.71, 0.88)	0.71 (0.58, 0.82)	0.57 (0.48, 0.66)
	Villarosa-Hurlocker, 2020[27]	Use Disorder (potential AUD)	All	382	39.8	NR	≥5	0.83 (0.76, 0.88)	0.51 (0.44, 0.57)	0.53 (0.46, 0.59)	0.82 (0.75, 0.87)
							≥6	0.70 (0.62, 0.76)	0.68 (0.62, 0.74)	0.59 (0.52, 0.66)	0.77 (0.71, 0.82)
							≥7*	0.61 (0.53, 0.69)	0.79 (0.73, 0.83)	0.65 (0.57, 0.73)	0.75 (0.70, 0.80)
							≥8	0.45 (0.38, 0.53)	0.87 (0.82, 0.90)	0.69 (0.59, 0.77)	0.71 (0.65, 0.76)
							≥9	0.34 (0.27, 0.42)	0.92 (0.87, 0.95)	0.73 (0.62, 0.82)	0.68 (0.62, 0.73)

Appendix E, Table 4. Accuracy of Screening Instruments To Detect Unhealthy Alcohol Use Among Young Adults (KQ2)

Screening instrument	Author, year	Condition (study definition)	Screened group	N screened	% with condition	AUC (95% CI)	Cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
			Female	263	38.4	NR	≥5	0.80 (0.71, 0.87)	0.53 (0.45, 0.61)	0.52 (0.44, 0.59)	0.81 (0.73, 0.87)
							≥7*	0.54 (0.44, 0.63)	0.85 (0.79, 0.90)	0.69 (0.58, 0.78)	0.75 (0.68, 0.80)
							≥6	0.61 (0.52, 0.70)	0.72 (0.65, 0.79)	0.58 (0.48, 0.67)	0.75 (0.68, 0.81)
							≥8	0.39 (0.30, 0.48)	0.94 (0.89, 0.97)	0.80 (0.66, 0.89)	0.71 (0.65, 0.77)
							≥9	0.28 (0.20, 0.37)	0.96 (0.92, 0.98)	0.82 (0.66, 0.92)	0.68 (0.62, 0.74)
			Male	117	42.7	NR	≥5	0.88 (0.76, 0.94)	0.46 (0.35, 0.58)	0.55 (0.44, 0.65)	0.84 (0.69, 0.92)
							≥6*	0.86 (0.74, 0.93)	0.57 (0.45, 0.68)	0.60 (0.48, 0.70)	0.84 (0.71, 0.92)
							≥7	0.76 (0.63, 0.86)	0.63 (0.51, 0.73)	0.60 (0.48, 0.71)	0.78 (0.65, 0.87)
							≥8	0.60 (0.46, 0.72)	0.69 (0.57, 0.78)	0.59 (0.45, 0.71)	0.70 (0.58, 0.79)
							≥9	0.48 (0.35, 0.61)	0.81 (0.70, 0.88)	0.65 (0.49, 0.78)	0.68 (0.57, 0.77)

* Author-reported optimal cutoff

Abbreviations: AUC = Area Under the Curve; AUD = Alcohol Use Disorder; CI = confidence interval; N = number of participants; NPV = negative predictive value; NR = not reported; PPV = positive predictive value; Quant = quantity; USAUDIT = U.S. Alcohol Use Disorders Identification Test; USAUDIT-C = U.S. Alcohol Use Disorders Identification Test-Concise

Appendix E, Table 5. Studies Among Adults Included for Key Question 4

Study	Population	Quality rating	N rand	Country	Intervention
Aalto, 2000[28]	Adults	Fair	265	FIN	IG1: Three 10-20 min personalized feedback sessions with GP
Alegria, 2019[29]	Adults	Fair	341	USA,ESP	IG1: 10-12 60-min individual counseling sessions
Barticevic, 2021[30]	Adults	Fair	342	CHL	IG1: One brief individual counseling session
Baumann, 2021[31]	Adults	Fair	553	DEU	IG1: Three personalized normative feedback letters
Bertholet, 2015[32]	Young adults	Good	737	SWL	IG1: Internet-based personalized feedback
Bischof, 2008[33]	Adults	Fair	408	DEU	IG0: IG1 + IG2 combined
Bischof, 2008[33]	Adults	Fair	408	DEU	IG1: Four 30-min computerized feedback and brief individual counseling sessions comprising of motivational interviewing and behavioral change counseling
Bischof, 2008[33]	Adults	Fair	408	DEU	IG2: Up to 3 30-40 min computerized feedback and motivational interviewing sessions
Burge, 1997[34]	Adults	Fair	242	USA	IG1: Two 10-15 min physician-delivered sessions and six 90 min patient educator-led group psychoeducation sessions
Burge, 1997[34]	Adults	Fair	242	USA	IG2: Six 90 min patient educator-led group psychoeducation sessions
Burge, 1997[34]	Adults	Fair	242	USA	IG3: Two 10-15 min physician delivered brief intervention sessions
Butler, 2013[35]	Adults	Fair	775	UK	IG1: Provider training in behavior change counseling; patients seen for at least one consultation
Carey, 2006[36]	Young adults	Fair	509	USA	IG1: One in-person motivational interview with enhanced counseling
Carey, 2006[36]	Young adults	Fair	509	USA	IG2: One in-person motivational interview
Carey, 2006[36]	Young adults	Fair	509	USA	IG3: One in-person TLFB interview and one in-person motivational interview with enhanced counseling
Carey, 2006[36]	Young adults	Fair	509	USA	IG4: One in-person TLFB interview and one in-person motivational interview
Carey, 2020[37]	Young adults	Fair	121	USA	IG1: 10 weeks of daily text messages containing accurate drinking norms
Chander, 2021[38]	Adults	Good	439	USA	IG1: One 20 min computer-based module plus 3 automated phone calls and thrice weekly text messages
Chander, 2021[38]	Adults	Good	439	USA	IG2: One 20 min computer-based module
Chang, 1999[39]	Pregnant	Fair	250	USA	IG1: One 45-minute physician-delivered counseling session
Chang, 2005[40]	Pregnant	Fair	304	USA	IG1: One 25 min partner-enhanced brief intervention
Chang, 2011[41]	Adults	Fair	511	USA	IG1: One 30-min physician-delivered individual counseling session
Collins, 2014[42]	Young adults	Fair	724	USA	IG1: One web-based personalized feedback session
Collins, 2014[42]	Young adults	Fair	724	USA	IG2: One web-based decisional balance feedback session
Crawford, 2014[43]	Adults	Fair	802	UK	IG1: One 2-3 min physician delivered brief intervention followed by 1-2 optional Alcohol Health Worker (AHW)-delivered ≤30 min FRAMES sessions
Crombie, 2018[44]	Adults	Good	825	Scotland	IG1: 112 tailored text messages
Cunningham, 2010[45]	Adults	Good	185	CAN	IG1: One 10-min online personalized feedback module

Appendix E, Table 5. Studies Among Adults Included for Key Question 4

Study	Population	Quality rating	N rand	Country	Intervention
Cunningham, 2012[46]	Adults	Fair	1767	CAN	IG1: Normative Feedback Pamphlet
Curry, 2003[47]	Adults	Fair	307	USA	IG1: One 5-min motivational interviewing session with PCP followed by written personalized feedback and three telephone counseling calls
Daeppen, 2011[48]	Young adults	Fair	217	SWL	IG1: One in-person 15 min brief motivational session
Drummond, 2009[49]	Adults	Fair	112	UK	IG1: One 40 min counseling session plus up to four additional 50 min counseling sessions
Emmen, 2005[50]	Adults	Fair	123	NLD	IG1: Assessment followed by one 60 min personalized health feedback session
Ettner, 2014[51]	Older adults	Good	1186	USA	IG1: Two personalized mailings, reviewed at routine visits with PCP, and three health educator calls
Fleming, 1997[52]	Adults	Good	774	USA	IG1: Two 15-min physician-delivered brief intervention sessions followed by two nurse-delivered followup calls
Fleming, 1999[53]	Older adults	Fair	158	USA	IG1: Two 10-15 min physician-delivered counseling sessions and two clinic nurse followup calls
Fleming, 2008[54]	Postpartum	Fair	235	USA	IG1: Two 15-minute in-person counseling sessions with a workbook and follow-up phone calls after each session
Fleming, 2010[55]	Young adults	Fair	986	USA, CAN	IG1: Two 15-min visits with a physician plus 2 followup calls or emails
Hansen, 2012[56]	Adults	Fair	1380	DNK	IG1: One computer-based personalized feedback session
Hansen, 2012[56]	Adults	Fair	1380	DNK	IG2: One computer-based automated personalized brief advice session
Heather, 1987[57]	Adults	Fair	104	UK	IG1: Two screening and brief counseling sessions with PCP
Heather, 1987[57]	Adults	Fair	104	UK	IG2: One brief advice session with PCP
Helstrom, 2014[58]	Adults	Fair	139	USA	IG1: One PCP-delivered counseling session followed by three telephone counseling sessions
Hilbink, 2012[59]	Adults	Fair	712	NLD	IG1: Screening and advice, with support visits as needed; mailed personalized feedback, booklets
Johnson, 2018[60]	Adults	Fair	837	AUS	IG1: One 5-10 min assessment and personalized feedback session via iPad
Johnsson, 2006[61]	Young adults	Fair	177	SWE	IG1: Five 2-hour group sessions based on BASICS manual
Kaner, 2013[62]	Adults	Fair	756	UK	IG1: One 5 min brief advice session followed by one 20 min brief lifestyle counseling session
Kaner, 2013[62]	Adults	Fair	756	UK	IG2: One 5 min brief advice session
Karnik, 2023[63]	Young adults	Fair	329	USA	IG1: One 10-minute electronic session of 11 MI-based modules
Kypri, 2004[64]	Young adults	Good	104	NZL	IG1: One computer-based personalized feedback session
Kypri, 2008[65]	Young adults	Fair	576	NZL	IG1: Two computer-based personalized feedback sessions
Kypri, 2008[65]	Young adults	Fair	576	NZL	IG2: One computer-based personalized feedback session
Kypri, 2009[66]	Young adults	Fair	2435	AUS	IG1: Two computer-based personalized feedback sessions
LaBrie, 2009[67]	Young adults	Fair	285	USA	IG1: One group counseling session

Appendix E, Table 5. Studies Among Adults Included for Key Question 4

Study	Population	Quality rating	N rand	Country	Intervention
LaBrie, 2013[68]	Young adults	Fair	554	USA	IG1: One computer-based personalized feedback session + optional printed feedback
LaBrie, 2013[68]	Young adults	Fair	554	USA	IG2: One sex-, race-, and Greek status-specific computer-based personalized feedback session
Larimer, 2007[69]	Young adults	Fair	1488	USA	IG1: One personalized feedback postcard followed by 10 generic postcards
Leeman, 2016[70]	Young adults	Fair	208	USA	IG1: One computer-based personalized feedback session with direct + indirect protective behavioral strategies
Leeman, 2016[70]	Young adults	Fair	208	USA	IG2: One computer-based personalized feedback session with direct protective behavioral strategies
Leeman, 2016[70]	Young adults	Fair	208	USA	IG3: One computer-based personalized feedback session with indirect protective behavioral strategies
Lewis, 2014[71]	Young adults	Fair	359	USA	IG1: One web-based personalized normative feedback session
Lewis, 2014[71]	Young adults	Fair	359	USA	IG2: One web-based combined alcohol and alcohol-related risky sexual behavior personalized normative feedback session
Maisto, 2001[72]	Adults	Fair	301	USA	IG1: One 30-45 min ME session followed by two 15-20 min followup booster sessions
Maisto, 2001[72]	Adults	Fair	301	USA	IG2: One 10-15 min brief advice session
Marlatt, 1998[73]	Young adults	Fair	348	USA	IG1: One 60-min MI session & summary sheet; mailed personalized feedback; follow-up phone calls and session optional (high risk or extreme)
Martens, 2010[74]	Young adults	Fair	263	USA	IG1: One targeted computer-based personalized drinking feedback session
Martens, 2010[74]	Young adults	Fair	263	USA	IG2: One standard computer-based personalized drinking feedback session
Martino, 2018[75]	Adults	Fair	165	USA	IG1: One 20-min in-person counseling session
Martino, 2018[75]	Adults	Fair	165	USA	IG2: One 20-min electronic MI session
Moore, 2010[76]	Older adults	Fair	631	USA	IG1: One physician-delivered personalized feedback session followed by one 40 min health educator call and two 20 min health educator calls
Neighbors, 2004[77]	Young adults	Fair	252	USA	IG1: Web-based personalized normative feedback printout
Neighbors, 2010[78]	Young adults	Fair	818	USA	IG1: Five web-based sex-specific personalized normative feedback sessions
Neighbors, 2010[78]	Young adults	Fair	818	USA	IG2: Five web-based sex-nonspecific personalized normative feedback sessions
Neighbors, 2010[78]	Young adults	Fair	818	USA	IG3: One web-based sex-specific personalized normative feedback session followed by four web-based attention-control sessions
Neighbors, 2010[78]	Young adults	Fair	818	USA	IG4: One web-based sex-nonspecific personalized normative feedback session followed by four web-based attention-control sessions
Neighbors, 2016[79]	Young adults	Fair	623	USA	IG1: One computer-based personalized normative feedback session
Neighbors, 2016[79]	Young adults	Fair	623	USA	IG2: One computer-based personalized social comparison feedback session
Neighbors, 2019[80]	Young adults	Fair	959	USA	IG1: One computer-based personalized normative feedback using Uncommon/Unhealthy/Negative framing

Appendix E, Table 5. Studies Among Adults Included for Key Question 4

Study	Population	Quality rating	N rand	Country	Intervention
Neighbors, 2019[80]	Young adults	Fair	959	USA	IG2: One computer-based personalized normative feedback using Uncommon/Healthy/Positive framing
Neighbors, 2019[80]	Young adults	Fair	959	USA	IG3: One computer-based personalized normative feedback using Common/Unhealthy/Positive framing
Neighbors, 2019[80]	Young adults	Fair	959	USA	IG4: One computer-based personalized normative feedback using Common/Healthy/Negative framing
Ntouva, 2019[81]	Adults	Fair	234	UK	IG1: One 10-min individual counseling session
Ockene, 1999[82]	Adults	Fair	530	USA	IG1: One to two 5-10 min patient-centered counseling session with PCP
O'Connor, 2007[83]	Pregnant	Fair	345	USA	IG1: One brief intervention session
Ondersma, 2015[84]	Pregnant	Fair	48	USA	IG1: One 20-minute web-based intervention with 3 subsequent tailored mailings
Ondersma, 2016[85]	Postpartum	Fair	123	USA	IG1: One 20-min web-based brief interview session
Osterman, 2014[86]	Pregnant	Fair	122	USA	IG1: One 30-min motivational interviewing session
Reynolds, 1995[87]	Pregnant	Fair	78	USA	IG1: One 10-min health-educator delivered brief counseling session plus self-help manual and one followup call to assess progress
Richmond, 1995[88]	Adults	Fair	285	AUS	IG1: Five physician-delivered counseling sessions of varying length
Richmond, 1995[88]	Adults	Fair	285	AUS	IG2: One 5-min physician-delivered brief advice session
Rose, 2017[89]	Adults	Fair	1855	USA	IG1: One 6.2-min (median) Interactive Voice Recognition session via telephone
Rubio, 2010[90]	Adults	Good	752	ESP	IG1: Two 10-15 min physician-delivered counseling sessions followed by two nurse contacts
Rubio, 2014[91]	Pregnant	Fair	330	USA	IG1: Four 10-15 min in-person prenatal motivational interview sessions and one 10-30 min postpartum in person motivational interview sessions
Saitz, 2003[92]	Adults	Fair	312	USA	IG1: One physician-delivered brief intervention
Schaus, 2009[93]	Young adults	Fair	363	USA	IG1: Two 20-min brief MI sessions plus personalized feedback document and alcohol-prevention brochure
Schulz, 2013[94]	Adults	Fair	448	DEU	IG0: IG1 + IG2 combined
Schulz, 2013[94]	Adults	Fair	448	DEU	IG1: Three web-based personalized feedback sessions, interspersing questions among advice
Schulz, 2013[94]	Adults	Fair	448	DEU	IG2: Three web-based personalized feedback sessions, advice given all at once
Scott, 1990[95]	Adults	Fair	226	UK	IG1: One 10-min personalized feedback session with PCP
Senft, 1997[96]	Adults	Fair	516	USA	IG1: One 30-sec message from primary care clinician and one 15-min counseling session from health counselor
Stein, 2018[97]	Young adults	Fair	226	USA	IG1: Five individual counseling sessions, in-person or by phone
Turrisi, 2009[98]	Young adults	Good	1275	USA	IG1: One 45-60 min personalized feedback session + parent handbook intervention
Turrisi, 2009[98]	Young adults	Good	1275	USA	IG2: One 45-60 min personalized feedback session

Appendix E, Table 5. Studies Among Adults Included for Key Question 4

Study	Population	Quality rating	N rand	Country	Intervention
Turrisi, 2009[98]	Young adults	Good	1275	USA	IG3: Informational handbook mailed to the participants' parents
Tzilos, 2011[99]	Pregnant	Fair	50	USA	IG1: One 15-20 min computer-based motivational intervention
van der Wulp, 2014[100]	Pregnant	Fair	393	NLD	IG1: Three midwife-delivered counseling sessions
van der Wulp, 2014[100]	Pregnant	Fair	393	NLD	IG2: Three web-based personalized feedback sessions
Voogt, 2014[101]	Young adults	Good	913	NLD	IG1: One web-based personalized feedback session
Wallace, 1988[102]	Adults	Fair	909	UK	IG1: One physician-delivered personalized feedback session and up to four followup sessions with physician
Watkins, 2017[103]	Adults	Fair	397	USA	IG1: Collaborative care (registry, regular assessment, adherence support) plus training for behavioral therapists and MDs for medication-assisted treatment
Watson, 2013[104]	Older adults	Good	529	UK	IG1: Stepped care: one 20-min counseling session with followup phone call; as needed three 40-min sessions, referral to specialist
Williams, 2019[105]	Adults	Fair	124	USA	IG1: Mean 7 nurse care management visits over 12 mo
Wilson, 2014[106]	Adults	Fair	102	UK	IG1: One 5 min personalized feedback session

Abbreviations: AUS = Australia; BASICS = Brief Alcohol Screening and Intervention for College Students—a Harm Reduction Approach; CAN = Canada; CHL = Chile; DEU = Germany; DNK = Denmark; ESP = Spain; FIN = Finland; FRAMES = Feedback about the adverse effects of alcohol, an emphasis on personal Responsibility for changing drinking behavior, Advice about alcohol consumption, a Menu of options for further help and advice, an Empathic stance towards the patient and an emphasis on Self-efficacy; GP = general practitioner; IG = intervention group; MD = medical doctor; min = minute; ME = motivational enhancement; MI = motivational interviewing; mo = months; NLD = Netherlands; N rand = number of participants randomized; NZL = New Zealand; PCP = primary care practitioner; sec = second; SWE = Sweden; SWL = Switzerland; TLFB = Timeline Follow Back; UK = United Kingdom; USA = United States of America

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
Aalto, 2000[28] (Fair)	FIN	265	Adults, aged 20-60 years	ETOH ≥ 280/190 g/week [M/F] or CAGE ≥ 3/2 [M/F]	42.0	29.4	NR	Comprehensive school: 49% Vocational school: 26% College: 21% Unemployed: 39%	Alc dep dx: 0 CAGE score (mean): 3.1 [2=likely hazardous use]
Alegria, 2019[29] (Fair)	USA,ESP	341	Latino adult immigrants with co-occurring mental health symptoms, aged 18-70 years	Affirmative response to 2 questions about substance misuse on AC-OK screener	34	51	Black: 5 Lat./Hisp: 100 Native Amer.: 8 White: 18	High school, GED, or vocational school: 62% Income < US$15,000: 85%	AUDIT-C (mean); 5.4 [5=likely hazardous use]
Barticevic, 2021[30] (Fair)	CL	342	Adults aged >=18 years	AUDIT 8-15	29	43	NR	Education level "basic": 60% University/technical education: 28%	AUD dx: NR Alc dep dx: NR Alc abuse dx: NR AUDIT (mean): 10.5 [8=likely hazardous use]
Baumann, 2021[31] (Fair)	DEU	553	Adults attending a municipal registry office, aged 18-64 years	Included subgroup: AUDIT-C 5-12/4-12 [M/F])	31	56	NR	12+ years education: 65% Unemployed: 3.2%	Drinks/week (mean): 1.8 At-risk drinking: 34% AUDIT (mean): 4.7 [8=likely hazardous use]
Bertholet, 2015[32] (Good)	SWL	737	Men, aged 21 years	AUDIT ≥8 or >14 drinks/weeks or at least one episode of binge drinking (≥6 drinks/occasion) per month during the past 12 months.	20.8	0	NR	NR	AUD dx: 52.0 Drinks/week (mean): 9.8
Bischof, 2008[33] (Fair)	DEU	408	Adults, aged 18-64 years	Alcohol dependence, abuse, at-risk consumption (>30/20 g ETOH per day [M/F], or >80/60 g of alcohol [M/F] on at least two occasions within the last 4 weeks)	36.5	31.9	NR	Years education (mean): 10.5	AUD dx: 13.8 Alc dep dx: 30.4 Alc abuse dx: 14.5
Burge, 1997[34] (Fair)	USA	242	Mexican-American adults attending a primary care	Alcohol abuse or dependence within the past year	39.4	25.0	Black: 7.2 Lat./Hisp: 86.7 White: 6.1	Years education (mean): 8.8 Uninsured: 77%	Alc dep dx: 35.0 Alc abuse dx: 65.0

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
			appointment, aged ≥18 years						Current drinkers: Men, 67%; Women, 32%
Butler, 2013[35] (Fair)	UK	775	Adults, aged ≥18 years	AUDIT-C >4/3 [M/F]	50.9	62.0	NR	Managerial/professional occupations: 43% Semi-routine and routine occupations: 20%	NR
Carey, 2006[36] (Fair)	USA	509	College students aged 18-25 years	≥1 episodes of heavy drinking in an average week, or four heavy drinking episodes in the last month (5/4 drinks [M/F])	19.2	65	White: 89	NR	Drinks/wk (mean): 19.2 Drinks/drinking day (mean): 5.7 Heavy use episode/month: 7.4
Carey, 2020[37] (Fair)	USA	121	First semester college students, aged 18-20 years	>4/3 [M/F] drinks in a day or >14/7 [M/F] in one week in the past 30 days	18	50	Asian: 18 Black: 8 Lat./Hisp: 16 White: 58	NR	Heavy use days/month (mean): 4.8 Drinks/drinking day (mean): 4.7
Chander, 2021[38] (Good)	USA	439	Women seeking care at an STI clinic, aged >= 18 years	>7 drinks/week, >3 drinks per occasion at least twice, or had sex under the influence of alcohol at least two times in prior 3 month	31	100	Black: 88	Less than high school graduate/GED: 30% Income	AUD dx: 67 Alc dep dx: 49 Alc abuse dx: 18 AUDIT score, 7-12: 29% >=13: 44% [8=like hazardous use]
Chang, 1999[39] (Fair)	USA	250	Pregnant women attending their first prenatal appointment (mean 16 weeks' gestation), aged 18-43 years	T-ACE ≥ 2	30.7	100	Asian: 2.0 Black: 14.0 Lat./Hisp: 6.0 White: 78.0	Some college: 29% College degree or higher: 56% Married: 74% Private insurance: 80%	Lifetime alcohol dx: 41% Current abstinence: 57%
Chang, 2005[40] (Fair)	USA	304	Pregnant women attending a prenatal appointment (mean 12 weeks' gestation)	T-ACE ≥2 and at risk for prenatal alcohol use (any alcohol consumption in 3 months before study enrollment [while pregnant], consumption of ≥1 drink per day in 6 months before study enrollment, or drinking	31.4	100	Black: 7.6 White: 78.6	Years education (median): 16 Annual income for homes in ZIP code (median): $55,357 Married/in a committed relationship: 81%	% days used alcohol (mean): 5 Drinks/drinking day (mean): 1.6

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
				during a previous pregnancy)					
Chang, 2011[41] (Fair)	USA	511	Women with medical diagnoses potentially exacerbated by risky drinking	T-ACE alcohol screen-positive, typically consumes >7 drinks/week, or >2 drinks at a time	45.1	100	Asian: 2.0 Black: 21.8 Lat./Hisp: 5.4 Pac. Isl.: 0.7 White: 75.5	College degree or higher: 62%	AUD dx: 9.4 Lifetime alcohol use disorder: 43%
Collins, 2014[42] (Fair)	USA	724	College students aged 18 years or older	At least one heavy episode (5/4 drinks [M/F]) in the past 30 days	20.8	56.0	Asian: 17.8 Black: 1.0 Lat./Hisp: 6.5 Native Amer.: 0.6 Pac. Isl.: 0.7 White: 67.1	NR	NR
Crawford, 2014[43] (Fair)	UK	802	Adults attending a sexual health clinic, aged ≥19 years	>8/6 [M/F] units of alcohol on ≥1 occasion per month	26.7	53.9	Asian: 3.6 Black: 13.0 White: 77.3	NR	Monthly heavy use episodes (>=8/6 [M/F] units): 37% Weekly heavy use episodes: 62%
Crombie, 2018[44] (Good)	Scotland	825	Men from areas of high deprivation, aged 25–44 years	>=2 episodes of binge drinking (> 8 drinks/64g alcohol in a single occasion) in the preceding 28 days	34.6	0	NR	High school graduate: 62% Further training or degree: 39% Unemployed: 36% Scottish IMD most deprived deciles: 77%	AUD dx: NR Alc dep dx: NR Alc abuse dx: NR Drinks in past 28 days (mean): 134 3+ heavy use episodes in past 28 days: 84%
Cunningham, 2010[45] (Good)	CAN	185	Adults aged >=18 years	AUDIT-C >=4	40	47	NR	Some post-secondary education: 78% Income >=$50,000: 74%	AUDIT-C (mean): 5.6 [5=likely hazardous use]
Cunningham, 2012[46] (Fair)	CAN	1767	Adults, aged ≥19 years	AUDIT ≥8	40.7	33.6	NR	Post-secondary education: 74% Employed full or part time: 74%	AUDIT (mean): 12.1 [8=likely hazardous use]
Curry, 2003[47] (Fair)	USA	307	Adults, aged ≥18 years	≥ 2 drinks per day in the past month, ≥2 episodes of binge drinking (≥5 drinks on a single occasion), or ≥ 1 episodes of driving after consuming ≥ 3 drinks AND scoring ≤ 15 on AUDIT	46.9	35.5	White: 80.0	Post-high school education: 91% Annual income>$35,000: 68% Employed full or part time: 81%	Alc dep dx: 0.0 AUDIT (mean): 5.6 [8=likely hazardous use]

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
Daeppen, 2011[48] (Fair)	SWL	217	Male Army conscripts, aged 20 years	Included subgroup: ≥1 heavy use episode (≥5 drinks on a single occasion) per month on average	19.9	0	NR	Some post-secondary education: 57%	AUDIT ≥ 8: 71%
Drummond, 2009[49] (Fair)	UK	112	Males attending a primary care appointment, aged ≥18 years	AUDIT ≥8 or a diagnosis of AUD >21 units/week or >8 units/day	41.8	0	NR	NR	NR
Emmen, 2005[50] (Fair)	NLD	123	Adults attending a primary care appointment, aged ≥18 years	Yes to any of: felt the need to cut down on drinking, drink to forget worries, or close relatives worry or complain about your drinking; or suspicion of a drinking problem based on somatic symptoms, specific liver function disturbances, etc.	49.0	24.4	NR	Post-secondary education: 47%	Alc dep dx: 14.0 Units/day (mean): 3.9
Ettner, 2014[51] (Good)	USA	1186	Primary care patients, aged ≥60 years	CARET ≥1	71.0	34.3	Asian/PI: 0.9 Black: 0.3 Lat./Hisp: 5.9 Native Amer.: 1.5 White: 97.3	Some college: 27% College degree or higher: 59% Income >=$100,000: 30%	NR
Fleming, 1997[52] (Good)	USA	774	Adults attending a primary care appointment, aged 18-65 years	>14/11 [M/F] drinks per week	NR	37.7	Black: 4.2 Lat./Hisp: 1.3 White: 91.6	Some college: 39% College degree or higher: 19%	NR
Fleming, 1999[53] (Fair)	USA	158	Older adults attending a primary care appointment, aged ≥65 years	>11/>8 [M/F] drinks per week, CAGE ≥2, or ≥4/3 [M/F] drinks per occasion ≥2 times in past 3 months	NR	33.5	NR	NR	NR
Fleming, 2008[54] (Fair)	USA	235	Postpartum women (mean 6.4 weeks postpartum) attending an appointment for	≥20 drinks, ≥20 drinking days, or ≥4 drinks on ≥4 occasions or in the last 28 days	28	100	Asian: 0.9 Black: 6.8 Lat./Hisp: 2.5 Native Amer.: 7.2 White: 81.7	Some college: 32% College graduate: 32%	NR

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
			postpartum care, aged ≥18 years						
Fleming, 2010[55] (Fair)	USA,CAN	986	College students	>50/40 drinks or ≥8 (≥5/4 drinks) in the past 28 days [M/F]	21	50.9	White: 90.7	NR	NR
Hansen, 2012[56] (Fair)	DNK	1380	Adults participating in epidemiologic household survey	>21/14 [M/F] drinks per week	57.9	44.9	NR	15+ years education: 52%	Drinks/wk (mean): 32 [men], 21 [women] Weekly heavy use episodes: 50% [men], 26% [women]
Heather, 1987[57] (Fair)	UK	104	Adults attending a GP appointment, aged 18-65 years	35/20 [M/F] units of alcohol per week or clinical impression of an alcohol-related problem	36.4	25.0	NR	NR	MAST score (mean): 7.2 [5=possible alcohol use disorder] Problem range: no problem, 13%; mild, 24%; moderate, 37%; significant, 23%; severe, 4%
Helstrom, 2014[58] (Fair)	USA	139	Veterans attending PCP appointment, aged 23-83 years	>21/14 [M/F] drinks over the past week or any episodes of binge drinking (≥5/4 [M/F] drinks on one occasion)	57.2	2.0	White: 55.0	"Enough money to get by": 80% Employed: 37%	NR
Hilbink, 2012[59] (Fair)	NLD	712	Adults attending a primary care appointment, aged ≥18 years	AUDIT ≥8	47.5	30.3	NR	"High" education level: 33%	NR
Johnson, 2018[60] (Fair)	AUS	837	Adults attending an outpatient appointment at a hospital-affiliated specialty clinics, aged >=18 years	AUDIT-C 5-9	44	25	NR	Median IRSAD [SES] score (range 1-80): 51	AUD dx: NR Alc dep dx: 0 Alc abuse dx: NR AUDIT-C (median): 6 to 7 [5=likely hazardous use]
Johnsson, 2006[61] (Fair)	SWE	177	Incoming university students	AUDIT ≥11/ ≥7 [M/F]	21	24.8	NR	NR	Heavy use episodes (6+ drinks) 2+ time/month: Men, 55%; Women, 15%
Kaner, 2013[62] (Fair)	UK	756	Adults attending an appointment	Positive for alcohol use disorder according to FAST or M-SASQ	44.5	37.8	White: 91.7	College degree or equivalent: 34%	NR

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
			with GP, aged ≥18 years						
Karnik, 2023[63] (Fair)	USA	329	Adolescents and young adults presenting for HIV testing, aged 16-25 years	AUDIT>=8 or endorsed binge drinking on the AUDIT	23	0*	Black: 40 Lat./Hisp: 15 White: 33	High school graduate/GED: 23% Some college/trade school: 32% College degree or higher: 36%	AUD dx: NR Alc dep dx: NR Alc abuse dx: NR
Kypri, 2004[64] (Good)	NZL	104	College students aged 17-26 years	AUDIT ≥8 or more than 6/4 [M/F] standard drinks on ≥1 occasion in the past 4 weeks	20	50.0	NR	NR	NR
Kypri, 2008[65] (Fair)	NZL	576	College students, aged 17-29 years	AUDIT ≥8 and 6/4 [M/F] standard drinks on ≥1 occasion in the past 4 weeks	20.1	52.0	NR	NR	NR
Kypri, 2009[66] (Fair)	AUS	2435	College students aged 17-24 years	AUDIT ≥8 and more than 6/4 [M/F] standard drinks on ≥1 occasion in the past 4 weeks	19.7	45.3	NR	NR	Drinks/drinking day (mean): 8.5 AUDIT (mean): 14.3 [8=likely hazardous use]
LaBrie, 2009[67] (Fair)	USA	285	First year female college students	None (study not limited to risky drinkers)	17.9	100	Asian/PI: 10.5 Black: 5.3 Lat./Hisp: 13.0 White: 57.5	NR	Drinks/month (mean): 16.4
LaBrie, 2013[68] (Fair)	USA	554	College students, aged 18-24 years	≥1 past-month heavy episodic drinking event (5/4 [M/F] drinks during one occasion)	19.9	56.7	Asian: 24.3 White: 75.7	NR	NR
Larimer, 2007[69] (Fair)	USA	1488	College students	None (study not limited to risky drinkers)	20.6	70.8	Asian: 7.8 Black: 0.8 Lat./Hisp: 3.1 White: 80.8	NR	% Heavy episodic drinking: 36
Leeman, 2016[70] (Fair)	USA	208	College students aged 18-24 years	≥5/4 [M/F] drinks on one occasion in the past month	19.8	62.5	Black: 16.8 Lat./Hisp: 4.3 White: 68.3	NR	Drinks/week (mean): 7.4 Heavy use episodes/month (mean): 4.8
Lewis, 2014[71] (Fair)	USA	359	College students, aged 18-25 years	≥ 5/4 [M/F] drinks on one occasion in the past month	20.1	57.6	Asian: 12.5 White: 70.0	NR	NR

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
Maisto, 2001[72] (Fair)	USA	301	Adults attending a primary care appointment, aged ≥21 years	AUDIT ≥8 or 16/12 [M/F] average drinks per week over past year	45.6	30.2	Black: 21.9 Lat./Hisp: 0.3 Native Amer.: 0.3 White: 76.7	Post-high school education: 57% Lowest 2 (of 5) Hollingshead Index categories: 2.8%	NR
Marlatt, 1998[73] (Fair)	USA	348	Incoming college students, aged ≤19 years	≥5 drinks on one occasion in the past month, or 3 alcohol-related problems on 3-5 occasions in the past 3 years on the RAPI	NR	54.0	White: 84.0	NR	Typical BAC weekly (mean): 0.12
Martens, 2010[74] (Fair)	USA	263	College athletes	None (study not limited to risky drinkers)	20.0	76.0	Asian/PI: 5.0 Black: 1.9 Lat./Hisp: 1.9 White: 85.5	NR	Drinks/week (mean): 6.5 BAC on peak drinking occasion in past month (mean): 0.09
Martino, 2018[75] (Fair)	USA	165	Nonpregnant and pregnant women attending reproductive health clinics, aged >=18 years	Included subgroup: >3 drinks on any day or >7 drinks in a week in the past month (non-pregnant) or any alcohol consumption in the past month (pregnant)	36	100	Black: 80 Lat./Hisp: 10 White: 8	Some high school or less: 35% High school graduate: 47% Not working: 61%	Drinking days/month (mean): 18 ASSIST (mean): 25 [11=likely hazardous use]
Moore, 2010[76] (Fair)	USA	631	Older adults attending a primary care appointment, aged ≥55 years	CARET ≥1	68.4	29.0	Lat./Hisp: 9.2 White: 87.3	Some college: 31%- College degree or higher: 46% Employed full or part time: 26%	Exceeds recommended use: 47%
Neighbors, 2004[77] (Fair)	USA	252	College students	5/4 [M/F] drinks on ≥1 occasion(s) during the past month	18.5	58.7	Asian: 13.7 White: 79.5	NR	NR
Neighbors, 2010[78] (Fair)	USA	818	Incoming college freshman students	≥5/4 [M/F] drinks on ≥1 occasion(s) during the past month	18.7	57.58	Asian/PI: 24.2 Black: 1.5 Lat./Hisp: 4.2 Native Amer.: 0.5 White: 65.3	NR	NR
Neighbors, 2016[79] (Fair)	USA	623	College students, aged 18-26 years	≥5/4 [M/F] drinks on ≥1 occasion(s) during the past month	20.6	53.2	Asian: 15.5 Black: 5.4 Lat./Hisp: 21.3 Native Amer.: 1.0	NR	Drinks/drinking day (mean): 5

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
							Pac. Isl.: 0.8 White: 61.7		
Neighbors, 2019[80] (Fair)	USA	959	College students, aged 18-26 years	>=5/4 [M/F] drinks on one occasion in the past month.	21	54	Asian: 24 Black: 18 Lat./Hisp: 31 White: 27	NR	Drinks/month (mean): 26.6
Ntouva, 2019[81] (Fair)	UK	234	Adults attending a dental appointment, aged >=18 years	AUDIT-C >=5	41	45	NR	High school graduate or equivalent: 37% University degree or higher: 55%	AUDIT-C (mean): 6.9 [5=likely hazardous use]
Ockene, 1999[82] (Fair)	USA	530	Adults attending a primary care appointment, aged 21-70 years	>12/9 [M/F] drinks per week or ≥5/4 [M/F] drinks on 1 or more occasions in previous month	43.9	35.3	White: 95	High school graduate: 47% College graduate: 37%	Alc dep dx: 2.0
O'Connor, 2007[83] (Fair)	USA	345	Pregnant women attending a prenatal appointment at a WIC clinic (mean 18 weeks' gestation)	Current alcohol use	28.1	100	Black: 18.9 Lat./Hisp: 34.5 White: 7.9	Years education (mean): 11.4 Annual income <=$15,000: 67%	TWEAK score (mean): 1.9 [2=likely hazardous use]
Ondersma, 2015[84] (Fair)	USA	48	Pregnant women, seeking services at a prenatal care clinic (mean 12 weeks' gestation), aged ≥ 18 years	Drinking weekly or more in the past month; or ≥ 4 drinks at least monthly in the 12 months before becoming pregnant	NR	100	Black: 81.3	High school degree or higher: 67% Any public assistance: 81% Married: 21%	Alcohol abuse or dependence: 25% Heavy use episodes weekly when not pregnant: 58%
Ondersma, 2016[85] (Fair)	USA	123	Postpartum women in post-delivery recovery, aged ≥18 years	T-ACE ≥2 and >4 standard drinks at a time at least twice a month in the 12 months prior to becoming pregnant	27.1	100	Black: 87.0 White: 4.1	High school degree or higher: 75% Food assistance: 75%	ASSIST score (mean): 22.3 [11=moderate risk of hazardous use]
Osterman, 2014[86] (Fair)	USA	122	Pregnant women attending a prenatal appointment (mean 24 weeks' gestation), aged 18-44years	Any alcohol use in past year	25.4	100	Black: 58.2 Lat./Hisp: 3.3 White: 30.3	Some college: 42% College degree: 3% Annual income	NR

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
Reynolds, 1995[87] (Fair)	USA	78	Pregnant women attending prenatal appointment (mean 12 weeks' gestation)	Any alcohol use in past month	22.4	100	Black: 66.7 White: 33.3	Annual income:	Drinks/month (mean): 36.6
Richmond, 1995[88] (Fair)	AUS	285	Adults attending an appointment with GP, aged 18-70 years	>35/21 [M/F] drinks per week	37.3	44.3	NR	Post-secondary education: 69% Employed: 74%	Alc dep dx: 0.0 Physical dependence score (mean): 3.8 [0-4=low dependence]
Rose, 2017[89] (Fair)	USA	1855	Adults scheduled for a routine primary care visit, aged ≥18 years	SASQ ≥1 (≥5/4 [M/F] drinks per day in the past year)	NR	52.5	White: 95.0	High school/GED: 32% College degree or higher: 59%	AUD dx: 28.5
Rubio, 2010[90] (Good)	ESP	752	Adults attending a primary care appointment, aged 18-65 years	≥5/4 [M/F] drinks per occasion on one or more occasions in the previous month and AUDIT ≤15	NR	34.7	NR	Some college: 38% College degree or more: 4% Unemployed: 4%	Elevated GGT levels: 21%
Rubio, 2014[91] (Fair)	USA	330	Pregnant women attending their first or second obstetric appointment, aged ≥ 18 years	≥ 3 drinks per week between conception and recognition of pregnancy, ≥ 1 drink per week after recognition of pregnancy, or had ≥ 1 episode of drinking ≥ 4 drinks on one occasion, after conception	23.8	100	Black: 43 White: 53.6	Some post-secondary education: 26% College degree or higher: 10% Medicaid: 89%	Alc dep dx: 23.6 Alc abuse dx: 23.2 Drinks/day before knew of pregnancy (mean): 3.5
Saitz, 2003[92] (Fair)	USA	312	Adults attending primary care appointment	CAGE ≥ 1 for past year, >4/3 [M/F] drinks per occasion in past 30 days, or >14/7 [M/F] drinks per week in past 30 days	43.0	36.5	Black: 56.1 Lat./Hisp: 16.5 White: 19.1	High school degree: 63% Unemployed: 40%	Alcohol dependency score (mean): 7.5 [range NR]
Schaus, 2009[93] (Fair)	USA	363	College students seeking care at university health services, aged ≥18 years	≥5/4 [M/F] drinks on ≥1 occasion(s) during the past month	20.6	52.1	Asian: 2.8 Black: 4.7 Lat./Hisp: 11.3 Native Amer.: 0.3 Pac. Isl.: 0.6 White: 77.4	NR	Heavy drinker: 62% Heavy and frequent drinker: 20%
Schulz, 2013[94] (Fair)	DEU	448	Adults, aged ≥18 years	AUDIT ≥8; >2/1 [M/F] drinks per day; drinking >5 days per week; or drinking	41.7	43.5	NR	"High" education level: 34% Monthly income >€2000: 40% Employed: 65%	NR

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
				alcohol while pregnant, trying to get pregnant, or breastfeeding					
Scott, 1990[95] (Fair)	UK	226	Adults, aged 17-69 years	≥ 350/210 g ETOH [M/F] of alcohol per week	44.7	31.9	NR	NR	NR
Senft, 1997[96] (Fair)	USA	516	Adults attending a primary care appointment, aged ≥21 years	AUDIT 8-21	42.5	29.5	White: 82.3	Some college or higher: 60%	AUDIT (mean): 10.6 [8=likely hazardous use] Weekly heavy use episodes: 28%
Stein, 2018[97] (Fair)	USA	226	Young adults, aged 18-25 years	At least monthly binge drinking (>=5/4 [M/F] drinks in a 2-hour period)	21.2	45	Black: 11 Lat./Hisp: 12 White: 66	Full-time student: 47% Part-time student: 14% Not enrolled: 39%	Alc dep dx: 16 Heavy use episodes/month (mean): 5.2
Turrisi, 2009[98] (Good)	USA	1275	Former high school athletes beginning college	None (study not limited to risky drinkers)	17.9	55.6	Asian: 10.6 Black: 2.0 Lat./Hisp: 4.5 Native Amer.: 0.2 White: 79.8	NR	Drinks/week (mean): 3.7 Lifetime alcohol use: 85% Peak BAC (mean): 0.07
Tzilos, 2011[99] (Fair)	USA	50	Pregnant women attending a prenatal care appointment (mean 25 weeks' gestation), aged 18-45 years	T-ACE ≥2 or ≥7 drinks per week or ≥2 drinks at a time before pregnancy	25.6	100	Black: 82.0 Lat./Hisp: 2.0 White: 16.0	High school graduate/GED: 30% Some college or higher: 12% WIC food assistance in past year: 72% FIA assistance in past year: 44%	NR
van der Wulp, 2014[100] (Fair)	NLD	393	Pregnant women (mean 8 weeks' gestation), aged ≥18 years	Any alcohol use since awareness of pregnancy	32.6	100	NR	High school degree: 32% College degree or higher: 32% Working full or part-time: 20% Married: 61%	Drinks/week during pregnancy (mean): 1.1 T-ACE positive for problematic use: 57%
Voogt, 2014[101] (Good)	NLD	913	College students, aged 18-24 years	≥21/14 [M/F] drinks per week and/or consumption of ≥5 drinks at least one day per week in past six months	20.8	39.7	NR	University education: 74%	NR
Wallace, 1988[102] (Fair)	UK	909	Adult primary care patients, aged 17-69 years	≥35/21 [M/F] drinks per week	42.0	29.4	NR	NR	NR
Watkins, 2017[103] (Fair)	USA	397	Adults attending a primary care	Positive score for risky opioid or alcohol use in	42	20.4	Asian: 0.8 Black: 13.3	High school graduation/GED: 31% >High school: 41%	AUD dx: 100 Drinks/day, among

Appendix E, Table 6. Study and Population Characteristics for Studies Among Adults Included for Key Question 4

Study (Quality rating)	Country	N rand	Brief population description	Alcohol use eligibility criteria	Mean age, yrs	Female, %	Race/ethnicity, %	SES	BL alcohol use
			appointment, aged ≥18 years	previous 3 months on NIDA 3-item quick screen			Lat./Hisp: 31.0 Native Amer.: 1.3 Pac. Isl.: 0.5 White: 43.8		those with any alcohol use (median): 6
Watson, 2013[104] (Good)	UK	529	Older adults attending primary care appointments, aged ≥55 years	AUDIT ≥8	62.8	19.7	NR	College degree or equivalent: 42% Local authority/public housing: 15%	Alc dep dx: 7.9
Williams, 2019[105] (Fair)	USA	124	Patients at VA primary care clinics, aged 21-75 years	Included subgroup: AUDIT-C >=5/4 [M/F] and >=5/4 [M/F] drinks/day twice/week (or once/week if any prior alcohol-related treatment)	NR	9	Asian: 2 Black: 11 Lat./Hisp: 6 Native Amer.: 8 Pac. Isl.: 2 White: 72	Some college/tech school: 52% College graduate or more: 29% Annual income	Alc dep dx: 0 Alc abuse dx: 35
Wilson, 2014[106] (Fair)	UK	102	Adults with hypertension, aged ≥18 years	AUDIT ≥8 score	64.0	12.0	NR	Unemployed: 74%	NR

* Study reports 9% as transgender female

Abbreviations: AC-OK = Andrew Cherry, Oklahoma screening tool; Alc abuse dx = alcohol abuse diagnosis; Alc dep dx = alcohol dependence diagnosis; ASSIST = Alcohol, Smoking and Substance Involvement Screening Test; AUD = alcohol use disorder; AUDIT = Alcohol Use Disorders Identification; AUDIT-C= Alcohol Use Disorders Identification-Concise; AUS = Australia; BAC = blood alcohol content; BL = baseline; CAGE = Cut down, Annoyed, Guilty, Eye-opener; CAN = Canada; CARET = Comorbidity Alcohol Risk Evaluation Tool; CHL = Chile; DEU = Germany; DNK = Denmark; dx = diagnosis; ESP = Spain; ETOH = ethanol; F = female; FIA = Family Independence Agency; FIN = Finland; GED = General Educational Development; GGT = Gamma-Glutamyl Transferase; GP = general practitioner; HIV = human immunodeficiency virus; IMD = Index of Multiple Deprivation; IRSAD = Index of Relative Socioeconomic Advantage and Disadvantage; Lat./Hisp = Latina/Latino/Hispanic; M = male; MAST = Michigan Alcohol Screening Test; NLD = Netherlands; NR = not reported; N rand = number of participants randomized; NZL = New Zealand; PCP = primary care provider; PI = Pacific Islander; RAPI = Rutgers Alcohol Problems Index; SES = socioeconomic status; STI = sexually transmitted infection; SWE = Sweden; SWL = Switzerland; T-ACE = Tolerance, Annoyed, Cut down, Eye opener; UK = United Kingdom; USA = United States of America; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children; wk = week; ZIP = Zone Improvement Plan

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Aalto, 2000[28]	IG1	Brief Multiple	Three 10-20 min personalized feedback sessions with GP	24	Indiv	General counseling, PNF, FRAMES	Primary care	Medical doctors (PCP role: Delivered most/all)	Usual care
Alegria, 2019[29]	IG1	Extended Multiple	10-12 60-min individual counseling sessions	6	Indiv, Phone	CBT, Mindfulness-based strategies, MI, Referral	Community-based, Primary care, Home, Other, ED	Mental or behavioral health specialists, Psychologists, Social work professionals	Usual care
Barticevic, 2021[30]	IG1	Brief Single	One brief individual counseling session	0.03	Indiv	General counseling	Primary care	Health educators	Minimal
Baumann, 2021[31]	IG1	Brief Multiple	Three personalized normative feedback letters	6	Mail	General counseling, PNF, Referral, TTM	Community-based, Other	NA (e.g., electronic only)	No intervention
Bertholet, 2015[32]	IG1	Brief Single	Internet-based personalized feedback	0.03	Digital	PNF	Other	Self-directed	No intervention
Bischof, 2008[33]	IG1	Extended Multiple	Four 30-min computerized feedback and brief individual counseling sessions comprising of motivational interviewing and behavioral change counseling	6	Phone, Digital	MI, PNF, TTM	Primary care	Psychologists	Usual care
Bischof, 2008[33]	IG2	Extended Multiple	Up to 3 30-40 min computerized feedback and motivational interviewing sessions	6	Phone, Digital	MI, PNF, SC, TTM	Primary care	Psychologists	Usual care
Burge, 1997[34]	IG1	Extended Multiple	Two 10-15 min physician-delivered sessions and six 90 min patient educator-led group psychoeducation sessions	NR	Indiv, Group	General counseling, PHF	Primary care	Medical doctors, Health educators (PCP role: Delivered part)	No intervention
Burge, 1997[34]	IG2	Extended Multiple	Six 90 min patient educator-led group psychoeducation sessions	NR	Group	General counseling	Primary care	Health educators	No intervention
Burge, 1997[34]	IG3	Brief Multiple	Two 10-15 min physician delivered brief intervention sessions	NR	Indiv	PHF	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Butler, 2013[35]	IG1	Brief Single	Provider training in behavior change counseling; patients	NA	Indiv	CBT, MI	Primary care	Medical doctors, Nursing professionals	Usual care

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
			seen for at least one consultation					(PCP role: Delivered most/all)	
Carey, 2006[36]	IG1	Extended Single	One in-person motivational interview with enhanced counseling	0.03	Indiv	MI, PNF	University	Interventionist (generic)	No intervention
Carey, 2006[36]	IG2	Extended Single	One in-person motivational interview	0.03	Indiv	MI, PNF	University	Interventionist (generic)	No intervention
Carey, 2006[36]	IG3	Extended Single	One in-person TLFB interview and one in-person motivational interview with enhanced counseling	0.03	Indiv	MI, PNF	University	Research staff, Interventionist (generic)	No intervention
Carey, 2006[36]	IG4	Extended Single	One in-person TLFB interview and one in-person motivational interview	0.03	Indiv	MI, PNF	University	Research staff, Interventionist (generic)	No intervention
Carey, 2020[37]	IG1	Brief Multiple	10 weeks of daily text messages containing accurate drinking norms	2.3	Text	PNF	University	NA (e.g., electronic only)	Attn control
Chander, 2021[38]	IG1	Extended Multiple	One 20 min computer-based module plus 3 automated phone calls and thrice weekly text messages	1.38	Phone, Digital, Text	General counseling, PNF	Other medical, Home	NA (e.g., electronic only)	Attn control
Chander, 2021[38]	IG2	Extended Single	One 20 min computer-based module	0.03	Digital	General counseling, PNF	Other medical	NA (e.g., electronic only)	Attn control
Chang, 1999[39]	IG1	Extended Single	One 45-min physician-delivered counseling session	0.03	Indiv	General counseling	OBGYN	Medical doctors (PCP role:)	No intervention
Chang, 2005[40]	IG1	Extended Single	One 25-min partner-enhanced brief intervention	0.03	Indiv	General counseling, Partner involvement	OBGYN	Nursing professionals, Research staff	No intervention
Chang, 2011[41]	IG1	Extended Single	One 30-min physician-delivered individual counseling session	0.03	Indiv	CBT, MI, PNF	Other medical	Medical doctors (PCP role:)	No intervention
Collins, 2014[42]	IG1	Brief Single	One web-based personalized feedback session	0.03	Digital	PNF	Home	Self-directed	No intervention
Collins, 2014[42]	IG2	Brief Single	One web-based decisional balance feedback session	0.03	Digital	General counseling	Home	Self-directed	No intervention
Crawford, 2014[43]	IG1	Very Brief	One 2-3 min physician delivered brief intervention followed by 1-2 optional Alcohol Health Worker (AHW)-delivered ≤30 min FRAMES sessions	NR	Indiv	Referral, FRAMES	Other medical	Medical doctors, Substance use treatment specialist (PCP role: Delivered part)	Attn control

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Crombie, 2018[44]	IG1	Brief Multiple	112 tailored text messages	3	Text	FRAMES	Community-based, Home	NA (e.g., electronic only)	Attn control
Cunningham, 2010[45]	IG1	Brief Single	One 10-min online personalized feedback module	0.03	Digital	PNF	Home	NA (e.g., electronic only)	Minimal
Cunningham, 2012[46]	IG1	Very Brief	Normative Feedback Pamphlet	0.03	Mail	PNF	Home	Self-directed	No intervention
Curry, 2003[47]	IG1	Brief Multiple	One 5-min motivational interviewing session with PCP followed by written personalized feedback and three telephone counseling calls	~2.5	Indiv, Phone	MI, PNF	Primary care, Home	Medical doctors, Health educators (PCP role: Delivered part)	No intervention
Daeppen, 2011[48]	IG1	Brief Single	One in-person 15-min brief motivational session	0.03	Indiv	MI	Other	Psychologists	No intervention
Drummond, 2009[49]	IG1	Extended Multiple	One 40-min counseling session plus up to 4 additional 50-min counseling sessions	1	Indiv	ME, MI	Primary care	Nursing professionals, Substance use treatment specialist	Minimal
Emmen, 2005[50]	IG1	Extended Multiple	Assessment followed by one 60-min personalized health feedback session	0.5	Indiv, Mail	MI	Primary care	Psychologists	Usual care
Ettner, 2014[51]	IG1	Brief Multiple	Two personalized mailings, reviewed at routine visits with PCP, and three health educator calls		Indiv, Phone	CBT, PHF	Primary care, Home	Medical doctors, Health educators (PCP role: Delivered part)	Usual care
Fleming, 1997[52]	IG1	Brief Multiple	Two 15-min physician-delivered brief intervention sessions followed by two nurse-delivered followup calls	1.5	Indiv, Phone	CM	Primary care	Medical doctors, Nursing professionals (PCP role: Delivered most/all)	Usual care
Fleming, 1999[53]	IG1	Brief Multiple	Two 10-15 min physician-delivered counseling sessions and two clinic nurse followup calls	1.5	Indiv	General counseling	Primary care	Medical doctors, Nursing professionals (PCP role: Delivered most/all)	Attn control
Fleming, 2008[54]	IG1	Brief Multiple	Two 15-min in-person counseling sessions with a workbook and follow-up phone calls after each session	2	Indiv, Phone	CBT, MI	OBGYN, Home	Nursing professionals, Interventionist (generic)	Attn control

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Fleming, 2010[55]	IG1	Brief Multiple	Two 15-min visits with a physician plus 2 followup calls or emails	2	Indiv, Phone, Email	General counseling	University health clinic	Medical doctors (PCP role: Delivered most/all)	Usual care
Hansen, 2012[56]	IG1	Brief Single	One computer-based personalized feedback session	0.03	Digital	PNF	Home	Self-directed	No intervention
Hansen, 2012[56]	IG2	Brief Single	One computer-based automated personalized brief advice session	0.03	Digital	PNF	Other	Self-directed	No intervention
Heather, 1987[57]	IG1	Brief Multiple	Two screening and brief counseling sessions with PCP	0.5	Indiv	General counseling, PHF	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Heather, 1987[57]	IG2	Brief Single	One brief advice session with PCP	0.03	Indiv	General counseling	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Helstrom, 2014[58]	IG1	Brief Multiple	One PCP-delivered counseling session followed by three telephone counseling sessions	9	Indiv, Phone	ME, SC	Primary care, Home	Medical doctors, Nursing professionals, Mental or behavioral health specialists (PCP role: Delivered part)	Usual care
Hilbink, 2012[59]	IG1	Brief Multiple	Screening and advice, with support visits as needed; mailed personalized feedback, booklets	24	Indiv, Mail	PNF	Primary care	Medical doctors (PCP role: Delivered part)	Usual care
Johnson, 2018[60]	IG1	Brief Single	One 5-10 min assessment and personalized feedback session via iPad	0.03	Digital	PNF, PHF	Other medical	NA (e.g., electronic only)	No intervention
Johnsson, 2006[61]	IG1	Extended Multiple	Five 2-hour group sessions based on BASICS manual	1.25	Group	CBT, PNF	University health clinic	Research staff, Peers	Minimal
Kaner, 2013[62]	IG1	Extended Multiple	One 5 min brief advice session followed by one 20 min brief lifestyle counseling session	0.5	Indiv	MI, PNF	Primary care	Medical doctors, Nursing professionals (PCP role: NR)	Usual care
Kaner, 2013[62]	IG2	Very Brief	One 5 min brief advice session	0.03	Indiv	PNF	Primary care	Medical doctors, Nursing professionals (PCP role: NR)	Usual care

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Karnik, 2023[63]	IG1	Brief Single	One 10-minute electronic session of 11 MI-based modules	.03	Digital	General counseling, MI	Other medical	NA (e.g., electronic only)	Attn control
Kypri, 2004[64]	IG1	Brief Single	One computer-based personalized feedback session	NR	Digital	PNF	University health clinic	Self-directed	No intervention
Kypri, 2008[65]	IG1	Brief Multiple	Two computer-based personalized feedback sessions	12	Digital	PNF	University health clinic	Self-directed	Minimal
Kypri, 2008[65]	IG2	Brief Single	One computer-based personalized feedback session	0.03	Digital	PNF	University health clinic	Self-directed	Minimal
Kypri, 2009[66]	IG1	Brief Multiple	Two computer-based personalized feedback sessions	1	Digital	PNF	University	Self-directed	No intervention
LaBrie, 2009[67]	IG1	Extended Single	One group counseling session	0.03	Group	CBT, PNF	University	Research staff	Minimal
LaBrie, 2013[68]	IG1	Brief Single	One computer-based personalized feedback session + optional printed feedback	0.03	Digital	PNF	University	Self-directed	Attn control
LaBrie, 2013[68]	IG2	Brief Single	One sex-, race-, and Greek status-specific computer-based personalized feedback session	0.03	Digital	PNF	University	Self-directed	Attn control
Larimer, 2007[69]	IG1	Brief Multiple	One personalized feedback postcard followed by 10 generic postcards	2.5	Mail	PNF	Home	Self-directed	No intervention
Leeman, 2016[70]	IG1	Brief Single	One computer-based personalized feedback session with direct + indirect protective behavioral strategies	0.03	Digital	PNF	University	Self-directed	No intervention
Leeman, 2016[70]	IG2	Brief Single	One computer-based personalized feedback session with direct protective behavioral strategies	0.03	Digital	PNF	University	Self-directed	No intervention
Leeman, 2016[70]	IG3	Brief Single	One computer-based personalized feedback session with indirect protective behavioral strategies	0.03	Digital	PNF	University	Self-directed	No intervention
Lewis, 2014[71]	IG1	Brief Single	One web-based personalized normative feedback session	0.03	Digital	PNF	Home	Self-directed	Attn control
Lewis, 2014[71]	IG2	Brief Single	One web-based combined alcohol and alcohol-related	0.03	Digital, Email	PNF	Other	Self-directed	Attn control

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
			risky sexual behavior personalized normative feedback session						
Maisto, 2001[72]	IG1	Extended Multiple	One 30-45 min ME session followed by two 15-20 min followup booster sessions	1.5	Indiv	ME	Primary care	Interventionist (generic)	Usual care
Maisto, 2001[72]	IG2	Brief Single	One 10-15 min brief advice session	0.03	Indiv	General counseling	Primary care	Interventionist (generic)	Usual care
Marlatt, 1998[73]	IG1	Extended Single	One 60-min motivational interviewing session & summary sheet; mailed personalized feedback; follow-up phone calls and session optional (high risk or extreme)	12	Indiv, Phone, Mail	MI, PNF, Referral	University, Home	Psychologists	No intervention
Martens, 2010[74]	IG1	Brief Single	One targeted computer-based personalized drinking feedback session	0.03	Digital	PNF	Home	Self-directed	Minimal
Martens, 2010[74]	IG2	Brief Single	One standard computer-based personalized drinking feedback session	0.03	Digital	PNF	Home	Self-directed	Minimal
Martino, 2018[75]	IG1	Extended Single	One 20-min in-person counseling session	0.03	Indiv	MI, Referral	OBGYN	Nursing professionals, Social work professionals, Obstetrician-gynecologist	Minimal
Martino, 2018[75]	IG2	Extended Single	One 20-min electronic MI session	0.03	Digital	MI, Referral	OBGYN	NA (e.g., electronic only)	Minimal
Moore, 2010[76]	IG1	Extended Multiple	One physician-delivered personalized feedback session followed by one 40 min health educator call and two 20 min health educator calls	2	Indiv, Phone	MI, PHF	Primary care, Home	Medical doctors, Health educators (PCP role: Delivered part)	Minimal
Neighbors, 2004[77]	IG1	Very Brief	Web-based personalized normative feedback printout	0.03	Digital	PNF	University	Self-directed	No intervention
Neighbors, 2010[78]	IG1	Brief Multiple	Five web-based sex-specific personalized normative feedback sessions	24	Digital	PNF	Home	Self-directed	Attn control

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Neighbors, 2010[78]	IG2	Brief Multiple	Five web-based sex-nonspecific personalized normative feedback sessions	24	Digital	PNF	Home	Self-directed	Attn control
Neighbors, 2010[78]	IG3	Brief Single	One web-based sex-specific personalized normative feedback session followed by four web-based attention-control sessions	0.03	Digital	PNF	Home	Self-directed	Attn control
Neighbors, 2010[78]	IG4	Brief Single	One web-based sex-nonspecific personalized normative feedback session followed by four web-based attention-control sessions	0.03	Digital	PNF	Home	Self-directed	Attn control
Neighbors, 2016[79]	IG1	Brief Single	One computer-based personalized normative feedback session	0.03	Digital	PNF	University	Self-directed	Attn control
Neighbors, 2016[79]	IG2	Brief Single	One computer-based personalized social comparison feedback session	0.03	Digital	PNF	University	Self-directed	Attn control
Neighbors, 2019[80]	IG1	Brief Single	One computer-based personalized normative feedback using Uncommon/Unhealthy/Negative framing	0.03	Digital	PNF	University	NA (e.g., electronic only)	Attn control
Neighbors, 2019[80]	IG2	Brief Single	One computer-based personalized normative feedback using Uncommon/Healthy/Positive framing	0.03	Digital	PNF	University	NA (e.g., electronic only)	Attn control
Neighbors, 2019[80]	IG3	Brief Single	One computer-based personalized normative feedback using Common/Unhealthy/Positive framing	0.03	Digital	PNF	University	NA (e.g., electronic only)	Attn control
Neighbors, 2019[80]	IG4	Brief Single	One computer-based personalized normative feedback using Common/Healthy/Negative framing	0.03	Digital	PNF	University	NA (e.g., electronic only)	Attn control

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Ntouva, 2019[81]	IG1	Brief Single	One 10-minute individual counseling session	0.03	Indiv	General counseling, PNF, Referral	Other medical	Dentists	Attn control
Ockene, 1999[82]	IG1	Brief Single	One to two 5-10 min patient-centered counseling session with PCP	0.03	Indiv	MI	Primary care	Medical doctors (PCP role: Delivered most/all)	Minimal
O'Connor, 2007[83]	IG1	Brief Single	One brief intervention session	0.03	Indiv	CBT	Community-based	Nutritionists	Usual care
Ondersma, 2015[84]	IG1	Extended Single	One 20-min web-based intervention with 3 subsequent tailored mailings	3	Digital, Mail	MI, PNF	OBGYN, Home	Self-directed	Attn control
Ondersma, 2016[85]	IG1	Extended Single	One 20-min web-based brief interview session	0.03	Digital	MI, PNF, FRAMES	OBGYN	Self-directed	Attn control
Osterman, 2014[86]	IG1	Extended Single	One 30 min motivational interviewing session	0.03	Indiv	MI	OBGYN	Research staff	No intervention
Reynolds, 1995[87]	IG1	Brief Multiple	One 10-min health-educator delivered brief counseling session plus self-help manual and one followup call to assess progress	0.07	Indiv	CBT	OBGYN, Home	Health educators	Usual care
Richmond, 1995[88]	IG1	Extended Multiple	Five physician-delivered counseling sessions of varying length	5	Indiv	CBT, MI, PNF	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Richmond, 1995[88]	IG2	Very Brief	One 5-min physician-delivered brief advice session	0.03	Indiv	General counseling	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Rose, 2017[89]	IG1	Brief Single	One 6.2-min (median) Interactive Voice Recognition session via telephone	6	Digital	SC, TTM	Home	Self-directed	No intervention
Rubio, 2010[90]	IG1	Brief Multiple	Two 10-15 min physician-delivered counseling sessions followed by two nurse contacts		Indiv	CBT, General counseling	Primary care	Medical doctors, Nursing professionals (PCP role: Delivered most/all)	Usual care
Rubio, 2014[91]	IG1	Extended Multiple	Four 10-15-min in-person prenatal motivational interview sessions and one 10-30-min postpartum in person motivational interview sessions	10	Indiv, Phone	ME, MI, Referral, FRAMES	OBGYN	Nursing professionals, Lay counselors	Usual care

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
Saitz, 2003[92]	IG1	Very Brief	One physician-delivered brief intervention	0.03	Indiv	General counseling	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Schaus, 2009[93]	IG1	Extended Multiple	Two 20 min brief motivational intervention sessions plus personalized feedback document and alcohol-prevention brochure	0.5	Indiv	CBT, MI, PNF	University health clinic	Medical doctors, Nursing professionals, Physician's assistants (PCP role: Delivered most/all)	Usual care
Schulz, 2013[94]	IG1	Brief Multiple	Three web-based personalized feedback sessions, interspersing questions among advice	6	Digital	PNF	Home	Self-directed	Waitlist
Schulz, 2013[94]	IG2	Brief Multiple	Three web-based personalized feedback sessions, advice given all at once	6	Digital	PNF	Home	Self-directed	Waitlist
Scott, 1990[95]	IG1	Brief Single	One 10-min personalized feedback session with PCP	0.03	Indiv	PNF	Primary care	Medical doctors (PCP role: Delivered most/all)	No intervention
Senft, 1997[96]	IG1	Brief Multiple	One 30-sec message from primary care clinician and one 15-min counseling session from health counselor	0.03	Indiv	MI, PNF	Primary care	Medical doctors, Nursing professionals, Health educators (PCP role: Delivered part)	No intervention
Stein, 2018[97]	IG1	Extended Multiple	Five individual counseling sessions, in-person or by phone	9	Indiv, Phone	MI	Other medical	Psychologists, Research staff	Attn control
Turrisi, 2009[98]	IG1	Extended Single	One 45-60-min personalized feedback session + parent handbook intervention	0.03	Indiv, Mail	ME, MI, PNF, Parent involvement	University, Home	Peers, Self-directed	Minimal
Turrisi, 2009[98]	IG2	Extended Single	One 45-60-min personalized feedback session	0.03	Indiv	ME, MI, PNF	University	Peers	Minimal
Turrisi, 2009[98]	IG3	Very Brief	Informational handbook mailed to the participants' parents	0.03	Mail	Parent involvement	Home	Self-directed	Minimal
Tzilos, 2011[99]	IG1	Extended Single	One 15-20-min computer-based motivational intervention	0.03	Digital	MI, PNF	OBGYN	Self-directed	Attn control
van der Wulp, 2014[100]	IG1	Brief Multiple	Three midwife-delivered counseling sessions	3.5	Indiv	TTM	OBGYN	Midwives	Usual care

Appendix E, Table 7. Intervention Characteristics for Studies Among Adults Included for Key Question 4

Study	Group	Intensity category	Brief description	Duration, mo	Delivery	Therapeutic approach	Setting	Interventionist	Control
van der Wulp, 2014[100]	IG2	Brief Multiple	Three web-based personalized feedback sessions	3	Digital	PHF, TTM	Home	Self-directed	Usual care
Voogt, 2014[101]	IG1	Brief Single	One web-based personalized feedback session	0.03	Digital	MI, PNF	Home	Self-directed	No intervention
Wallace, 1988[102]	IG1	Brief Multiple	One physician-delivered personalized feedback session and up to four followup sessions with physician	10	Indiv	PNF, PHF	Primary care	Medical doctors (PCP role: Delivered most/all)	Usual care
Watkins, 2017[103]	IG1	Extended Multiple	Collaborative care (registry, regular assessment, adherence support) plus training for behavioral therapists and MDs for medication-assisted treatment	NR	Indiv	CBT, MI, Medication-Assisted Therapy	Primary care	Medical doctors, Mental or behavioral health specialists, Social work professionals (PCP role: Delivered part)	Usual care
Watson, 2013[104]	IG1	Extended Multiple	Stepped care: one 20-minute counseling session with followup phone call; as needed three 40-minute sessions, referral to specialist	12	Indiv	ME, PNF, Referral, SC	Primary care	Nursing professionals, Mental or behavioral health specialists, Research staff	Minimal
Williams, 2019[105]	IG1	Extended Multiple	Mean 7 nurse care management visits over 12 mo	12	Indiv, Phone	MI, PHF, Referral	Primary care	Nursing professionals	Usual care
Wilson, 2014[106]	IG1	Very Brief	One 5 min personalized feedback session	0.03	Indiv	PNF	Primary care	Research staff	Usual care

Abbreviations: AHW = alcohol health worker; Attn = attention; BASICS = Brief Alcohol Screening and Intervention for College Students—a Harm Reduction Approach; CBT = cognitive behavioral therapy; CM = contingency management; ED = emergency department; FRAMES = Feedback about the adverse effects of alcohol, an emphasis on personal Responsibility for changing drinking behavior, Advice about alcohol consumption, a Menu of options for further help and advice, an Empathic stance towards the patient and an emphasis on Self-efficacy; GP = general practitioner; IG = intervention group; Indiv = individual (one-on-one); MD = medical doctor; ME = motivational enhancement; MI = motivational interviewing; min = minute; mo = months; NA = not applicable; NR = not reported; OB-GYN = obstetrics and gynecology; PCP = primary care provider; PHF = personalized health-related feedback; PNF = personalized normative feedback; SC = stepped care; TLFB = Timeline Follow Back; TTM = transtheoretical model of change;

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Aalto, 2000[28]	Adults	IG1	36	Men	181	20.3 (18.7)	22 (24.1)	0.4 (19.1)	2.1 (25.4)	MD in Chg	-1.71 (-8.21 to 4.78)	NR, NS
Aalto, 2000[28]	Adults	IG1	36	Women	76	12.6 (11.6)	11.1 (10)	4.8 (20.9)	-0.4 (10.6)	MD in Chg	5.14 (-2.25 to 12.53)	NR, NS
Baumann, 2021[31]	Adults	IG1	6	Overall	561	NR	NR	NR	NR	IRR (negative binom.)	1.06 (0.94 to 1.20)	0.328
Baumann, 2021[31]	Adults	IG1	12	Overall	561	NR	NR	NR	NR	IRR (negative binom.)	1.01 (0.85 to 1.20)	NR, NS
Bertholet, 2015[32]	Young adults	IG1	6	Overall	667	10.1 (7.9)	9.5 (7.8)	-1.6 (7.8)	-0.5 (7.6)	MD in Chg	-1.12 (-2.29 to 0.05)	<0.05
Bertholet, 2015[32]	Young adults	IG1	47	Overall	737	10.1 (7.9)	9.5 (7.8)	.7 (12.3)	1.2 (12.2)	MD in Chg	-0.49 (-2.26 to 1.28)	0.975
Bischof, 2008[33]	Adults	IG0	12	Overall	408	24 (NR)	20.5 (25.1)	-6.3 (18.9)	-3.2 (17.5)	MD in Chg	-3.15 (-6.92 to 0.62)	0.124
Bischof, 2008[33]	Adults	IG1	12	Overall	270	24.5 (25.6)	20.5 (25.1)	-6.5 (18.6)	-3.2 (17.5)	MD in Chg	-3.35 (-7.66 to 0.96)	NR, NS
Bischof, 2008[33]	Adults	IG2	12	Overall	277	23.5 (24.6)	20.5 (25.1)	-6.1 (19.1)	-3.2 (17.5)	MD in Chg	-2.95 (-7.28 to 1.38)	NR, NS
Burge, 1997[34]	Adults	IG1	12	Overall	93	38.9 (32.4)	35.6 (44.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	IG1	18	Overall	93	38.9 (32.4)	35.6 (44.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	IG2	12	Overall	88	34 (41.6)	35.6 (44.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	IG2	18	Overall	88	34 (41.6)	35.6 (44.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	IG3	12	Overall	86	27 (31.4)	35.6 (44.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	IG3	18	Overall	86	27 (31.4)	35.6 (44.2)	NR	NR	NR	NR	NR, NS
Carey, 2006[36]	Young adults	IG1	6	Overall	129	19.2 (13)	19.4 (12.4)	-1.6 (13.1)	-2 (11.6)	MD in Chg	0.40 (-3.86 to 4.66)	NR, NS
Carey, 2006[36]	Young adults	IG1	12	Overall	124	19.2 (13)	19.4 (12.4)	-3.6 (12.1)	-4.4 (11.6)	MD in Chg	0.80 (-3.37 to 4.97)	NR, NS

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Carey, 2006[36]	Young adults	IG2	6	Overall	134	20.7 (16)	19.4 (12.4)	-6.7 (14.1)	-2 (11.6)	MD in Chg	-4.70 (-9.08 to -0.32)	<0.05
Carey, 2006[36]	Young adults	IG2	12	Overall	123	20.7 (16)	19.4 (12.4)	-7.9 (14)	-4.4 (11.6)	MD in Chg	-3.50 (-8.06 to 1.06)	NR
Carey, 2006[36]	Young adults	IG3	6	Overall	132	18.7 (13.2)	19.4 (12.4)	-4.1 (12.5)	-2 (11.6)	MD in Chg	-2.10 (-6.22 to 2.02)	NR, NS
Carey, 2006[36]	Young adults	IG3	12	Overall	127	18.7 (13.2)	19.4 (12.4)	-2.2 (13.1)	-4.4 (11.6)	MD in Chg	2.20 (-2.13 to 6.53)	NR, NS
Carey, 2006[36]	Young adults	IG4	6	Overall	128	19.6 (12.4)	19.4 (12.4)	-5.8 (11.5)	-2 (11.6)	MD in Chg	-3.80 (-7.80 to 0.20)	NR, NS
Carey, 2006[36]	Young adults	IG4	12	Overall	127	19.6 (12.4)	19.4 (12.4)	-5.1 (16.3)	-4.4 (11.6)	MD in Chg	-0.70 (-5.69 to 4.29)	NR
Chander, 2021[38]	Adults	IG1	6	Overall	294	NR	NR	FUP=8.8 (15.7)	FUP=9.5 (19.8)	MD in Chg	-0.92 (-5.35 to 3.13)	NR, NS
Chander, 2021[38]	Adults	IG1	12	Overall	294	NR	NR	FUP=8.2 (11.7)	FUP=9.6 (20)	MD in Chg	-1.51 (-5.93 to 1.60)	NR, NS
Chander, 2021[38]	Adults	IG2	6	Overall	293	NR	NR	FUP=9.1 (9.2)	FUP=9.5 (19.8)	MD in Chg	-0.53 (-5.15 to 1.88)	NR, NS
Chander, 2021[38]	Adults	IG2	12	Overall	293	NR	NR	FUP=8.9 (9)	FUP=9.6 (20)	MD in Chg	-0.70 (-5.47 to 1.64)	NR, NS
Chander, 2021[38]	Adults	IG1	6	AUD	NR	NR	NR	FUP=8.9 (NR)	FUP=9.6 (NR)	MD in Chg	-0.91 (-5.37 to 3.39)	NR, NS
Chander, 2021[38]	Adults	IG1	12	AUD	NR	NR	NR	FUP=8.3 (NR)	FUP=9.5 (NR)	MD in Chg	-1.34 (-6.10 to 1.97)	NR, NS
Chander, 2021[38]	Adults	IG2	6	AUD	NR	NR	NR	FUP=8.8 (NR)	FUP=9.6 (NR)	MD in Chg	-0.92 (-5.55 to 1.75)	NR, NS
Chander, 2021[38]	Adults	IG2	12	AUD	NR	NR	NR	FUP=8.7 (NR)	FUP=9.5 (NR)	MD in Chg	-0.93 (-5.68 to 1.67)	NR, NS
Collins, 2014[42]	Young adults	IG1	6	Overall	395	10.1 (8.5)	9.8 (8.8)	-1.8 (8.5)	-1.7 (8.5)	MD in Chg	-0.17 (-1.85 to 1.52)	0.10
Collins, 2014[42]	Young adults	IG1	12	Overall	356	10.1 (8.5)	9.8 (8.8)	-1.8 (8.3)	-2.7 (7.8)	MD in Chg	0.89 (-0.79 to 2.56)	NR, NS
Collins, 2014[42]	Young adults	IG2	6	Overall	401	10.3 (9.3)	9.8 (8.8)	-2.5 (8.6)	-1.7 (8.5)	MD in Chg	-0.87 (-2.55 to 0.82)	0.01
Collins, 2014[42]	Young adults	IG2	12	Overall	354	10.3 (9.3)	9.8 (8.8)	-2.8 (8.5)	-2.7 (7.8)	MD in Chg	-0.08 (-1.78 to 1.63)	NR, NS
Crawford, 2014[43]	Adults	IG1	6	Overall	591	NR	NR	FUP=18.1 (15.6)	FUP=20.3 (16.6)	MD in Chg	-2.33 (-4.69 to 0.03)	0.053

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Crombie, 2018[44]	Adults	IG1	12	Overall	707	33.3 (33.2)	33.7 (33.3)	-14 (31.7)	-13.9 (31.8)	MD in Chg	1.12 (-2.78 to 5.01)	0.573
Cunningham, 2010[45]	Adults	IG1	6	Overall	185	13.9 (10.9)	11.9 (10.1)	-2.8 (10.1)	-0.4 (10.2)	MD in Chg	-2.40 (-5.32 to 0.52)	.001
Cunningham, 2010[45]	Adults	IG1	12	Overall	185	13.9 (10.9)	11.9 (10.1)	NR	NR	NR	NR	NR, NS
Cunningham, 2010[45]	Adults	IG1	6	High risk drinking	72	22.5 (12.6)	19.1 (12)	-6.5 (12.3)	-1.2 (12.3)	MD in Chg	-5.30 (-10.97 to 0.37)	NR, NS
Cunningham, 2010[45]	Adults	IG1	12	High risk drinking	72	22.5 (12.6)	19.1 (12)	NR	NR	NR	NR	NR, NS
Cunningham, 2010[45]	Adults	IG1	6	Medium risk drinking	113	8.7 (4.8)	7.2 (4)	-0.6 (4.5)	.1 (4.9)	MD in Chg	-0.70 (-2.43 to 1.03)	NR, NS
Cunningham, 2010[45]	Adults	IG1	12	Medium risk drinking	113	8.7 (4.8)	7.2 (4)	NR	NR	NR	NR	NR, NS
Cunningham, 2012[46]	Adults	IG1	6	Overall	1178	12.3 (11.9)	11.6 (11.1)	-0.5 (11.5)	.3 (11.1)	MD in Chg	-0.80 (-2.09 to 0.49)	NR, NS
Curry, 2003[47]	Adults	IG1	12	Overall	307	14.9 (10.1)	13.6 (10.4)	-4.3 (NR)	-3 (NR)	NR	NR	0.33
Daeppen, 2011[48]	Young adults	IG1	6	Overall	235	11.3 (11)	9.9 (10.9)	-1.5 (13.2)	.8 (10.8)	MD in Chg	-2.30 (-5.37 to 0.77)	0.03
Drummond, 2009[49]	Adults	IG1	6	Overall	91	64.6 (54.4)	54.1 (32.8)	-15.5 (30.4)	-9 (26.3)	MD in Chg	-5.53 (-14.93 to 3.86)	NR, NS
Emmen, 2005[50]	Adults	IG1	6	Overall	123	29.1 (15.1)	25.9 (18.7)	5.7 (14)	5.9 (18.3)	MD in Chg	-0.21 (-5.97 to 5.55)	0.46
Emmen, 2005[50]	Adults	IG1	6	Men	93	NR	NR	7.5 (13.9)	6.9 (19.3)	MD in Chg	0.56 (-6.39 to 7.51)	NR, NS
Emmen, 2005[50]	Adults	IG1	6	Women	30	NR	NR	1.3 (13.4)	1.2 (12.7)	MD in Chg	0.14 (-9.48 to 9.76)	NR, NS
Ettner, 2014[51]	Older adults	IG1	6	Overall	1073	13.3 (7.9)	13.9 (8)	-3.5 (NR)	-1.7 (NR)	Mean difference	NR	<0.01
Ettner, 2014[51]	Older adults	IG1	12	Overall	1049	13.3 (7.9)	13.9 (8)	-3.9 (NR)	-2.3 (NR)	Mean difference	NR	<0.01
Fleming, 1997[52]	Adults	IG1	6	Overall	774	19.1 (12.3)	18.9 (11.8)	-7.6 (11.6)	-4 (11.5)	MD in Chg	-3.61 (-5.24 to -1.98)	<0.001
Fleming, 1997[52]	Adults	IG1	12	Overall	774	19.1 (12.3)	18.9 (11.8)	-7.7 (11.8)	-3.5 (12.4)	MD in Chg	-4.18 (-5.89 to -2.47)	<0.001

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Fleming, 1997[52]	Adults	IG1	24	Overall	774	19.1 (12.3)	18.9 (11.8)	-6.7 (NR)	-3 (NR)	NR	NR	<0.05
Fleming, 1997[52]	Adults	IG1	36	Overall	774	19.1 (12.3)	18.9 (11.8)	-6.6 (NR)	-3.9 (NR)	NR	NR	<0.05
Fleming, 1997[52]	Adults	IG1	48	Overall	774	19.1 (12.3)	18.9 (11.8)	-7 (NR)	-5.2 (NR)	NR	NR	<0.05
Fleming, 1997[52]	Adults	IG1	6	Men	482	21.7 (12.9)	22 (12.4)	-7.8 (12.4)	-4.8 (12.5)	MD in Chg	-3.00 (-5.22 to -0.78)	<0.005
Fleming, 1997[52]	Adults	IG1	12	Men	482	21.7 (12.9)	22 (12.4)	-8.1 (12.6)	-5.1 (13)	MD in Chg	-2.96 (-5.25 to -0.67)	<0.005
Fleming, 1997[52]	Adults	IG1	6	Women	292	15.1 (10)	15.7 (10.1)	-7.1 (9.1)	-4.1 (9)	MD in Chg	-2.99 (-5.07 to -0.91)	<0.001
Fleming, 1997[52]	Adults	IG1	12	Women	292	15.1 (10)	15.7 (10.1)	-7 (9.3)	-2.5 (11)	MD in Chg	-4.53 (-6.86 to -2.20)	<0.001
Fleming, 1997[52]	Adults	IG1	6	Young adults (18-30 yrs)	226	16.2 (11.2)	18.3 (12.1)	-6.8 (10.8)	-4 (11.6)	MD in Chg	-2.80 (-5.72 to 0.12)	0.001
Fleming, 1997[52]	Adults	IG1	12	Young adults (18-30 yrs)	226	16.2 (11.2)	18.3 (12.1)	-7.4 (10.2)	-3.3 (12.7)	MD in Chg	-4.10 (-7.10 to -1.10)	0.001
Fleming, 1997[52]	Adults	IG1	24	Young adults (18-30 yrs)	226	16.2 (11.2)	18.3 (12.1)	-7.3 (10.5)	-3.8 (14.9)	MD in Chg	-3.50 (-6.85 to -0.15)	0.002
Fleming, 1997[52]	Adults	IG1	36	Young adults (18-30 yrs)	226	16.2 (11.2)	18.3 (12.1)	-6.8 (12)	-4.4 (14.7)	MD in Chg	-2.40 (-5.89 to 1.09)	0.02
Fleming, 1997[52]	Adults	IG1	48	Young adults (18-30 yrs)	226	16.2 (11.2)	18.3 (12.1)	-7.6 (10.7)	-6.7 (12.4)	MD in Chg	-0.90 (-3.92 to 2.12)	0.06
Fleming, 1999[53]	Older adults	IG1	6	Overall	158	15.5 (7.5)	16.7 (11.3)	-5.3 (7.5)	-0.2 (12.7)	MD in Chg	-5.10 (-8.28 to -1.92)	<0.001
Fleming, 1999[53]	Older adults	IG1	12	Overall	158	15.5 (7.5)	16.7 (11.3)	-5.4 (7.3)	-0.1 (12.2)	MD in Chg	-5.30 (-8.37 to -2.23)	<0.001
Fleming, 1999[53]	Older adults	IG1	24	Overall	158	15.5 (7.5)	16.7 (11.3)	-5 (7.8)	-2 (11.5)	MD in Chg	-3.00 (-6.02 to 0.02)	<0.001
Fleming, 2008[54]	Postpartum	IG1	6	Overall	235	8.5 (5.7)	8.1 (4.1)	-3.6 (5.3)	-1.3 (5)	MD in Chg	-2.28 (-3.59 to -0.96)	0.05
Fleming, 2010[55]	Young adults	IG1	6	Overall	986	17.8 (8.9)	17.3 (8)	-4.5 (9.9)	-3 (9.1)	MD in Chg	-1.53 (-2.71 to -0.34)	<0.05

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Fleming, 2010[55]	Young adults	IG1	12	Overall	986	17.8 (8.9)	17.3 (8)	-4.8 (9.5)	-3.6 (9.2)	MD in Chg	-1.20 (-2.37 to -0.03)	0.018
Hansen, 2012[56]	Adults	IG1	6	Overall	930	27.7 (NR)	26.7 (NR)	NR	-4.6 (16.3)	MD in Chg	-1.80 (-4.00 to 0.30)	NR, NS
Hansen, 2012[56]	Adults	IG1	12	Overall	930	27.7 (NR)	26.7 (NR)	NR	-5.5 (15.8)	MD in Chg	-1.40 (-3.40 to 0.60)	NR, NS
Hansen, 2012[56]	Adults	IG2	6	Overall	904	27.6 (NR)	26.7 (NR)	NR	-4.6 (16.3)	MD in Chg	-0.50 (-2.70 to 1.60)	NR, NS
Hansen, 2012[56]	Adults	IG2	12	Overall	904	27.6 (NR)	26.7 (NR)	NR	-5.5 (15.8)	MD in Chg	-1.20 (-3.30 to 0.90)	NR, NS
Hansen, 2012[56]	Adults	IG1	6	Men	515	32.8 (16.9)	31.3 (10.3)	-7.7 (16.6)	-4.6 (12.3)	MD in Chg	-3.10 (-5.65 to -0.55)	NR, NS
Hansen, 2012[56]	Adults	IG1	12	Men	515	32.8 (16.9)	31.3 (10.3)	-8 (15.9)	-6 (12.5)	MD in Chg	-2.00 (-4.49 to 0.49)	NR, NS
Hansen, 2012[56]	Adults	IG2	6	Men	490	32.7 (14)	31.3 (10.3)	-5.8 (14.9)	-4.6 (12.3)	MD in Chg	-1.20 (-3.61 to 1.21)	NR, NS
Hansen, 2012[56]	Adults	IG2	12	Men	490	32.7 (14)	31.3 (10.3)	-7.3 (14.9)	-6 (12.5)	MD in Chg	-1.30 (-3.74 to 1.14)	NR, NS
Hansen, 2012[56]	Adults	IG1	6	Women	415	20.9 (7)	21.3 (8.2)	-4.9 (11.7)	-4.6 (13.1)	MD in Chg	-0.30 (-2.70 to 2.10)	NR, NS
Hansen, 2012[56]	Adults	IG1	12	Women	415	20.9 (7)	21.3 (8.2)	-5.5 (13.3)	-4.9 (11.3)	MD in Chg	-0.60 (-2.98 to 1.78)	NR, NS
Hansen, 2012[56]	Adults	IG2	6	Women	414	21.5 (9)	21.3 (8.2)	-4.5 (15.5)	-4.6 (13.1)	MD in Chg	0.10 (-2.66 to 2.86)	NR, NS
Hansen, 2012[56]	Adults	IG2	12	Women	414	21.5 (9)	21.3 (8.2)	-6.1 (11.6)	-4.9 (11.3)	MD in Chg	-1.20 (-3.41 to 1.01)	NR, NS
Heather, 1987[57]	Adults	IG1	6	Overall	61	42.6 (22.1)	57.9 (39.2)	-8.4 (21.7)	-9.1 (37.7)	MD in Chg	0.75 (-14.91 to 16.41)	NR, NS
Heather, 1987[57]	Adults	IG2	6	Overall	62	44.5 (24)	57.9 (39.2)	-7.6 (28.1)	-9.1 (37.7)	MD in Chg	1.50 (-15.14 to 18.14)	NR, NS
Johnson, 2018[60]	Adults	IG1	6	Overall	693	NR	NR	NR	NR	RR (negative binom.)	1.12 (0.96 to 1.31)	0.17
Johnson, 2018[60]	Adults	IG1	12	Overall	635	NR	NR	NR	NR	RR (negative binom.)	0.98 (0.83 to 1.16)	0.82
Johnson, 2018[60]	Adults	IG1	6	Men	NR	NR	NR	NR	NR	RR (negative binom.)	1.12 (0.93 to 1.34)	0.23

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Johnson, 2018[60]	Adults	IG1	6	Women	NR	NR	NR	NR	NR	RR (negative binom.)	1.13 (0.82 to 1.54)	0.46
Johnson, 2018[60]	Adults	IG1	6	Medium risk drinking	NR	NR	NR	NR	NR	RR (negative binom.)	1.12 (0.93 to 1.34)	0.23
Karnik, 2023[63]	Young adults	IG1	6	Overall	329	13.2 (12.6)	10.5 (10.4)	-5 (11)	-3 (9.4)	MD in Chg	-1.95 (-4.17 to 0.27)	0.97
Karnik, 2023[63]	Young adults	IG1	12	Overall	329	13.2 (12.6)	10.5 (10.4)	-4.3 (11.9)	-2.2 (9.4)	MD in Chg	-2.10 (-4.42 to 0.22)	0.29
Kypri, 2004[64]	Young adults	IG1	6	Overall	94	NR	NR	NR	NR	RR (negative binom.)	0.45 (0.35 to 0.59)	0.46
Kypri, 2008[65]	Young adults	IG1	6	Overall	246	NR	NR	NR	NR	RR (negative binom.)	0.40 (0.32 to 0.49)	0.02
Kypri, 2008[65]	Young adults	IG1	12	Overall	247	NR	NR	NR	NR	RR (negative binom.)	0.44 (0.36 to 0.53)	0.16
Kypri, 2008[65]	Young adults	IG2	6	Overall	238	NR	NR	NR	NR	RR (negative binom.)	0.39 (0.32 to 0.48)	0.02
Kypri, 2008[65]	Young adults	IG2	12	Overall	239	NR	NR	NR	NR	RR (negative binom.)	0.39 (0.32 to 0.48)	0.01
Kypri, 2009[66]	Young adults	IG1	6	Overall	2435	NR	NR	NR	NR	RR (negative binom.)	0.86 (0.81 to 0.92)	<0.001
LaBrie, 2009[67]	Young adults	IG1	6	Overall	250	4.7 (NR)	3.5 (NR)	-0.6 (NR)	1.2 (NR)	NR	NR	NR
LaBrie, 2013[68]	Young adults	IG1	6	Overall	285	10.7 (8.1)	10.4 (9.5)	-1.3 (8.2)	-1 (9.9)	MD in Chg	-0.30 (-2.41 to 1.81)	NR, NS
LaBrie, 2013[68]	Young adults	IG1	12	Overall	287	10.7 (8.1)	10.4 (9.5)	-2.2 (8.4)	-1.4 (9)	MD in Chg	-0.80 (-2.82 to 1.22)	NR, NS
LaBrie, 2013[68]	Young adults	IG2	6	Overall	285	10.3 (9.4)	10.4 (9.5)	-0.8 (9.3)	-1 (9.9)	MD in Chg	0.20 (-2.02 to 2.42)	NR, NS
LaBrie, 2013[68]	Young adults	IG2	12	Overall	282	10.3 (9.4)	10.4 (9.5)	-1.8 (9.3)	-1.4 (9)	MD in Chg	-0.40 (-2.53 to 1.73)	NR, NS

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Larimer, 2007[69]	Young adults	IG1	12	Overall	1488	4.6 (7.4)	4.6 (6.3)	0.2 (7.2)	1 (6.3)	MD in Chg	-0.83 (-1.52 to -0.14)	<0.05
Leeman, 2016[70]	Young adults	IG1	6	Overall	90	8.3 (8.3)	5.8 (4.8)	-1.7 (9.3)	2.7 (12.8)	MD in Chg	-4.39 (-8.96 to 0.18)	<0.05
Leeman, 2016[70]	Young adults	IG2	6	Overall	87	8 (9)	5.8 (4.8)	-0.4 (9.4)	2.7 (12.8)	MD in Chg	-3.10 (-7.79 to 1.59)	NR, NS
Leeman, 2016[70]	Young adults	IG3	6	Overall	90	7.8 (8.9)	5.8 (4.8)	-1.3 (8.3)	2.7 (12.8)	MD in Chg	-4.00 (-8.39 to 0.39)	<0.05
Lewis, 2014[71]	Young adults	IG1	6	Overall	240	13.1 (11.1)	13 (9.8)	-5.2 (10.1)	-3.7 (9.2)	MD in Chg	-1.55 (-3.99 to 0.89)	NR, NS
Lewis, 2014[71]	Young adults	IG2	6	Overall	240	13.1 (11.2)	13 (9.8)	-5.2 (10.2)	-3.7 (9.2)	MD in Chg	-1.51 (-3.96 to 0.94)	NR, NS
Maisto, 2001[72]	Adults	IG1	6	Overall	158	16.2 (14.1)	17.1 (15.2)	-5.1 (13.3)	-3.4 (15.2)	MD in Chg	-1.70 (-6.20 to 2.80)	NR, NS
Maisto, 2001[72]	Adults	IG1	12	Overall	158	16.2 (14.1)	17.1 (15.2)	-5.5 (11.3)	-3.6 (11.8)	MD in Chg	-1.94 (-5.55 to 1.67)	NR, NS
Maisto, 2001[72]	Adults	IG2	6	Overall	159	20.6 (19.9)	17.1 (15.2)	-7.7 (17.6)	-3.4 (15.2)	MD in Chg	-4.27 (-9.37 to 0.82)	NR, NS
Maisto, 2001[72]	Adults	IG2	12	Overall	159	20.6 (19.9)	17.1 (15.2)	-8.3 (16.4)	-3.6 (11.8)	MD in Chg	-4.74 (-9.15 to -0.33)	<0.05
Moore, 2010[76]	Older adults	IG1	12	Overall	507	15.1 (7.2)	15.2 (7.4)	-5.7 (7.6)	-4.5 (7.9)	MD in Chg	-1.21 (-2.59 to 0.17)	<0.05
Neighbors, 2004[77]	Young adults	IG1	6	Overall	252	12.1 (9.2)	10.9 (9.5)	-3.6 (9)	-0.8 (9.5)	MD in Chg	-2.80 (-5.08 to -0.52)	<0.05
Neighbors, 2010[78]	Young adults	IG1	6	Overall	328	12 (NR)	10.4 (NR)	-1 (NR)	-0.7 (NR)	Beta coefficient	NR	0.02
Neighbors, 2010[78]	Young adults	IG1	12	Overall	328	12 (NR)	10.4 (NR)	-1.8 (NR)	-0.9 (NR)	Beta coefficient	NR	0.02
Neighbors, 2010[78]	Young adults	IG1	18	Overall	328	12 (NR)	10.4 (NR)	-2.5 (NR)	-1.9 (NR)	Beta coefficient	NR	0.02
Neighbors, 2010[78]	Young adults	IG1	24	Overall	328	12 (NR)	10.4 (NR)	-3.2 (NR)	-0.9 (NR)	Beta coefficient	NR	0.02
Neighbors, 2010[78]	Young adults	IG2	6	Overall	327	11.3 (NR)	10.4 (NR)	-1.9 (NR)	-0.7 (NR)	Beta coefficient	NR	0.32
Neighbors, 2010[78]	Young adults	IG2	12	Overall	327	11.3 (NR)	10.4 (NR)	-0.7 (NR)	-0.9 (NR)	Beta coefficient	NR	0.32
Neighbors, 2010[78]	Young adults	IG2	18	Overall	327	11.3 (NR)	10.4 (NR)	-1.6 (NR)	-1.9 (NR)	Beta coefficient	NR	0.32

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Neighbors, 2010[78]	Young adults	IG2	24	Overall	327	11.3 (NR)	10.4 (NR)	-1.7 (NR)	-0.9 (NR)	Beta coefficient	NR	0.32
Neighbors, 2010[78]	Young adults	IG3	6	Overall	327	11.8 (NR)	10.4 (NR)	-1.8 (NR)	-0.7 (NR)	Beta coefficient	NR	0.31
Neighbors, 2010[78]	Young adults	IG3	12	Overall	327	11.8 (NR)	10.4 (NR)	-1.8 (NR)	-0.9 (NR)	Beta coefficient	NR	0.31
Neighbors, 2010[78]	Young adults	IG3	18	Overall	327	11.8 (NR)	10.4 (NR)	-1.7 (NR)	-1.9 (NR)	Beta coefficient	NR	0.31
Neighbors, 2010[78]	Young adults	IG3	24	Overall	327	11.8 (NR)	10.4 (NR)	-2.2 (NR)	-0.9 (NR)	Beta coefficient	NR	0.31
Neighbors, 2010[78]	Young adults	IG4	6	Overall	328	12.8 (NR)	10.4 (NR)	-1 (NR)	-0.7 (NR)	Beta coefficient	NR	0.23
Neighbors, 2010[78]	Young adults	IG4	12	Overall	328	12.8 (NR)	10.4 (NR)	-0.3 (NR)	-0.9 (NR)	Beta coefficient	NR	0.23
Neighbors, 2010[78]	Young adults	IG4	18	Overall	328	12.8 (NR)	10.4 (NR)	-1.3 (NR)	-1.9 (NR)	Beta coefficient	NR	0.23
Neighbors, 2010[78]	Young adults	IG4	24	Overall	328	12.8 (NR)	10.4 (NR)	-1.3 (NR)	-0.9 (NR)	Beta coefficient	NR	0.23
Neighbors, 2016[79]	Young adults	IG1	6	Overall	357	10.1 (9.2)	9.4 (6.9)	-2.5 (8.7)	-2.1 (6.9)	MD in Chg	-0.37 (-2.00 to 1.26)	NR, NS
Neighbors, 2016[79]	Young adults	IG2	6	Overall	353	10.6 (10.1)	9.4 (6.9)	-3 (10)	-2.1 (6.9)	MD in Chg	-0.86 (-2.65 to 0.93)	NR, NS
Neighbors, 2019[80]	Young adults	IG1	6	Overall	213	7.1 (4.6)	5.9 (3.1)	-3.1 (4.1)	-1.6 (2.8)	MD in Chg	-1.40 (-2.35 to -0.45)	<0.05
Neighbors, 2019[80]	Young adults	IG2	6	Overall	212	7.2 (5.1)	5.9 (3.1)	-0.2 (5.9)	-1.6 (2.8)	MD in Chg	1.42 (0.17 to 2.68)	<0.05
Neighbors, 2019[80]	Young adults	IG3	6	Overall	215	6.5 (3.2)	5.9 (3.1)	-2.7 (2.9)	-1.6 (2.8)	MD in Chg	-1.00 (-1.77 to -0.23)	<0.05
Neighbors, 2019[80]	Young adults	IG4	6	Overall	212	6.7 (3.8)	5.9 (3.1)	-2 (3.8)	-1.6 (2.8)	MD in Chg	-0.33 (-1.22 to 0.57)	NR, NS
Ockene, 1999[82]	Adults	IG1	6	Overall	481	18.7 (14.6)	16.4 (12.1)	-6 (11.2)	-3.1 (10.2)	MD in Chg	-2.40 (-4.20 to -0.60)	0.001
Ockene, 1999[82]	Adults	IG1	12	Overall	445	18.7 (14.6)	16.4 (12.1)	-5.7 (11.3)	-3.2 (11.4)	MD in Chg	-2.60 (-4.53 to -0.27)	0.03
Ockene, 1999[82]	Adults	IG1	48	Overall	481	18.7 (14.6)	16.4 (12.1)	-4.8 (NR)	-6 (NR)	Beta coefficient	1.07 (0.90 to 1.26)	NR, NS
Ockene, 1999[82]	Adults	IG1	6	Men	343	20.8 (16.4)	19.4 (14.4)	-5.6 (12.5)	-2.9 (11.9)	MD in Chg	-2.70 (-5.30 to -0.10)	0.05

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Ockene, 1999[82]	Adults	IG1	6	Women	187	14.4 (8.6)	12.2 (5.6)	-6.8 (8)	-3.5 (7)	MD in Chg	-3.30 (-5.45 to -1.15)	0.003
Ondersma, 2016[85]	Postpartum	IG1	6	Overall	87	NR	NR	FUP=8.7 (20)	FUP=6.4 (12.8)	Effect size (NOS)	NR	0.988
Richmond, 1995[88]	Adults	IG1	6	Overall	135	39.4 (26.3)	32.5 (27.7)	-7 (25.2)	-4.9 (27.2)	MD in Chg	-2.10 (-10.94 to 6.74)	NR, NS
Richmond, 1995[88]	Adults	IG1	12	Overall	127	39.4 (26.3)	32.5 (27.7)	-6.3 (26.2)	-3.5 (25)	MD in Chg	-2.80 (-11.72 to 6.12)	NR, NS
Richmond, 1995[88]	Adults	IG2	6	Overall	136	35 (21.4)	32.5 (27.7)	-4 (22.9)	-4.9 (27.2)	MD in Chg	0.90 (-7.53 to 9.33)	NR, NS
Richmond, 1995[88]	Adults	IG2	12	Overall	131	35 (21.4)	32.5 (27.7)	-2.4 (21.3)	-3.5 (25)	MD in Chg	1.10 (-6.82 to 9.02)	NR, NS
Richmond, 1995[88]	Adults	IG1	6	Men	71	51.2 (28.5)	43.5 (34.3)	-12.5 (26.9)	-8.8 (34.2)	MD in Chg	-3.70 (-17.94 to 10.54)	NR, NS
Richmond, 1995[88]	Adults	IG1	12	Men	66	51.2 (28.5)	43.5 (34.3)	-9.6 (29.9)	-7.3 (30.6)	MD in Chg	-2.30 (-16.92 to 12.32)	NR, NS
Richmond, 1995[88]	Adults	IG2	6	Men	74	43.5 (23)	43.5 (34.3)	-5.5 (25.7)	-8.8 (34.2)	MD in Chg	3.30 (-10.37 to 16.97)	NR, NS
Richmond, 1995[88]	Adults	IG2	12	Men	70	43.5 (23)	43.5 (34.3)	-4.2 (22.5)	-7.3 (30.6)	MD in Chg	3.10 (-9.35 to 15.55)	NR, NS
Richmond, 1995[88]	Adults	IG1	6	Women	64	25.9 (14.6)	20.9 (9.3)	-0.7 (18.6)	-0.9 (11.1)	MD in Chg	0.20 (-7.30 to 7.70)	NR, NS
Richmond, 1995[88]	Adults	IG1	12	Women	61	25.9 (14.6)	20.9 (9.3)	-2.4 (14.6)	.6 (11.4)	MD in Chg	-3.00 (-9.57 to 3.57)	NR, NS
Richmond, 1995[88]	Adults	IG2	6	Women	62	23.6 (11.9)	20.9 (9.3)	-1.9 (12.8)	-0.9 (11.1)	MD in Chg	-1.00 (-6.96 to 4.96)	NR, NS
Richmond, 1995[88]	Adults	IG2	12	Women	61	23.6 (11.9)	20.9 (9.3)	.6 (15)	.6 (11.4)	MD in Chg	0.00 (-6.71 to 6.71)	NR, NS
Rose, 2017[89]	Adults	IG1	6	Overall	1363	9.2 (10.2)	9.7 (10.2)	-0.5 (9.9)	-0.9 (10)	MD in Chg	0.40 (-0.66 to 1.46)	0.41
Rose, 2017[89]	Adults	IG1	6	AUD	395	13 (9.4)	13.5 (9.3)	-0.8 (9.1)	-1.7 (9)	MD in Chg	0.85 (-0.93 to 2.63)	NR, NS
Rose, 2017[89]	Adults	IG1	6	No AUD	968	5.5 (9.4)	5.9 (9.3)	-0.1 (9.1)	0 (9.1)	MD in Chg	-0.06 (-1.21 to 1.09)	NR, NS
Rubio, 2010[90]	Adults	IG1	12	Overall	752	27.4 (9.4)	26.9 (9.8)	-8.2 (9.3)	-4.7 (9.5)	MD in Chg	-3.56 (-4.90 to -2.22)	<0.001
Rubio, 2010[90]	Adults	IG1	12	Men	491	28.9 (9.8)	28.2 (10)	-7 (9.7)	-4.5 (9.3)	MD in Chg	-2.58 (-4.26 to -0.90)	<0.05

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Rubio, 2010[90]	Adults	IG1	12	Women	261	24.5 (7.9)	24.5 (8.8)	-10.3 (7)	-5.1 (7.7)	MD in Chg	-5.19 (-6.97 to -3.41)	<0.001
Schaus, 2009[93]	Young adults	IG1	6	Overall	363	8.4 (7.4)	9.6 (8.4)	-2.2 (7.4)	-0.7 (9.2)	MD in Chg	-1.53 (-3.25 to 0.19)	0.007
Schaus, 2009[93]	Young adults	IG1	9	Overall	363	8.4 (7.4)	9.6 (8.4)	-2.3 (7.3)	-2.1 (8.5)	MD in Chg	-0.14 (-1.76 to 1.48)	0.134
Schaus, 2009[93]	Young adults	IG1	12	Overall	363	8.4 (7.4)	9.6 (8.4)	-1.9 (7.4)	-2.3 (8.4)	MD in Chg	0.40 (-1.23 to 2.03)	0.700
Schulz, 2013[94]	Adults	IG0	6	Overall	448	12.8 (NR)	14.8 (NR)	-3.9 (NR)	-0.4 (NR)	Beta coefficient	-1.15 (-4.02 to 1.72)	NR, NS
Scott, 1990[95]	Adults	IG1	12	Men	154	37.1 (8.9)	38 (10.4)	-11.2 (13.9)	-6.6 (16)	MD in Chg	-4.64 (-9.36 to 0.08)	<0.06
Scott, 1990[95]	Adults	IG1	12	Women	72	35.3 (9.2)	36.6 (10.6)	-11.6 (13)	-10 (15.3)	MD in Chg	-1.60 (-8.23 to 5.03)	NR, NS
Senft, 1997[96]	Adults	IG1	6	Overall	425	NR	NR	FUP=13.6 (NR)	FUP=16.6 (NR)	Mean difference	NR	0.04
Senft, 1997[96]	Adults	IG1	12	Overall	411	NR	NR	FUP=12.1 (NR)	FUP=13.8 (NR)	Mean difference	NR	0.13
Senft, 1997[96]	Adults	IG1	6	Men	301	NR	NR	FUP=15 (NR)	FUP=19.3 (NR)	NR	NR	0.03
Senft, 1997[96]	Adults	IG1	12	Men	290	NR	NR	FUP=13.6 (NR)	FUP=16.2 (NR)	NR	NR	0.08
Senft, 1997[96]	Adults	IG1	6	Women	124	NR	NR	FUP=9.5 (NR)	FUP=10.8 (NR)	NR	NR	0.29
Senft, 1997[96]	Adults	IG1	12	Women	121	NR	NR	FUP=8.2 (NR)	FUP=8.5 (NR)	NR	NR	0.43
Turrisi, 2009[98]	Young adults	IG1	10	Overall	583	3.7 (5.8)	4 (5.8)	3.6 (5.8)	4.4 (6)	MD in Chg	-0.82 (-1.79 to 0.14)	<0.05
Turrisi, 2009[98]	Young adults	IG2	10	Overall	533	3.6 (5.8)	4 (5.8)	3.8 (5.8)	4.4 (6)	MD in Chg	-0.56 (-1.58 to 0.45)	<0.05
Turrisi, 2009[98]	Young adults	IG3	10	Overall	584	3.6 (5.8)	4 (5.8)	4.9 (6)	4.4 (6)	MD in Chg	0.50 (-0.47 to 1.47)	NR, NS
Tzilos, 2011[99]	Pregnant	IG1	1 (G)	Overall	50	6.4 (6.5)	6 (10.5)	NR	NR	NR	NR	0.71
Voogt, 2014[101]	Young adults	IG1	6	Overall	907	22.2 (12.9)	22.1 (13.8)	.7 (13)	1.9 (13.8)	MD in Chg	-1.20 (-2.94 to 0.54)	0.04
Wallace, 1988[102]	Adults	IG1	6	Men	640	62.2 (28.5)	63.7 (34.1)	-15.5 (26.7)	-8.2 (26.9)	MD in Chg	-7.30 (-11.46 to -3.14)	<0.001
Wallace, 1988[102]	Adults	IG1	12	Men	640	62.2 (28.5)	63.7 (34.1)	-18.2 (26.7)	-8.1 (28.7)	MD in Chg	-10.10 (-14.40 to -5.80)	<0.001

Appendix E, Table 8. Results for the Outcome Drinks per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Wallace, 1988[102]	Adults	IG1	6	Women	267	35.1 (17.1)	36.8 (19.9)	-10.3 (14.8)	-8 (18.7)	MD in Chg	-2.30 (-6.37 to 1.77)	NR, NS
Wallace, 1988[102]	Adults	IG1	12	Women	267	35.1 (17.1)	36.8 (19.9)	-11.5 (18.2)	-6.3 (23.4)	MD in Chg	-5.20 (-10.25 to -0.15)	<0.05

* Mean (SD)

† For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: binom = binomial; BL = baseline; CG = control group; CI = confidence interval; FUP = followup**;** G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; IRR = incidence rate ratio; MD in Chg = mean difference in change; mo = months; N = number of participants; NR = not reported; NS = not statistically significant; SD = standard deviation; RR = risk ratio; yrs = years

Appendix E, Table 9. Results for the Outcome Exceeding Recommended Limits from Trials Among Adults, Key Question 4

Population	Study	Group	FUP, mo	Analysis	IG results. n/N (%)	CG results, n/N (%)	OR (95% CI)	p	Definition
Adults	Curry, 2003[47]	IG1	12	Overall	65/151 (43.0)	89/156 (57.1)	0.57 (0.36 to 0.89)	0.012	≥ 2 drinks/day, ≥5 drinks/day 2+times, or driving after >2 drinks (post mo)
Older adults	Ettner, 2014[51]	IG1	6	Overall	91/453 (20.1)	180/620 (29.0)	0.61 (0.46 to 0.82)	≤0.01	≥5 drinks/day, 4/day 2+ times/mo, or 3/day 4+ times/wk
Older adults	Ettner, 2014[51]	IG1	12	Overall	79/439 (18.0)	165/610 (27.0)	0.59 (0.44 to 0.80)	≤0.01	≥5 drinks/day, 4/day 2+ times/mo, or 3/day 4+ times/wk
Adults	Fleming, 1997[52]	IG1	6	Overall	86/392 (21.9)	124/382 (32.5)	0.58 (0.42 to 0.81)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	12	Overall	79/392 (20.2)	128/382 (33.5)	0.50 (0.36 to 0.69)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	24	Overall	99/392 (25.3)	126/382 (33.0)	0.69 (0.50 to 0.94)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	36	Overall	91/392 (23.2)	132/382 (34.6)	0.57 (0.42 to 0.78)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	48	Overall	88/392 (22.4)	101/382 (26.4)	0.81 (0.58 to 1.12)	NR, NS	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	6	Men	57/244 (23.4)	71/238 (29.8)	0.72 (0.48 to 1.08)	NR, NS	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	12	Men	49/244 (20.1)	76/238 (31.9)	0.54 (0.35 to 0.81)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	24	Men	62/244 (25.4)	77/238 (32.4)	0.71 (0.48 to 1.06)	NR, NS	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	36	Men	61/244 (25.0)	83/238 (34.9)	0.62 (0.42 to 0.92)	<0.05	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	48	Men	59/244 (24.2)	57/238 (23.9)	1.01 (0.67 to 1.54)	NR, NS	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	6	Women	29/148 (19.6)	53/144 (36.8)	0.42 (0.25 to 0.71)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	12	Women	30/148 (20.3)	52/144 (36.1)	0.45 (0.27 to 0.76)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	24	Women	37/148 (25.0)	49/144 (34.0)	0.65 (0.39 to 1.07)	<0.10	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	36	Women	30/148 (20.3)	52/144 (36.1)	0.45 (0.27 to 0.76)	<0.01	>20/13 [M/F] drinks/wk
Adults	Fleming, 1997[52]	IG1	48	Women	29/148 (19.6)	44/144 (30.6)	0.55 (0.32 to 0.95)	<0.05	>20/13 [M/F] drinks/wk

Appendix E, Table 9. Results for the Outcome Exceeding Recommended Limits from Trials Among Adults, Key Question 4

Population	Study	Group	FUP, mo	Analysis	IG results. n/N (%)	CG results, n/N (%)	OR (95% CI)	p	Definition
Older adults	Fleming, 1999[53]	IG1	6	Overall	12/87 (13.8)	21/71 (29.6)	0.38 (0.17 to 0.84)	<0.05	≥21/14 [M/F] drinks/wk (past week)
Older adults	Fleming, 1999[53]	IG1	12	Overall	12/87 (13.8)	23/71 (32.4)	0.33 (0.15 to 0.73)	<0.01	≥21/14 [M/F] drinks/wk (past week)
Older adults	Fleming, 1999[53]	IG1	24	Overall	13/87 (14.9)	19/71 (26.8)	0.48 (0.22 to 1.06)	<0.10	≥21/14 [M/F] drinks/wk (past week)
Adults	Helstrom, 2014[58]	IG1	8	Overall	35/68 (51.5)	38/71 (53.5)	0.92 (0.47 to 1.79)	NR, NS	>21/14 [M/F] drinks/wk or ≥5/4 [M/F] drinks/day (past week)
Adults	Helstrom, 2014[58]	IG1	12	Overall	35/68 (51.5)	40/71 (56.3)	0.82 (0.42 to 1.60)	NR, NS	>21/14 [M/F] drinks/wk or ≥5/4 [M/F] drinks/day (past week)
Adults	Hilbink, 2012[59]	IG1	24	Overall	140/217 (64.5)	132/249 (53.0)	1.61 (1.11 to 2.33)	0.01	AUDIT <8
Adults	Johnson, 2018[60]	IG1	6	Overall	126/331 (38.1)	123/362 (34.0)	1.19 (0.85 to 1.67)	0.30	>140g ethanol/wk
Adults	Johnson, 2018[60]	IG1	12	Overall	130/300 (43.3)	132/335 (39.4)	1.15 (0.82 to 1.60)	0.43	>140g ethanol/wk
Adults	Kaner, 2013[62]	IG1	6	Overall	146/205 (71.2)	130/202 (64.4)	1.28 (0.80 to 2.08)	0.30	AUDIT score <8
Adults	Kaner, 2013[62]	IG1	12	Overall	131/203 (64.5)	116/190 (61.1)	1.01 (0.62 to 1.67)	0.96	AUDIT score <8
Adults	Kaner, 2013[62]	IG2	6	Overall	147/208 (70.7)	130/202 (64.4)	1.18 (0.72 to 1.92)	0.51	AUDIT <8
Adults	Kaner, 2013[62]	IG2	12	Overall	133/205 (64.9)	116/190 (61.1)	1.10 (0.64 to 1.89)	0.73	AUDIT <8
Young adults	Kypri, 2009[66]	IG1	6	Overall	152/813 (18.7)	192/767 (25.0)	0.65 (0.46 to 0.92)	<0.001	>14/28 drinks/wk [F/M]
Young adults	Larimer, 2007[69]	IG1	12	Overall	243/737 (33.0)	300/751 (39.9)	0.74 (0.60 to 0.91)	<0.05	≥5 drinks/occasion, past 2 weeks
Older adults	Moore, 2010[76]	IG1	12	Overall	120/222 (54.1)	179/299 (59.9)	0.75 (0.42 to 1.36)	NR, NS	CARET>0
Adults	Ockene, 1999[82]	IG1	6	Overall	152/248 (61.3)	167/233 (71.7)	0.63 (0.43 to 0.92)	0.02	NR
Adults	Ockene, 1999[82]	IG1	12	Overall	137/235 (58.3)	149/210 (71.0)	0.63 (0.40 to 1.01)	0.06	NR
Adults	Richmond, 1995[88]	IG1	6	Overall	71/96 (74.0)	66/93 (71.0)	1.17 (0.56 to 2.43)	NR, NS	>28/14 [M/F] drinks/wk (past week)
Adults	Richmond, 1995[88]	IG1	12	Overall	73/96 (76.0)	73/93 (78.5)	0.83 (0.38 to 1.82)	NR, NS	>28/14 [M/F] drinks/wk (past week)

Appendix E, Table 9. Results for the Outcome Exceeding Recommended Limits from Trials Among Adults, Key Question 4

Population	Study	Group	FUP, mo	Analysis	IG results. n/N (%)	CG results, n/N (%)	OR (95% CI)	p	Definition
Adults	Richmond, 1995[88]	IG2	6	Overall	71/96 (74.0)	66/93 (71.0)	1.17 (0.56 to 2.43)	NR, NS	>28/14 [M/F] drinks/wk (past week)
Adults	Richmond, 1995[88]	IG2	12	Overall	74/96 (77.1)	73/93 (78.5)	0.90 (0.41 to 1.97)	NR, NS	>28/14 [M/F] drinks/wk (past week)
Adults	Rubio, 2010[90]	IG1	12	Overall	178/371 (48.0)	254/381 (66.7)	0.46 (0.34 to 0.62)	<0.001	>18/13 [M/F] drinks/wk
Adults	Rubio, 2010[90]	IG1	12	Men	126/243 (51.9)	167/248 (67.3)	0.52 (0.36 to 0.75)	<0.01	>18/13 [M/F] drinks/wk
Adults	Rubio, 2010[90]	IG1	12	Women	52/128 (40.6)	87/133 (65.4)	0.36 (0.22 to 0.60)	<0.001	>18/13 [M/F] drinks/wk
Adults	Saitz, 2003[92]	IG1	6	Faculty physicians	52/103 (50.5)	40/79 (50.6)	0.99 (0.55 to 1.79)	NR, NS	>14/7drinks/wk or>4/3 drinks/day [M/F or aged ≥65 years]
Adults	Saitz, 2003[92]	IG1	6	Resident physicians	16/31 (51.6)	16/23 (69.6)	0.47 (0.15 to 1.45)	NR, NS	>14/7drinks/wk or>4/3 drinks/day [M/F or aged ≥65 years]
Adults	Schulz, 2013[94]	IG0	6	Overall	88/313 (28.1)	57/135 (42.2)	0.90 (0.51 to 1.59)	0.72	≤2/1 [M/F] drinks/day no alcohol >=2 days/wk
Adults	Senft, 1997[96]	IG1	6	Overall	42/201 (20.9)	65/224 (29.0)	0.65 (0.41 to 1.01)	0.06	≤3/2 [M/F] drink/day and no alcohol >=2 days/wk
Adults	Senft, 1997[96]	IG1	12	Overall	39/196 (19.9)	58/215 (27.0)	0.67 (0.42 to 1.07)	0.07	≤3/2 [M/F] drink/day and no alcohol >=2 days/wk
Adults	Wallace, 1988[102]	IG1	6	Men	188/318 (59.1)	246/322 (76.4)	0.45 (0.32 to 0.63)	<0.001	≥35/21 [M/F] units/wk
Adults	Wallace, 1988[102]	IG1	12	Men	179/318 (56.3)	240/322 (74.5)	0.44 (0.31 to 0.61)	<0.001	≥35/21 [M/F] units/wk
Adults	Wallace, 1988[102]	IG1	6	Women	69/130 (53.1)	101/137 (73.7)	0.40 (0.24 to 0.67)	<0.001	≥35/21 [M/F] units/wk
Adults	Wallace, 1988[102]	IG1	12	Women	68/130 (52.3)	97/137 (70.8)	0.45 (0.27 to 0.75)	<0.05	≥35/21 [M/F] units/wk
Older adults	Watson, 2013[104]	IG1	6	Overall	203/238 (85.3)	205/231 (88.7)	0.81 (0.48 to 1.37)	0.427	AUDIT-C ≥ 5
Older adults	Watson, 2013[104]	IG1	12	Overall	194/229 (84.7)	188/229 (82.1)	1.37 (0.76 to 2.47)	0.289	AUDIT-C ≥ 5
Adults	Williams, 2019[105]	IG1	12	Overall	53/61 (86.9)	47/63 (74.6)	2.26 (0.89 to 5.75)	.046	≤7/14 drinks/week [F/M]
Adults	Wilson, 2014[106]	IG1	6	Overall	18/28 (64.3)	29/39 (74.4)	0.64 (0.12 to 3.41)	NR	AUDIT <8

Abbreviations: AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; CG = control group; CI = confidence interval; FUP = followup**;** IG = intervention group; mo = months; M/F = male/female; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio; wk = week

Appendix E, Table 10. Results for the Outcome Any Heavy Episodic Drinking from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	OR (95% CI)	p
Bertholet, 2015[32]	Young adults	IG1	6	Overall	257/338 (76.0)	262/329 (79.6)	0.81 (0.46 to 1.59)	NR
Bertholet, 2015[32]	Young adults	IG1	47	Overall	314/367 (85.6)	312/370 (84.3)	0.97 (0.67 to 1.40)	0.872
Crawford, 2014[43]	Adults	IG1	6	Overall	221/291 (75.9)	246/301 (81.7)	0.70 (0.46 to 1.05)	0.087
Crombie, 2018[44]	Adults	IG1	12	Overall	61/349 (17.5)	67/358 (18.7)	0.97 (0.64 to 1.46)	0.871
Crombie, 2018[44]	Adults	IG1	12	Overall	145/349 (41.5)	171/358 (47.8)	0.79 (0.57 to 1.08)	0.140
Crombie, 2018[44]	Adults	IG1	12	Overall	145/349 (41.5)	171/358 (47.8)	0.79 (0.57 to 1.08)	0.140
Curry, 2003[47]	Adults	IG1	12	Overall	21/151 (13.9)	30/156 (19.2)	0.68 (0.37 to 1.25)	0.26
Ettner, 2014[51]	Older adults	IG1	6	Overall	45/453 (9.9)	112/620 (18.1)	0.50 (0.35 to 0.72)	≤0.01
Ettner, 2014[51]	Older adults	IG1	12	Overall	44/439 (10.0)	98/610 (16.1)	0.58 (0.40 to 0.85)	≤0.01
Fleming, 1997[52]	Adults	IG1	6	Overall	237/392 (60.5)	278/382 (72.8)	0.57 (0.42 to 0.77)	<0.01
Fleming, 1997[52]	Adults	IG1	12	Overall	225/392 (57.4)	273/382 (71.5)	0.54 (0.40 to 0.73)	<0.01
Fleming, 1997[52]	Adults	IG1	24	Overall	245/392 (62.5)	284/382 (74.3)	0.58 (0.42 to 0.78)	<0.01
Fleming, 1997[52]	Adults	IG1	36	Overall	241/392 (61.5)	270/382 (70.7)	0.66 (0.49 to 0.89)	<0.01
Fleming, 1997[52]	Adults	IG1	48	Overall	250/392 (63.8)	269/382 (70.4)	0.74 (0.55 to 1.00)	NR, NS
Fleming, 1997[52]	Adults	IG1	6	Men	159/244 (65.2)	177/238 (74.4)	0.64 (0.44 to 0.95)	<0.05
Fleming, 1997[52]	Adults	IG1	12	Men	145/244 (59.4)	178/238 (74.8)	0.49 (0.33 to 0.73)	<0.01
Fleming, 1997[52]	Adults	IG1	24	Men	151/244 (61.9)	173/238 (72.7)	0.61 (0.42 to 0.90)	<0.05
Fleming, 1997[52]	Adults	IG1	36	Men	150/244 (61.5)	163/238 (68.5)	0.73 (0.50 to 1.07)	NR, NS
Fleming, 1997[52]	Adults	IG1	48	Men	154/244 (63.1)	173/238 (72.7)	0.64 (0.44 to 0.95)	<0.05
Fleming, 1997[52]	Adults	IG1	6	Women	79/148 (53.4)	101/144 (70.1)	0.49 (0.30 to 0.79)	<0.01
Fleming, 1997[52]	Adults	IG1	12	Women	81/148 (54.7)	97/144 (67.4)	0.59 (0.36 to 0.94)	<0.05
Fleming, 1997[52]	Adults	IG1	24	Women	91/148 (61.5)	110/144 (76.4)	0.49 (0.30 to 0.82)	<0.01
Fleming, 1997[52]	Adults	IG1	36	Women	84/148 (56.8)	108/144 (75.0)	0.44 (0.27 to 0.72)	<0.01
Fleming, 1997[52]	Adults	IG1	48	Women	91/148 (61.5)	97/144 (67.4)	0.77 (0.48 to 1.25)	NR, NS
Fleming, 1997[52]	Adults	IG1	6	Young adults (18-30 yrs)	76/114 (66.7)	94/112 (83.9)	0.38 (0.20 to 0.72)	0.01
Fleming, 1997[52]	Adults	IG1	12	Young adults (18-30 yrs)	75/114 (65.8)	99/112 (88.4)	0.25 (0.13 to 0.51)	0.001
Fleming, 1997[52]	Adults	IG1	24	Young adults (18-30 yrs)	87/114 (76.3)	95/112 (84.8)	0.58 (0.29 to 1.13)	NR, NS
Fleming, 1997[52]	Adults	IG1	36	Young adults (18-30 yrs)	80/114 (70.2)	85/112 (75.9)	0.75 (0.41 to 1.35)	NR, NS

Appendix E, Table 10. Results for the Outcome Any Heavy Episodic Drinking from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	OR (95% CI)	p
Fleming, 1997[52]	Adults	IG1	48	Young adults (18-30 yrs)	75/114 (65.8)	91/112 (81.3)	0.44 (0.24 to 0.82)	0.01
Fleming, 1999[53]	Older adults	IG1	6	Overall	25/78 (32.1)	28/67 (41.8)	0.66 (0.33 to 1.30)	NR, NS
Fleming, 1999[53]	Older adults	IG1	12	Overall	24/78 (30.8)	33/67 (49.3)	0.46 (0.23 to 0.90)	<0.025
Johnson, 2018[60]	Adults	IG1	6	Overall	166/331 (50.2)	163/362 (45.0)	1.20 (0.86 to 1.66)	0.28
Johnson, 2018[60]	Adults	IG1	12	Overall	163/300 (54.3)	177/335 (52.8)	0.96 (0.69 to 1.35)	0.83
Karnik, 2023[63]	Young adults	IG1	6	Overall	68/167 (40.7)	60/162 (37.0)	1.17 (0.75 to 1.82)	0.37
Karnik, 2023[63]	Young adults	IG1	12	Overall	64/167 (38.3)	61/162 (37.7)	1.03 (0.66 to 1.61)	0.40
Kypri, 2009[66]	Young adults	IG1	6	Overall	430/813 (52.9)	418/767 (54.5)	0.81 (0.60 to 1.05)	0.22
Moore, 2010[76]	Older adults	IG1	12	Overall	23/213 (10.8)	39/294 (13.3)	0.88 (0.41 to 1.90)	NR, NS
Rose, 2017[89]	Adults	IG1	6	Overall	239/678 (35.3)	271/685 (39.6)	0.83 (0.67 to 1.04)	0.88
Rose, 2017[89]	Adults	IG1	6	AUD	88/198 (44.4)	106/197 (53.8)	0.69 (0.46 to 1.02)	NR
Rose, 2017[89]	Adults	IG1	6	No AUD	130/480 (27.1)	131/488 (26.8)	1.01 (0.76 to 1.34)	NR
Rubio, 2010[90]	Adults	IG1	12	Overall	194/371 (52.3)	256/381 (67.2)	0.54 (0.40 to 0.72)	<0.001
Rubio, 2010[90]	Adults	IG1	12	Men	140/243 (57.6)	165/248 (66.5)	0.68 (0.47 to 0.99)	<0.05
Rubio, 2010[90]	Adults	IG1	12	Women	54/128 (42.2)	91/133 (68.4)	0.34 (0.20 to 0.56)	<0.001
Saitz, 2003[92]	Adults	IG1	6	Faculty physicians	53/103 (51.5)	33/79 (41.8)	1.48 (0.82 to 2.67)	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Faculty physicians	53/103 (51.5)	33/79 (41.8)	1.48 (0.82 to 2.67)	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Resident physicians	14/31 (45.2)	15/23 (65.2)	0.44 (0.14 to 1.34)	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Resident physicians	14/31 (45.2)	15/23 (65.2)	0.44 (0.14 to 1.34)	NR, NS
Scott, 1990[95]	Adults	IG1	12	Men	18/80 (22.5)	29/74 (39.2)	0.45 (0.22 to 0.91)	<0.05
Scott, 1990[95]	Adults	IG1	12	Women	4/33 (12.1)	6/39 (15.4)	0.76 (0.19 to 2.96)	NR, NS
Watkins, 2017[103]	Adults	IG1	6	Overall	74/138 (53.6)	69/123 (56.1)	0.90 (0.56 to 1.48)	0.91

Abbreviations: AUD = alcohol use disorder; CG = control group; CI = confidence interval; FUP = followup**;** IG = intervention group; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio; yrs = years

Appendix E, Table 11. Results for the Outcome Abstinence from Alcohol Use from Trials Among Adults, Key Question 4

Population	Study	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	OR (95% CI)	p
Pregnant	O'Connor, 2007[83]	IG1	4 (G)	Overall	NR/117 (NR)	NR/138 (NR)	5.39 (1.59 to 18.25)	<0.05
Pregnant	Ondersma, 2015[84]	IG1	6 (G)	Overall	18/20 (90.0)	14/19 (73.7)	3.40 (0.50 to 21.00)	0.19
Pregnant	Reynolds, 1995[87]	IG1	2 (G)	Overall	34/39 (87.2)	23/33 (69.7)	2.96 (0.89 to 9.79)	<0.058
Pregnant	Reynolds, 1995[87]	IG1	2 (G)	African-American	26/29 (89.7)	16/23 (69.6)	3.79 (0.86 to 16.81)	<0.05
Pregnant	Reynolds, 1995[87]	IG1	2 (G)	White	10/13 (76.9)	9/13 (69.2)	1.48 (0.26 to 8.50)	NR, NS
Pregnant	Rubio, 2014[91]	IG1	8 (PP)	Overall	22/125 (17.6)	14/126 (11.1)	1.71 (0.83 to 3.52)	0.084
Pregnant	Rubio, 2014[91]	IG1	13 (PP)	Overall	15/125 (12.0)	9/126 (7.1)	1.77 (0.75 to 4.22)	0.087
Pregnant	Rubio, 2014[91]	IG1	19 (PP)	Overall	9/125 (7.2)	5/126 (4.0)	2.00 (0.92 to 4.35)	0.08
Pregnant	van der Wulp, 2014[100]	IG1	3 (G)	Overall	64/99 (64.6)	49/108 (45.4)	2.20 (1.26 to 3.85)	0.79
Pregnant	van der Wulp, 2014[100]	IG1	6 (G)	Overall	62/86 (72.1)	51/93 (54.8)	1.68 (0.68 to 4.18)	0.26
Pregnant	van der Wulp, 2014[100]	IG2	3 (G)	Overall	54/77 (70.1)	49/108 (45.4)	2.83 (1.52 to 5.24)	0.15
Pregnant	van der Wulp, 2014[100]	IG2	6 (G)	Overall	53/68 (77.9)	51/93 (54.8)	2.77 (1.05 to 7.34)	0.04
Postpartum	Ondersma, 2016[85]	IG1	6	Overall	17/61 (27.9)	17/62 (27.4)	1.00 (0.46 to 2.25)	NR, NS
Adults	Maisto, 2001[72]	IG1	6	Overall	3.1 (9.3)	1.8 (9.5)	1.30 (-1.65 to 4.25)	NR, NS
Adults	Maisto, 2001[72]	IG1	12	Overall	3.6 (8.7)	1.2 (7.1)	2.42 (-0.04 to 4.88)	NR, NS
Adults	Maisto, 2001[72]	IG2	6	Overall	2.7 (23.4)	1.8 (9.5)	0.90 (-4.53 to 6.33)	NR, NS
Adults	Maisto, 2001[72]	IG2	12	Overall	2.5 (8.8)	1.2 (7.1)	1.38 (-1.10 to 3.86)	NR, NS
Adults	Martino, 2018[75]	IG1	6	Alcohol as primary substance	3/15 (20.0)	0/13 (0.0)	7.56 (0.35 to 161.47)	NR, NS
Adults	Martino, 2018[75]	IG2	6	Alcohol as primary substance	3/23 (13.0)	0/13 (0.0)	4.61 (0.22 to 96.54)	NR, NS
Adults	Ntouva, 2019[81]	IG1	6	Overall	0/119 (0.0)	1/110 (0.9)	0.31 (0.01 to 7.58)	NR
Adults	Saitz, 2003[92]	IG1	6	Faculty physicians	23/103 (22.3)	21/79 (26.6)	0.79 (0.40 to 1.57)	NR, NS
Adults	Saitz, 2003[92]	IG1	6	Resident physicians	6/31 (19.4)	1/23 (4.3)	5.28 (0.59 to 47.33)	NR, NS
Adults	Watkins, 2017[103]	IG1	6	Overall	44/138 (31.9)	28/123 (22.8)	1.59 (0.91 to 2.76)	NR, NS
Adults	Williams, 2019[105]	IG1	12	Overall	2/61 (3.3)	8/63 (12.7)	0.23 (0.05 to 1.15)	0.04

Abbreviations: CG = control group; CI = confidence interval; FUP = followup; G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio; PP = outcome covers postpartum period, among studies in pregnant women

Appendix E, Table 12. Results for the Outcome Heavy Episodic Drinking Episodes per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Carey, 2006[36]	Young adults	IG1	6	Overall	129	1.8 (1)	1.9 (1)	0 (1.2)	-0.1 (1.2)	MD in Chg	0.07 (-0.34 to 0.49)	NR, NS
Carey, 2006[36]	Young adults	IG1	12	Overall	124	1.8 (1)	1.9 (1)	-0.3 (1)	-0.6 (1)	MD in Chg	0.32 (-0.04 to 0.69)	NR, NS
Carey, 2006[36]	Young adults	IG2	6	Overall	134	1.9 (1.3)	1.9 (1)	-0.4 (1.3)	-0.1 (1.2)	MD in Chg	-0.28 (-0.70 to 0.15)	NR, NS
Carey, 2006[36]	Young adults	IG2	12	Overall	123	1.9 (1.3)	1.9 (1)	-0.7 (1.1)	-0.6 (1)	MD in Chg	-0.02 (-0.41 to 0.36)	NR
Carey, 2006[36]	Young adults	IG3	6	Overall	132	1.7 (1)	1.9 (1)	-0.2 (1)	-0.1 (1.2)	MD in Chg	-0.15 (-0.54 to 0.24)	NR, NS
Carey, 2006[36]	Young adults	IG3	12	Overall	127	1.7 (1)	1.9 (1)	-0.1 (1.2)	-0.6 (1)	MD in Chg	0.58 (0.19 to 0.96)	<0.05
Carey, 2006[36]	Young adults	IG4	6	Overall	128	1.9 (1.3)	1.9 (1)	-0.5 (1.2)	-0.1 (1.2)	MD in Chg	-0.45 (-0.86 to -0.04)	<0.05
Carey, 2006[36]	Young adults	IG4	12	Overall	127	1.9 (1.3)	1.9 (1)	-0.6 (1.2)	-0.6 (1)	MD in Chg	0.10 (-0.29 to 0.49)	NR
Carey, 2020[37]	Young adults	IG1	6	Overall	108	1.2 (0.7)	1.2 (0.7)	-0.2 (NR)	-0.4 (NR)	Regression parameter	NR	0.201
Chander, 2021[38]	Adults	IG1	6	Overall	294	NR	NR	FUP=1 (1.4)	FUP=1.2 (1.4)	MD in Chg	-0.20 (-0.51 to 0.11)	NR, NS
Chander, 2021[38]	Adults	IG1	12	Overall	294	NR	NR	FUP=1 (1.3)	FUP=1.2 (1.5)	MD in Chg	-0.25 (-0.56 to 0.04)	NR, NS
Chander, 2021[38]	Adults	IG2	6	Overall	293	NR	NR	FUP=1.2 (1.3)	FUP=1.2 (1.4)	MD in Chg	-0.09 (-0.34 to 0.22)	NR, NS
Chander, 2021[38]	Adults	IG2	12	Overall	293	NR	NR	FUP=1.1 (1.2)	FUP=1.2 (1.5)	MD in Chg	-0.08 (-0.38 to 0.22)	NR, NS
Chander, 2021[38]	Adults	IG1	6	AUD	NR	NR	NR	FUP=1 (NR)	FUP=1.2 (NR)	MD in Chg	-0.20 (-0.53 to 0.17)	NR, NS
Chander, 2021[38]	Adults	IG1	12	AUD	NR	NR	NR	FUP=1 (NR)	FUP=1.2 (NR)	MD in Chg	-0.22 (-0.56 to 0.10)	NR, NS
Chander, 2021[38]	Adults	IG2	6	AUD	NR	NR	NR	FUP=1.1 (NR)	FUP=1.2 (NR)	MD in Chg	-0.12 (-0.46 to 0.21)	NR, NS
Chander, 2021[38]	Adults	IG2	12	AUD	NR	NR	NR	FUP=1.1 (NR)	FUP=1.2 (NR)	MD in Chg	-0.11 (-0.46 to 0.23)	NR, NS
Chang, 2011[41]	Adults	IG1	12	Overall	491	0.3 (0.9)	0.2 (0.6)	-0.1 (0.9)	-0.1 (0.5)	MD in Chg	-0.08 (-0.19 to 0.02)	0.11
Daeppen, 2011[48]	Young adults	IG1	6	Overall	235	1 (0.9)	0.9 (0.8)	-0.4 (0.9)	-0.2 (0.8)	MD in Chg	-0.17 (-0.39 to 0.04)	0.12
Fleming, 1997[52]	Adults	IG1	6	Overall	774	1.4 (1.5)	1.3 (1.3)	-0.7 (1.4)	-0.4 (1.2)	MD in Chg	-0.34 (-0.52 to -0.16)	<0.005
Fleming, 1997[52]	Adults	IG1	12	Overall	774	1.4 (1.5)	1.3 (1.3)	-0.6 (1.4)	-0.3 (1.3)	MD in Chg	-0.36 (-0.55 to -0.17)	<0.005
Fleming, 1997[52]	Adults	IG1	24	Overall	774	1.4 (1.5)	1.3 (1.3)	-0.3 (NR)	0.2 (NR)	NR	NR	<0.05
Fleming, 1997[52]	Adults	IG1	36	Overall	774	1.4 (1.5)	1.3 (1.3)	-0.3 (NR)	0.1 (NR)	NR	NR	<0.05
Fleming, 1997[52]	Adults	IG1	48	Overall	774	1.4 (1.5)	1.3 (1.3)	-0.4 (NR)	-0.1 (NR)	NR	NR	<0.05
Fleming, 1997[52]	Adults	IG1	6	Men	482	1.5 (1.6)	1.4 (1.2)	-0.7 (1.5)	-0.3 (1.3)	MD in Chg	-0.44 (-0.69 to -0.19)	<0.025
Fleming, 1997[52]	Adults	IG1	12	Men	482	1.5 (1.6)	1.4 (1.2)	-0.7 (1.5)	-0.2 (1.3)	MD in Chg	-0.44 (-0.70 to -0.19)	<0.05
Fleming, 1997[52]	Adults	IG1	6	Women	292	1.2 (1.2)	1.3 (1.3)	-0.7 (1.1)	-0.5 (1.2)	MD in Chg	-0.18 (-0.44 to 0.08)	<0.02

Appendix E, Table 12. Results for the Outcome Heavy Episodic Drinking Episodes per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Fleming, 1997[52]	Adults	IG1	12	Women	292	1.2 (1.2)	1.3 (1.3)	-0.6 (1.2)	-0.4 (1.3)	MD in Chg	-0.24 (-0.52 to 0.05)	<0.02
Fleming, 1997[52]	Adults	IG1	6	Young adults (18-30 yrs)	226	1.5 (1)	1.6 (1.1)	-0.7 (1.1)	-0.4 (1.1)	MD in Chg	-0.35 (-0.64 to -0.06)	0.01
Fleming, 1997[52]	Adults	IG1	12	Young adults (18-30 yrs)	226	1.5 (1)	1.6 (1.1)	-0.7 (1)	-0.2 (1.1)	MD in Chg	-0.50 (-0.78 to -0.22)	0.001
Fleming, 1997[52]	Adults	IG1	24	Young adults (18-30 yrs)	226	1.5 (1)	1.6 (1.1)	-0.4 (1.1)	-0.2 (1.2)	MD in Chg	-0.25 (-0.55 to 0.05)	0.03
Fleming, 1997[52]	Adults	IG1	36	Young adults (18-30 yrs)	226	1.5 (1)	1.6 (1.1)	-0.4 (1.3)	-0.2 (1.4)	MD in Chg	-0.23 (-0.58 to 0.13)	NR, NS
Fleming, 1997[52]	Adults	IG1	48	Young adults (18-30 yrs)	226	1.5 (1)	1.6 (1.1)	-0.6 (1.1)	-0.4 (1.3)	MD in Chg	-0.20 (-0.51 to 0.11)	0.08
Fleming, 1999[53]	Older adults	IG1	6	Overall	158	.8 (1.7)	1.2 (2.3)	-0.4 (1.5)	0 (2.2)	MD in Chg	-0.33 (-0.91 to 0.25)	<0.05
Fleming, 1999[53]	Older adults	IG1	12	Overall	158	.8 (1.7)	1.2 (2.3)	-0.6 (1.5)	0.2 (2.3)	MD in Chg	-0.77 (-1.37 to -0.17)	<0.001
Fleming, 1999[53]	Older adults	IG1	24	Overall	158	.8 (1.7)	1.2 (2.3)	-0.3 (1.5)	-0.2 (2.2)	MD in Chg	-0.15 (-0.74 to 0.43)	NR, NS
Fleming, 2008[54]	Postpartum	IG1	6	Overall	235	0.9 (0.9)	0.8 (0.8)	-0.4 (0.8)	-0.1 (0.8)	MD in Chg	-0.32 (-0.53 to -0.12)	0.019
Fleming, 2010[55]	Young adults	IG1	6	Overall	986	1.8 (0.9)	1.8 (0.8)	-0.5 (1)	-0.3 (0.9)	MD in Chg	-0.15 (-0.27 to -0.03)	<0.05
Fleming, 2010[55]	Young adults	IG1	12	Overall	986	1.8 (0.9)	1.8 (0.8)	-0.5 (1)	-0.4 (0.9)	MD in Chg	-0.07 (-0.19 to 0.04)	0.148
Helstrom, 2014[58]	Adults	IG1	8	Overall	139	2.8 (2.6)	2.2 (2.3)	-1.2 (2.5)	-0.9 (2.2)	MD in Chg	-0.36 (-1.15 to 0.43)	NR, NS
Helstrom, 2014[58]	Adults	IG1	12	Overall	139	2.8 (2.6)	2.2 (2.3)	-1 (2.6)	-1 (2.2)	MD in Chg	-0.02 (-0.82 to 0.78)	NR, NS
Karnik, 2023[63]	Young adults	IG1	6	Overall	329	1 (1.5)	0.8 (1.3)	-0.4 (1.4)	-0.4 (1.1)	MD in Chg	-0.01 (-0.28 to 0.26)	0.17
Karnik, 2023[63]	Young adults	IG1	12	Overall	329	1 (1.5)	0.8 (1.3)	-0.4 (1.4)	-0.3 (1.2)	MD in Chg	-0.16 (-0.44 to 0.12)	0.94
Kypri, 2004[64]	Young adults	IG1	6	Overall	94	NR	NR	NR	NR	RR (negative binom.)	0.43 (0.29 to 0.61)	0.38
Kypri, 2008[65]	Young adults	IG1	6	Overall	246	NR	NR	NR	NR	RR (negative binom.)	0.33 (0.23 to 0.47)	0.02
Kypri, 2008[65]	Young adults	IG1	12	Overall	247	NR	NR	NR	NR	RR (negative binom.)	0.36 (0.26 to 0.51)	0.06
Kypri, 2008[65]	Young adults	IG2	6	Overall	238	NR	NR	NR	NR	RR (negative binom.)	0.39 (0.28 to 0.56)	0.18

Appendix E, Table 12. Results for the Outcome Heavy Episodic Drinking Episodes per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Kypri, 2008[65]	Young adults	IG2	12	Overall	239	NR	NR	NR	NR	RR (negative binom.)	0.38 (0.27 to 0.54)	0.12
LaBrie, 2009[67]	Young adults	IG1	6	Overall	250	2.5 (4.1)	1.9 (3.2)	-1.9 (3.8)	-1.2 (2.9)	MD in Chg	-0.65 (-1.51 to 0.21)	NR, NS
Leeman, 2016[70]	Young adults	IG1	6	Overall	103	1.1 (1.2)	1.5 (1.7)	-0.3 (1)	-0.3 (1.6)	MD in Chg	0.04 (-0.49 to 0.56)	NR, NS
Leeman, 2016[70]	Young adults	IG2	6	Overall	103	1.2 (1.3)	1.5 (1.7)	-0.3 (1.2)	-0.3 (1.6)	MD in Chg	0.01 (-0.53 to 0.56)	NR, NS
Leeman, 2016[70]	Young adults	IG3	6	Overall	102	1 (0.9)	1.5 (1.7)	0 (0.9)	-0.3 (1.6)	MD in Chg	0.33 (-0.18 to 0.84)	NR, NS
Neighbors, 2010[78]	Young adults	IG1	6	Overall	328	6.6 (NR)	6.3 (NR)	-0.7 (NR)	-0.9 (NR)	Beta coefficient	NR	0.28
Neighbors, 2010[78]	Young adults	IG1	12	Overall	328	6.6 (NR)	6.3 (NR)	-1.3 (NR)	-1 (NR)	Beta coefficient	NR	0.28
Neighbors, 2010[78]	Young adults	IG1	18	Overall	328	6.6 (NR)	6.3 (NR)	-1 (NR)	-1.8 (NR)	Beta coefficient	NR	0.28
Neighbors, 2010[78]	Young adults	IG1	24	Overall	328	6.6 (NR)	6.3 (NR)	-2.3 (NR)	-1.6 (NR)	Beta coefficient	NR	0.28
Neighbors, 2010[78]	Young adults	IG2	6	Overall	327	6.4 (NR)	6.3 (NR)	-1 (NR)	-0.9 (NR)	Beta coefficient	NR	0.64
Neighbors, 2010[78]	Young adults	IG2	12	Overall	327	6.4 (NR)	6.3 (NR)	-0.8 (NR)	-1 (NR)	Beta coefficient	NR	0.64
Neighbors, 2010[78]	Young adults	IG2	18	Overall	327	6.4 (NR)	6.3 (NR)	-1.6 (NR)	-1.8 (NR)	Beta coefficient	NR	0.64
Neighbors, 2010[78]	Young adults	IG2	24	Overall	327	6.4 (NR)	6.3 (NR)	-1.2 (NR)	-1.6 (NR)	Beta coefficient	NR	0.64
Neighbors, 2010[78]	Young adults	IG3	6	Overall	327	6.5 (NR)	6.3 (NR)	-0.7 (NR)	-0.9 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	IG3	12	Overall	327	6.5 (NR)	6.3 (NR)	-0.7 (NR)	-1 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	IG3	18	Overall	327	6.5 (NR)	6.3 (NR)	-0.9 (NR)	-1.8 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	IG3	24	Overall	327	6.5 (NR)	6.3 (NR)	-1.8 (NR)	-1.6 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	IG4	6	Overall	328	6.9 (NR)	6.3 (NR)	-0.9 (NR)	-0.9 (NR)	Beta coefficient	NR	0.73
Neighbors, 2010[78]	Young adults	IG4	12	Overall	328	6.9 (NR)	6.3 (NR)	-0.8 (NR)	-1 (NR)	Beta coefficient	NR	0.73
Neighbors, 2010[78]	Young adults	IG4	18	Overall	328	6.9 (NR)	6.3 (NR)	-1.2 (NR)	-1.8 (NR)	Beta coefficient	NR	0.73

Appendix E, Table 12. Results for the Outcome Heavy Episodic Drinking Episodes per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Neighbors, 2010[78]	Young adults	IG4	24	Overall	328	6.9 (NR)	6.3 (NR)	-1.4 (NR)	-1.6 (NR)	Beta coefficient	NR	0.73
Ockene, 1999[82]	Adults	IG1	6	Overall	481	1.2 (1.5)	0.9 (1.5)	-0.4 (1.2)	-0.2 (1.2)	MD in Chg	-0.20 (-0.42 to 0.02)	0.09
Ockene, 1999[82]	Adults	IG1	12	Overall	445	1.2 (1.5)	0.9 (1.5)	-0.5 (1.2)	-0.4 (1.2)	MD in Chg	-0.10 (-0.33 to -0.11)	0.36
Ockene, 1999[82]	Adults	IG1	48	Overall	445	1.2 (1.5)	0.9 (1.5)	NR	NR	Beta coefficient	0.26 (0.22 to 0.31)	NR, NS
Ondersma, 2016[85]	Postpartum	IG1	6	Overall	87	NR	NR	FUP=0.6 (1.2)	FUP=0.8 (1.6)	Effect size (NOS)	NR	0.499
Rubio, 2010[90]	Adults	IG1	12	Overall	752	0.7 (0.6)	0.7 (0.6)	-0.5 (0.5)	-0.3 (0.5)	MD in Chg	-0.10 (-0.18 to -0.03)	<0.001
Rubio, 2010[90]	Adults	IG1	12	Men	491	0.9 (0.6)	0.9 (0.6)	-0.6 (0.5)	-0.4 (0.5)	MD in Chg	-0.11 (-0.20 to -0.02)	<0.05
Rubio, 2010[90]	Adults	IG1	12	Women	261	0.6 (0.4)	0.6 (0.5)	-0.4 (0.4)	-0.3 (0.4)	MD in Chg	-0.10 (-0.20 to 0.00)	<0.001
Saitz, 2003[92]	Adults	IG1	6	Faculty physicians	NR	NR	NR	FUP=1.2 (NR)	FUP=1 (NR)	NR	NR	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Resident physicians	NR	NR	NR	FUP=1 (NR)	FUP=1.3 (NR)	NR	NR	NR, NS
Schaus, 2009[93]	Young adults	IG1	6	Overall	363	1.3 (1.1)	1.4 (1.2)	-0.3 (1.3)	0 (1.7)	MD in Chg	-0.26 (-0.56 to 0.05)	0.031
Schaus, 2009[93]	Young adults	IG1	9	Overall	363	1.3 (1.1)	1.4 (1.2)	-0.3 (1.3)	-0.2 (1.6)	MD in Chg	-0.12 (-0.42 to 0.19)	0.534
Schaus, 2009[93]	Young adults	IG1	12	Overall	363	1.3 (1.1)	1.4 (1.2)	-0.2 (1.3)	-0.3 (1.4)	MD in Chg	0.09 (-0.19 to 0.37)	0.942
Stein, 2018[97]	Young adults	IG1	6	Overall	226	NR	NR	NR	NR	IRR (negative binom.)	0.26 (0.20 to 0.35)	0.771
Stein, 2018[97]	Young adults	IG1	9	Overall	226	NR	NR	NR	NR	IRR (negative binom.)	0.21 (0.15 to 0.28)	0.185
Stein, 2018[97]	Young adults	IG1	12	Overall	226	NR	NR	NR	NR	IRR (negative binom.)	0.22 (0.16 to 0.30)	0.422
Stein, 2018[97]	Young adults	IG1	15	Overall	226	NR	NR	-0.3 (NR)	-0.3 (NR)	IRR (negative binom.)	0.22 (0.16 to 0.29)	0.337
Voogt, 2014[101]	Young adults	IG1	6	Overall	907	1.8 (1)	1.7 (1.1)	0 (1)	0.1 (1)	MD in Chg	-0.10 (-0.23 to 0.03)	0.045

* Mean (SD)

† For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: AUD = alcohol use disorder; binom = binomial; BL = baseline; CG = control group; CI = confidence interval; FUP = followup; IG = intervention group; IRR = incidence rate ratio; MD in Chg = mean difference in change; mo = months; N = number of participants; NOS = not otherwise specified; NR = not reported; NS = not statistically significant; RR = risk ratio; yrs = years

Appendix E, Table 13. Results for the Outcome Drinking Days per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Aalto, 2000[28]	Adults	IG1	36	Men	181	2.4 (1.6)	2.3 (1.8)	0.2 (1.7)	0.1 (1.9)	MD in Chg	0.10 (-0.42 to 0.62)	NR, NS
Aalto, 2000[28]	Adults	IG1	36	Women	76	2 (1.6)	2 (1.4)	-0.2 (1.6)	-0.1 (1.5)	MD in Chg	-0.10 (-0.78 to 0.58)	NR, NS
Chander, 2021[38]	Adults	IG1	6	Overall	294	NR	NR	FUP=1.8 (1.7)	FUP=1.9 (1.6)	MD in Chg	-0.11 (-0.45 to 0.26)	NR, NS
Chander, 2021[38]	Adults	IG1	12	Overall	294	NR	NR	FUP=1.8 (1.6)	FUP=1.9 (1.7)	MD in Chg	-0.14 (-0.50 to 0.22)	NR, NS
Chander, 2021[38]	Adults	IG2	6	Overall	293	NR	NR	FUP=1.9 (1.6)	FUP=1.9 (1.6)	MD in Chg	-0.08 (-0.43 to 0.28)	NR, NS
Chander, 2021[38]	Adults	IG2	12	Overall	293	NR	NR	FUP=1.8 (1.6)	FUP=1.9 (1.7)	MD in Chg	-0.10 (-0.44 to 0.25)	NR, NS
Chander, 2021[38]	Adults	IG1	6	AUD	NR	NR	NR	FUP=1.8 (NR)	FUP=2 (NR)	MD in Chg	-0.17 (-0.56 to 0.26)	NR, NS
Chander, 2021[38]	Adults	IG1	12	AUD	NR	NR	NR	FUP=1.8 (NR)	FUP=2 (NR)	MD in Chg	-0.18 (-0.62 to 0.27)	NR, NS
Chander, 2021[38]	Adults	IG2	6	AUD	NR	NR	NR	FUP=1.9 (NR)	FUP=2 (NR)	MD in Chg	-0.14 (-0.54 to 0.28)	NR, NS
Chander, 2021[38]	Adults	IG2	12	AUD	NR	NR	NR	FUP=1.8 (NR)	FUP=2 (NR)	MD in Chg	-0.17 (-0.61 to 0.24)	NR, NS
Collins, 2014[42]	Young adults	IG1	6	Overall	395	2.4 (1.5)	2.3 (1.5)	-0.3 (1.5)	-0.1 (1.5)	MD in Chg	-0.17 (-0.47 to 0.12)	0.25
Collins, 2014[42]	Young adults	IG1	12	Overall	356	2.4 (1.5)	2.3 (1.5)	-0.2 (1.5)	-0.2 (1.5)	MD in Chg	-0.08 (-0.38 to 0.23)	NR, NS
Collins, 2014[42]	Young adults	IG2	6	Overall	401	2.3 (1.5)	2.3 (1.5)	-0.2 (1.5)	-0.1 (1.5)	MD in Chg	-0.10 (-0.39 to 0.20)	0.66
Collins, 2014[42]	Young adults	IG2	12	Overall	354	2.3 (1.5)	2.3 (1.5)	-0.3 (1.4)	-0.2 (1.5)	MD in Chg	-0.11 (-0.41 to 0.20)	NR, NS
Fleming, 2008[54]	Postpartum	IG1	6	Overall	235	2.6 (1.7)	2.6 (1.8)	-0.9 (1.6)	-0.3 (4.9)	MD in Chg	-0.55 (-1.47 to 0.37)	0.01
Fleming, 2010[55]	Young adults	IG1	6	Overall	986	2.9 (1.3)	3 (1.2)	-0.5 (1.4)	-0.4 (1.3)	MD in Chg	-0.10 (-0.27 to 0.07)	NR, NS
Fleming, 2010[55]	Young adults	IG1	12	Overall	986	2.9 (1.3)	3 (1.2)	-0.5 (1.4)	-0.4 (1.3)	MD in Chg	-0.08 (-0.24 to 0.09)	0.053
Helstrom, 2014[58]	Adults	IG1	8	Overall	139	4.9 (2.4)	5.1 (2)	-1.5 (2.7)	-1.5 (2.6)	MD in Chg	0.01 (-0.87 to 0.89)	NR, NS

Appendix E, Table 13. Results for the Outcome Drinking Days per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Helstrom, 2014[58]	Adults	IG1	12	Overall	139	4.9 (2.4)	5.1 (2)	-1.1 (2.8)	-1.2 (2.3)	MD in Chg	0.03 (-0.83 to 0.89)	NR, NS
Johnson, 2018[60]	Adults	IG1	6	Overall	693	NR	NR	NR	NR	OR (negative binom.)	1.05 (0.86 to 1.29)	0.61
Johnson, 2018[60]	Adults	IG1	12	Overall	635	NR	NR	NR	NR	OR (negative binom.)	0.86 (0.70 to 1.07)	0.18
Kypri, 2004[64]	Young adults	IG1	6	Overall	94	NR	NR	NR	NR	RR (negative binom.)	0.42 (0.34 to 0.53)	0.15
Kypri, 2008[65]	Young adults	IG1	6	Overall	246	NR	NR	NR	NR	RR (negative binom.)	0.85 (0.73 to 1.00)	0.05
Kypri, 2008[65]	Young adults	IG1	12	Overall	247	NR	NR	NR	NR	RR (negative binom.)	0.92 (0.79 to 1.07)	0.28
Kypri, 2008[65]	Young adults	IG2	6	Overall	238	NR	NR	NR	NR	RR (negative binom.)	0.79 (0.68 to 0.94)	0.008
Kypri, 2008[65]	Young adults	IG2	12	Overall	239	NR	NR	NR	NR	RR (negative binom.)	0.86 (0.74 to 1.01)	0.07
Kypri, 2009[66]	Young adults	IG1	6	Overall	2435	NR	NR	NR	NR	RR (negative binom.)	0.23 (0.22 to 0.24)	<0.001
LaBrie, 2013[68]	Young adults	IG1	6	Overall	285	1.7 (1.2)	1.6 (1.1)	-0.2 (1.1)	-0.1 (1.1)	MD in Chg	-0.12 (-0.39 to 0.14)	NR, NS
LaBrie, 2013[68]	Young adults	IG1	12	Overall	287	1.7 (1.2)	1.6 (1.1)	-0.2 (1.2)	0 (1.1)	MD in Chg	-0.15 (-0.42 to 0.12)	NR, NS
LaBrie, 2013[68]	Young adults	IG2	6	Overall	285	1.6 (1.2)	1.6 (1.1)	-0.1 (1.2)	-0.1 (1.1)	MD in Chg	0.00 (-0.27 to 0.27)	NR, NS
LaBrie, 2013[68]	Young adults	IG2	12	Overall	282	1.6 (1.2)	1.6 (1.1)	-0.1 (1.2)	0 (1.1)	MD in Chg	-0.10 (-0.38 to 0.18)	NR, NS
Leeman, 2016[70]	Young adults	IG1	6	Overall	90	1.5 (1)	1.5 (1.1)	-0.2 (1)	0.1 (1.3)	MD in Chg	-0.30 (-0.79 to 0.19)	NR, NS
Leeman, 2016[70]	Young adults	IG2	6	Overall	87	1.7 (1.4)	1.5 (1.1)	-0.1 (1.4)	0.1 (1.3)	MD in Chg	-0.14 (-0.72 to 0.44)	NR, NS
Leeman, 2016[70]	Young adults	IG3	6	Overall	90	1.4 (1.1)	1.5 (1.1)	0 (1.2)	0.1 (1.3)	MD in Chg	-0.08 (-0.61 to 0.45)	NR, NS
Maisto, 2001[72]	Adults	IG1	6	Overall	158	2.7 (2.3)	2.4 (2.4)	-0.6 (2.2)	-0.3 (2.4)	MD in Chg	-0.30 (-1.02 to 0.42)	NR, NS
Maisto, 2001[72]	Adults	IG1	12	Overall	158	2.7 (2.3)	2.4 (2.4)	-0.6 (2.3)	-0.2 (1.8)	MD in Chg	-0.44 (-1.08 to 0.19)	NR, NS
Maisto, 2001[72]	Adults	IG2	6	Overall	159	2.5 (2.2)	2.4 (2.4)	0 (2.3)	-0.3 (2.4)	MD in Chg	0.35 (-0.38 to 1.08)	NR, NS

Appendix E, Table 13. Results for the Outcome Drinking Days per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Maisto, 2001[72]	Adults	IG2	12	Overall	159	2.5 (2.2)	2.4 (2.4)	-0.1 (2.3)	-0.2 (1.8)	MD in Chg	0.10 (-0.52 to 0.73)	<0.05
Marlatt, 1998[73]	Young adults	IG1	12	Overall	299	2.2 (1.1)	2.2 (1.2)	0 (1.2)	0.2 (1.3)	MD in Chg	-0.20 (-0.47 to 0.07)	<0.05
Marlatt, 1998[73]	Young adults	IG1	24	Overall	299	2.2 (1.1)	2.2 (1.2)	-0.2 (1.2)	-0.1 (1.2)	MD in Chg	-0.10 (-0.37 to 0.17)	<0.05
Martino, 2018[75]	Adults	IG1	6	Overall	110	2.9 (2.2)	3 (2.2)	-1.4 (2.3)	-1.2 (2.2)	MD in Chg	-0.15 (-1.00 to 0.70)	<0.05
Martino, 2018[75]	Adults	IG2	6	Overall	110	3.8 (3.2)	3 (2.2)	-1.9 (2.8)	-1.2 (2.2)	MD in Chg	-0.70 (-1.65 to 0.25)	<0.05
Neighbors, 2016[79]	Young adults	IG1	6	Overall	357	1.3 (0.5)	1.3 (0.4)	-0.2 (0.6)	-0.2 (0.5)	MD in Chg	-0.06 (-0.16 to 0.05)	NR, NS
Neighbors, 2016[79]	Young adults	IG2	6	Overall	353	1.3 (0.5)	1.3 (0.4)	-0.2 (0.6)	-0.2 (0.5)	MD in Chg	-0.07 (-0.18 to 0.04)	NR, NS
Ondersma, 2016[85]	Postpartum	IG1	6	Overall	87	NR	NR	FUP=1.2 (1.7)	FUP=1.7 (2)	Effect size (NOS)	NR	0.329
Osterman, 2014[86]	Pregnant	IG1	1 (G)	Overall	93	0.1 (0.6)	0.1 (0.4)	-0.1 (0.6)	-0.1 (0.3)	MD in Chg	-0.05 (-0.24 to 0.14)	NR, NS
Osterman, 2014[86]	Pregnant	IG1	5 (PP)	Overall	98	0.1 (0.6)	0.1 (0.4)	0 (0.5)	0 (0.3)	MD in Chg	0.07 (-0.11 to 0.25)	NR, NS
Rose, 2017[89]	Adults	IG1	6	Overall	1363	3.2 (2.6)	3.2 (2.6)	-0.1 (2.5)	-0.1 (2.5)	MD in Chg	-0.06 (-0.33 to 0.21)	0.64
Rose, 2017[89]	Adults	IG1	6	AUD	395	3.9 (2.3)	3.7 (2.4)	-0.2 (2.2)	-0.2 (2.2)	MD in Chg	-0.01 (-0.45 to 0.43)	NR, NS
Rose, 2017[89]	Adults	IG1	6	No AUD	968	2.5 (2.2)	2.6 (2.2)	-0.1 (2.2)	0 (2.2)	MD in Chg	-0.10 (-0.38 to 0.18)	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Faculty physicians	NR	NR	NR	FUP=2.2 (NR)	FUP=2.5 (NR)	NR	NR	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Resident physicians	NR	NR	NR	FUP=2.5 (NR)	FUP=2.3 (NR)	NR	NR	NR, NS
Senft, 1997[96]	Adults	IG1	6	Overall	427	3.3 (2.1)	3.5 (2.2)	-0.5 (NR)	-0.2 (NR)	Mean difference	NR	0.02
Senft, 1997[96]	Adults	IG1	12	Overall	413	3.3 (2.1)	3.5 (2.2)	-0.6 (NR)	-0.4 (NR)	Mean difference	NR	0.04
Senft, 1997[96]	Adults	IG1	6	Men	302	NR	NR	FUP=3.1 (NR)	FUP=3.6 (NR)	NR	NR	0.04
Senft, 1997[96]	Adults	IG1	12	Men	293	NR	NR	FUP=2.9 (NR)	FUP=3.2 (NR)	NR	NR	0.12

Appendix E, Table 13. Results for the Outcome Drinking Days per Week from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Senft, 1997[96]	Adults	IG1	6	Women	125	NR	NR	FUP=2.1 (NR)	FUP=2.8 (NR)	NR	NR	0.05
Senft, 1997[96]	Adults	IG1	12	Women	122	NR	NR	FUP=2 (NR)	FUP=2.7 (NR)	NR	NR	0.06

* Mean (SD)

† For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: AUD = alcohol use disorder; binom = binomial; BL = baseline; CG = control group; CI = confidence interval; FUP = followup; G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; MD in Chg = mean difference in change; mo = months; N = number of participants; NOS = not otherwise specified; NR = not reported; NS = not statistically significant; OR = odds ratio; PP = outcome covers postpartum period, among studies in pregnant women; RR = risk ratio

Appendix E, Table 14. Results for the Outcome Drinking Severity Score From Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Alegria, 2019[29]	Adults	ASI Lite-Alcohol (Range: 0-1)	IG1	6	Overall	341	0.2 (0.2)	0.2 (0.2)	NR	NR	Beta coefficient	NR	NR, NS
Alegria, 2019[29]	Adults	ASI Lite-Drug (Range: 0-1)	IG1	6	Overall	341	0 (0.1)	0.1 (0.1)	NR	NR	Beta coefficient	NR	NR, NS
Barticevic, 2021[30]	Adults	AUDIT (Range: 0-40)	IG1	6	Overall	294	10.4 (NR)	10.6 (NR)	-5.8 (NR)	-5.1 (NR)	MD in Chg	-0.86 (-1.69 to -0.08)	<0.05
Barticevic, 2021[30]	Adults	AUDIT-C (Range: 0-12)	IG1	6	Overall	294	6.1 (NR)	5.9 (NR)	-3 (NR)	-2.5 (NR)	MD in Chg	-0.44 (-0.88 to 0.00)	NR
Bertholet, 2015[32]	Young adults	AUDIT (Range: 0-12)	IG1	6	Overall	667	10.7 (4.3)	10.5 (4)	-1.7 (3.6)	-0.9 (3.5)	MD in Chg	-0.76 (-1.29 to -0.23)	<0.05
Burge, 1997[34]	Adults	ASI-Alcohol (Range: 0-1)	IG1	12	Overall	93	0.2 (0.2)	0.2 (0.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI-Alcohol (Range: 0-1)	IG1	18	Overall	93	0.2 (0.2)	0.2 (0.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI-Alcohol (Range: 0-1)	IG2	12	Overall	88	0.2 (0.2)	0.2 (0.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI-Alcohol (Range: 0-1)	IG2	18	Overall	88	0.2 (0.2)	0.2 (0.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI-Alcohol (Range: 0-1)	IG3	12	Overall	86	0.1 (0.2)	0.2 (0.2)	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI-Alcohol (Range: 0-1)	IG3	18	Overall	86	0.1 (0.2)	0.2 (0.2)	NR	NR	NR	NR	NR, NS
Butler, 2013[35]	Adults	AUDIT-C (Range: 0-12)	IG1	12	Overall	494	NR	NR	0.5 (NR)	0.6 (NR)	MD in Chg	-0.08 (-0.41 to 0.25)	NR, NS
Cunningham, 2010[45]	Adults	AUDIT-C (Range: 0-12)	IG1	6	Overall	185	7 (2.1)	6.4 (2.1)	-0.8 (2.2)	-0.1 (2.2)	MD in Chg	-0.70 (-1.33 to -0.07)	0.04
Cunningham, 2010[45]	Adults	AUDIT-C (Range: 0-12)	IG1	12	Overall	185	7 (2.1)	6.4 (2.1)	NR	NR	NR	NR	NR, NS
Cunningham, 2010[45]	Adults	AUDIT-C (Range: 0-12)	IG1	6	High risk drinking	72	8.9 (1.9)	8.1 (2.2)	-1.6 (2.3)	-0.2 (2.3)	MD in Chg	-1.40 (-2.46 to -0.34)	<0.05
Cunningham, 2010[45]	Adults	AUDIT-C (Range: 0-12)	IG1	12	High risk drinking	72	8.9 (1.9)	8.1 (2.2)	NR	NR	NR	NR	NR, NS
Cunningham, 2010[45]	Adults	AUDIT-C (Range: 0-12)	IG1	6	Medium risk drinking	113	8.7 (4.8)	7.2 (4)	-3.1 (4.2)	-2 (3.5)	MD in Chg	-1.10 (-2.53 to 0.33)	NR, NS
Cunningham, 2010[45]	Adults	AUDIT-C (Range: 0-12)	IG1	12	Medium risk drinking	113	8.7 (4.8)	7.2 (4)	NR	NR	NR	NR	NR, NS
Cunningham, 2012[46]	Adults	AUDIT-C (Range: 0-12)	IG1	6	Overall	1178	7.7 (1.9)	7.7 (1.9)	-0.9 (2.2)	-0.7 (2.1)	MD in Chg	-0.20 (-0.45 to 0.05)	0.043

Appendix E, Table 14. Results for the Outcome Drinking Severity Score From Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Drummond, 2009[49]	Adults	ADQ (Range: 0-60)	IG1	6	Overall	91	8.2 (6.6)	8.8 (9.1)	-1.5 (3.7)	-1.2 (5.8)	MD in Chg	0.60 (-1.40 to 2.50)	NR, NS
Heather, 1987[57]	Adults	Severity NOS (Range: NR)	IG1	6	Overall	61	420 (133.6)	420.3 (122.8)	-0.3 (142.4)	-25.9 (134.5)	MD in Chg	25.60 (-43.89 to 95.09)	NR, NS
Heather, 1987[57]	Adults	Severity NOS (Range: NR)	IG2	6	Overall	62	457.4 (99.2)	420.3 (122.8)	-9.4 (105.9)	-25.9 (134.5)	MD in Chg	16.50 (-44.02 to 77.02)	NR, NS
Johnson, 2018[60]	Adults	AUDIT (Range: 0-40)	IG1	6	Overall	693	NR	NR	NR	NR	MD in Chg	0.28 (-0.42 to 0.98)	0.44
Johnson, 2018[60]	Adults	AUDIT (Range: 0-40)	IG1	12	Overall	635	NR	NR	NR	NR	MD in Chg	0.17 (-0.52 to 0.86)	0.63
Johnson, 2018[60]	Adults	AUDIT (Range: 0-40)	IG1	6	Men	NR	NR	NR	NR	NR	MD in Chg	0.55 (-0.20 to 1.30)	0.15
Johnson, 2018[60]	Adults	AUDIT (Range: 0-40)	IG1	6	Women	NR	NR	NR	NR	NR	MD in Chg	-0.53 (-2.22 to 1.17)	0.54
Johnson, 2018[60]	Adults	AUDIT (Range: 0-40)	IG1	6	Medium risk drinking	NR	NR	NR	NR	NR	MD in Chg	-0.03 (-0.81 to 0.75)	0.94
Johnsson, 2006[61]	Young adults	AUDIT (Range: 0-40)	IG1	12	Overall	177	12.4 (3.6)	12.8 (3.8)	-1.7 (4.6)	-2.7 (4.5)	MD in Chg	-1.00 (-2.50 to 0.40)	NR, NS
Johnsson, 2006[61]	Young adults	AUDIT (Range: 0-40)	IG1	12	Men	133	13.7 (3.1)	13.9 (3.3)	-1.7 (5.2)	-3.1 (5)	MD in Chg	-1.40 (-3.20 to 0.40)	NR, NS
Johnsson, 2006[61]	Young adults	AUDIT (Range: 0-40)	IG1	12	Women	44	9 (2.6)	9.7 (3.5)	-1.8 (2.3)	-1.9 (3.5)	MD in Chg	-0.10 (-2.00 to 1.90)	NR
Johnsson, 2006[61]	Young adults	AUDIT-C (Range: 0-12)	IG1	12	Overall	177	7 (1.6)	6.9 (1.8)	-0.8 (1.7)	-0.8 (1.7)	MD in Chg	0.00 (-0.60 to 0.90)	NR, NS
Johnsson, 2006[61]	Young adults	AUDIT-C (Range: 0-12)	IG1	12	Men	133	7.6 (1.3)	7.6 (1.6)	-0.8 (1.7)	-0.9 (2.1)	MD in Chg	-0.10 (-0.70 to 0.60)	NR, NS
Johnsson, 2006[61]	Young adults	AUDIT-C (Range: 0-12)	IG1	12	Women	44	5.5 (1.2)	5.3 (1.1)	-0.8 (1)	-0.3 (1.1)	MD in Chg	0.50 (-0.30 to 1.20)	NR, NS
Kaner, 2013[62]	Adults	AUDIT (Range: 0-40)	IG1	6	Overall	407	13.1 (6.9)	12.3 (6.4)	-2.1 (7)	-0.9 (5.7)	MD in Chg	-0.38 (-1.51 to 0.75)	0.50
Kaner, 2013[62]	Adults	AUDIT (Range: 0-40)	IG1	12	Overall	398	13.1 (6.9)	12.3 (6.4)	-2.6 (6.4)	-1.6 (5.5)	MD in Chg	-0.25 (-1.19 to 0.68)	0.59
Kaner, 2013[62]	Adults	AUDIT (Range: 0-40)	IG2	6	Overall	410	12.6 (5.9)	12.3 (6.4)	-1.2 (5.1)	-0.9 (5.7)	MD in Chg	0.06 (-0.70 to 0.83)	0.87
Kaner, 2013[62]	Adults	AUDIT (Range: 0-40)	IG2	12	Overall	400	12.6 (5.9)	12.3 (6.4)	-2.1 (5.1)	-1.6 (5.5)	MD in Chg	-0.20 (-0.83 to 0.43)	0.53
Kypri, 2008[65]	Young adults	AUDIT (Range: 0-40)	IG1	12	Overall	247	14.7 (4.7)	15.1 (5.5)	NR	NR	Beta coefficient	-2.02 (-3.10 to -0.97)	<0.001

Appendix E, Table 14. Results for the Outcome Drinking Severity Score From Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Kypri, 2008[65]	Young adults	AUDIT (Range: 0-40)	IG2	12	Overall	239	14.9 (5.1)	15.1 (5.5)	NR	NR	Beta coefficient	-2.17 (-3.24 to -1.10)	<0.001
Marlatt, 1998[73]	Young adults	ADS (Range: 0-47)	IG1	12	Overall	299	7.9 (3.8)	8.2 (3.9)	-0.8 (4)	-0.2 (4.2)	MD in Chg	-0.60 (-1.53 to 0.33)	NR, NS
Marlatt, 1998[73]	Young adults	ADS (Range: 0-47)	IG1	24	Overall	299	7.9 (3.8)	8.2 (3.9)	-1.4 (3.7)	-0.4 (4.2)	MD in Chg	-1.00 (-1.90 to -0.10)	NR, NS
Moore, 2010[76]	Older adults	CARET (Range: 0-7)	IG1	12	Overall	521	2.9 (1.7)	3 (1.7)	-1.5 (1.8)	-1.4 (1.8)	MD in Chg	-0.15 (-0.46 to 0.16)	NR, NS
Neighbors, 2004[77]	Young adults	ACI (Range: 0-6)	IG1	6	Overall	252	2 (1.3)	1.9 (1.3)	-0.4 (1.3)	-0.1 (1.4)	MD in Chg	-0.36 (-0.70 to -0.02)	<0.05
Ntouva, 2019[81]	Adults	AUDIT-C (Range: 0-12)	IG1	6	Overall	229	7 (1.7)	6.7 (1.3)	-0.7 (1.4)	-0.3 (1.5)	MD in Chg	-0.38 (-0.76 to 0.00)	0.73
Osterman, 2014[86]	Pregnant	AUDIT (Range: 0-40)	IG1	1 (G)	Overall	93	4.9 (5)	5.6 (4.9)	-4.4 (4.6)	-5.2 (4.4)	MD in Chg	0.84 (-1.00 to 2.68)	NR, NS
Osterman, 2014[86]	Pregnant	AUDIT (Range: 0-40)	IG1	5 (PP)	Overall	98	4.9 (5)	5.6 (4.9)	-4.3 (4.5)	-5.2 (4.5)	MD in Chg	0.86 (-0.91 to 2.63)	NR, NS
Watson, 2013[104]	Older adults	AUDIT-C (ext) (Range: 0-12)	IG1	6	Overall	469	8.3 (2.2)	8.3 (2.3)	-1.2 (2.3)	-0.9 (2.4)	MD in Chg	-0.37 (-0.80 to 0.06)	0.16
Watson, 2013[104]	Older adults	AUDIT-C (ext) (Range: 0-12)	IG1	12	Overall	458	8.3 (2.2)	8.3 (2.3)	-1.2 (2.3)	-1.3 (2.5)	MD in Chg	0.10 (-0.34 to 0.54)	0.445
Wilson, 2014[106]	Adults	AUDIT (Range: 0-40)	IG1	6	Overall	67	12 (4.7)	12 (4.7)	-1.8 (2.9)	-1.5 (5.2)	MD in Chg	-0.30 (-2.44 to 1.84)	NR, NS

* Mean (SD)

† For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: ACI = Alcohol Consumption Index; ADS = Alcohol Dependence Scale; ADQ = Alcohol Dependence Questionnaire; ASI = Addiction Severity Index; AUDIT = Alcohol Use Disorders Identification Test; AUDIT-C = Alcohol Use Disorders Identification Test-Concise; BL = baseline; CARET = CARET = Comorbidity Alcohol Risk Evaluation Tool; CG = control group; CI = confidence interval; FUP = followup; G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; MD in Chg = mean difference in change; mo = months; N = number of participants; NOS = not otherwise specified; NR = not reported; NS = not statistically significant; OR = odds ratio; PP = outcome covers postpartum period, among studies in pregnant women; RR = risk ratio

Appendix E, Table 15. Results for the Outcome Drinks per Drinking Day from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Aalto, 2000[28]	Adults	IG1	36	Men	181	13.1 (8)	13 (8.3)	-0.6 (7.8)	0.7 (8.3)	MD in Chg	-1.30 (-3.64 to 1.04)	NR, NS
Aalto, 2000[28]	Adults	IG1	36	Women	76	9.5 (4.7)	8.2 (5)	1.7 (6.6)	-0.5 (4.7)	MD in Chg	2.20 (-0.35 to 4.75)	NR, NS
Carey, 2006[36]	Young adults	IG1	6	Overall	129	5.8 (3.3)	5.8 (2.6)	-1 (2.9)	-0.4 (2.5)	MD in Chg	-0.60 (-1.54 to 0.34)	NR, NS
Carey, 2006[36]	Young adults	IG1	12	Overall	124	5.8 (3.3)	5.8 (2.6)	-1.3 (2.9)	-1.2 (2.6)	MD in Chg	-0.10 (-1.07 to 0.87)	NR, NS
Carey, 2006[36]	Young adults	IG2	6	Overall	134	5.7 (3.4)	5.8 (2.6)	-1.4 (3)	-0.4 (2.5)	MD in Chg	-1.00 (-1.93 to -0.07)	<0.05
Carey, 2006[36]	Young adults	IG2	12	Overall	123	5.7 (3.4)	5.8 (2.6)	-1.6 (3.1)	-1.2 (2.6)	MD in Chg	-0.40 (-1.40 to 0.60)	NR
Carey, 2006[36]	Young adults	IG3	6	Overall	132	5.7 (2.5)	5.8 (2.6)	-1.1 (2.6)	-0.4 (2.5)	MD in Chg	-0.70 (-1.56 to 0.16)	NR, NS
Carey, 2006[36]	Young adults	IG3	12	Overall	127	5.7 (2.5)	5.8 (2.6)	-0.8 (2.7)	-1.2 (2.6)	MD in Chg	0.40 (-0.52 to 1.32)	NR, NS
Carey, 2006[36]	Young adults	IG4	6	Overall	128	5.5 (2.3)	5.8 (2.6)	-1.2 (2.4)	-0.4 (2.5)	MD in Chg	-0.80 (-1.64 to 0.04)	NR, NS
Carey, 2006[36]	Young adults	IG4	12	Overall	127	5.5 (2.3)	5.8 (2.6)	-1.4 (2.9)	-1.2 (2.6)	MD in Chg	-0.20 (-1.16 to 0.76)	NR
Carey, 2020[37]	Young adults	IG1	6	Overall	108	4.7 (1.8)	4.8 (2.4)	-0.5 (NR)	-0.8 (NR)	Regression parameter	NR	0.452
Chander, 2021[38]	Adults	IG1	6	Overall	294	NR	NR	FUP=5.7 (8)	FUP=6.2 (13.4)	MD in Chg	-0.40 (-2.32 to 2.59)	NR, NS
Chander, 2021[38]	Adults	IG1	12	Overall	294	NR	NR	FUP=5.1 (18)	FUP=3.9 (27.8)	MD in Chg	1.18 (-3.82 to 6.99)	NR, NS
Chander, 2021[38]	Adults	IG2	6	Overall	293	NR	NR	FUP=5.6 (4.7)	FUP=6.2 (13.4)	MD in Chg	-0.61 (-2.31 to 2.16)	NR, NS
Chander, 2021[38]	Adults	IG2	12	Overall	293	NR	NR	FUP=4.5 (5.6)	FUP=3.9 (27.8)	MD in Chg	0.67 (-4.25 to 4.83)	NR, NS
Chander, 2021[38]	Adults	IG1	6	AUD	NR	NR	NR	FUP=5.9 (NR)	FUP=6.3 (NR)	MD in Chg	-0.25 (-2.38 to 2.73)	NR, NS
Chander, 2021[38]	Adults	IG1	12	AUD	NR	NR	NR	FUP=5.1 (NR)	FUP=4 (NR)	MD in Chg	1.15 (-3.64 to 6.84)	NR, NS
Chander, 2021[38]	Adults	IG2	6	AUD	NR	NR	NR	FUP=5.8 (NR)	FUP=6.3 (NR)	MD in Chg	-0.44 (-2.23 to 2.42)	NR, NS
Chander, 2021[38]	Adults	IG2	12	AUD	NR	NR	NR	FUP=4.6 (NR)	FUP=4 (NR)	MD in Chg	0.70 (-4.02 to 4.57)	NR, NS

Appendix E, Table 15. Results for the Outcome Drinks per Drinking Day from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Chang, 1999[39]	Pregnant	IG1	5 (G)	Overall	250	0.6 (1.1)	0.9 (1.5)	-0.3 (NR)	-0.4 (NR)	NR	NR	NR, NS
Chang, 2005[40]	Pregnant	IG1	5 (G)	Overall	304	1.6 (NR)	1.6 (NR)	NR	NR	Beta coefficient	NR	NR
Chang, 2011[41]	Adults	IG1	12	Overall	491	2.1 (1.4)	2.2 (1.5)	-0.2 (1.4)	-0.3 (1.4)	MD in Chg	-0.06 (-0.30 to 0.18)	0.63
Crawford, 2014[43]	Adults	IG1	6	Overall	592	NR	NR	FUP=9.3 (5.3)	FUP=10.4 (5.8)	MD in Chg	-1.13 (-1.96 to -0.29)	0.009
Drummond, 2009[49]	Adults	IG1	6	Overall	91	15.2 (8.1)	12.9 (6.1)	-2.4 (5)	-1 (5.8)	MD in Chg	1.10 (-0.90 to 3.10)	NR, NS
Helstrom, 2014[58]	Adults	IG1	8	Overall	139	4.9 (2.7)	4.8 (3)	-0.1 (3)	0 (2.9)	MD in Chg	-0.07 (-1.05 to 0.91)	NR, NS
Helstrom, 2014[58]	Adults	IG1	12	Overall	139	4.9 (2.7)	4.8 (3)	-0.3 (2.7)	-0.7 (2.8)	MD in Chg	0.44 (-0.47 to 1.35)	NR, NS
Johnson, 2018[60]	Adults	IG1	6	Overall	693	NR	NR	NR	NR	RR (negative binom.)	1.04 (0.87 to 1.25)	0.66
Johnson, 2018[60]	Adults	IG1	12	Overall	635	NR	NR	NR	NR	RR (negative binom.)	1.00 (0.83 to 1.21)	0.99
Kypri, 2008[65]	Young adults	IG1	6	Overall	246	NR	NR	NR	NR	RR (negative binom.)	0.85 (0.73 to 0.98)	0.02
Kypri, 2008[65]	Young adults	IG1	12	Overall	247	NR	NR	NR	NR	RR (negative binom.)	0.87 (0.75 to 1.01)	0.06
Kypri, 2008[65]	Young adults	IG2	6	Overall	238	NR	NR	NR	NR	RR (negative binom.)	0.93 (0.80 to 1.08)	0.33
Kypri, 2008[65]	Young adults	IG2	12	Overall	239	NR	NR	NR	NR	RR (negative binom.)	0.95 (0.82 to 1.09)	0.47
Kypri, 2009[66]	Young adults	IG1	6	Overall	2435	8.5 (5.2)	8.5 (4.6)	NR	NR	RR (negative binom.)	0.94 (0.89 to 0.99)	0.02
Lewis, 2014[71]	Young adults	IG1	6	Overall	240	5 (3.3)	4.4 (2)	-1.3 (2.9)	-0.5 (2.1)	MD in Chg	-0.86 (-1.51 to -0.21)	<0.05
Lewis, 2014[71]	Young adults	IG2	6	Overall	240	4.5 (2.8)	4.4 (2)	-1 (2.6)	-0.5 (2.1)	MD in Chg	-0.52 (-1.12 to 0.08)	NR, NS
Maisto, 2001[72]	Adults	IG1	6	Overall	158	5.3 (3.3)	6 (3.8)	-0.9 (3.4)	-0.9 (4.5)	MD in Chg	0.00 (-1.25 to 1.25)	NR, NS
Maisto, 2001[72]	Adults	IG1	12	Overall	158	5.3 (3.3)	6 (3.8)	-1.3 (2.9)	-1.5 (3)	MD in Chg	0.18 (-0.73 to 1.09)	NR, NS
Maisto, 2001[72]	Adults	IG2	6	Overall	159	5.6 (4.2)	6 (3.8)	-1.3 (3.9)	-0.9 (4.5)	MD in Chg	-0.40 (-1.71 to 0.91)	NR, NS
Maisto, 2001[72]	Adults	IG2	12	Overall	159	5.6 (4.2)	6 (3.8)	-1.5 (3.4)	-1.5 (3)	MD in Chg	-0.07 (-1.05 to 0.91)	NR, NS

Appendix E, Table 15. Results for the Outcome Drinks per Drinking Day from Trials Among Adults, Key Question 4

Study	Population	Group	FUP, mo	Analysis	N	IG BL*	CG BL*	IG results†	CG results†	Stat	Effect (95% CI)	p
Marlatt, 1998[73]	Young adults	IG1	12	Overall	299	4.7 (2.3)	4.2 (2.7)	-0.7 (2.5)	0 (2.7)	MD in Chg	-0.70 (-1.28 to -0.12)	NR, NS
Marlatt, 1998[73]	Young adults	IG1	24	Overall	299	4.7 (2.3)	4.2 (2.7)	-1.1 (2.4)	-0.2 (2.8)	MD in Chg	-0.90 (-1.49 to -0.31)	NR, NS
Osterman, 2014[86]	Pregnant	IG1	1 (G)	Overall	93	0.2 (0.6)	0.2 (0.9)	-0.1 (0.5)	-0.2 (0.8)	MD in Chg	0.07 (-0.20 to 0.34)	NR, NS
Osterman, 2014[86]	Pregnant	IG1	5 (PP)	Overall	98	0.2 (0.6)	0.2 (0.9)	0.2 (0.7)	-0.1 (0.8)	MD in Chg	0.23 (-0.06 to 0.52)	NR, NS
Rose, 2017[89]	Adults	IG1	6	Overall	1298	2.8 (2.3)	3 (2.2)	-0.1 (2.2)	-0.1 (2.1)	MD in Chg	-0.01 (-0.24 to 0.22)	0.86
Rose, 2017[89]	Adults	IG1	6	AUD	377	3.3 (2)	3.7 (2)	-0.2 (2)	-0.1 (1.9)	MD in Chg	-0.12 (-0.51 to 0.27)	NR, NS
Rose, 2017[89]	Adults	IG1	6	No AUD	921	2.3 (1.9)	2.3 (1.9)	0 (1.9)	0 (1.9)	MD in Chg	0.08 (-0.17 to 0.33)	NR, NS
Rubio, 2014[91]	Pregnant	IG1	8 (PP)	Overall	251	0.2 (0.8)	0.5 (3.4)	0.1 (0.7)	-0.1 (3.1)	MD in Chg	0.21 (-0.34 to 0.76)	0.072
Rubio, 2014[91]	Pregnant	IG1	13 (PP)	Overall	251	0.2 (0.8)	0.5 (3.4)	0.4 (0.7)	0.2 (3.1)	MD in Chg	0.18 (-0.38 to 0.74)	0.069
Rubio, 2014[91]	Pregnant	IG1	19 (PP)	Overall	251	0.2 (0.8)	0.5 (3.4)	0.7 (1.6)	0.6 (3)	MD in Chg	0.11 (-0.48 to 0.70)	0.07
Saitz, 2003[92]	Adults	IG1	6	Faculty physicians	182	5.6 (5.3)	5.5 (4.2)	0.4 (7.7)	1 (8.3)	MD in Chg	-0.60 (-2.93 to 1.73)	NR, NS
Saitz, 2003[92]	Adults	IG1	6	Resident physicians	54	5.6 (5.3)	5.5 (4.2)	-1.8 (5.2)	6.1 (12.7)	MD in Chg	-7.90 (-12.83 to -2.97)	0.054
Schaus, 2009[93]	Young adults	IG1	6	Overall	363	4.7 (2.3)	4.9 (2.4)	-0.9 (2.9)	-0.3 (3)	MD in Chg	-0.53 (-1.14 to 0.08)	0.027
Schaus, 2009[93]	Young adults	IG1	9	Overall	363	4.7 (2.3)	4.9 (2.4)	-0.7 (3.4)	-0.9 (2.7)	MD in Chg	0.18 (-0.44 to 0.81)	0.928
Schaus, 2009[93]	Young adults	IG1	12	Overall	363	4.7 (2.3)	4.9 (2.4)	-0.7 (2.7)	-0.9 (2.8)	MD in Chg	0.14 (-0.43 to 0.70)	0.757
Senft, 1997[96]	Adults	IG1	6	Overall	428	5 (3.3)	4.7 (3.5)	-1.7 (NR)	-1.2 (NR)	NR	NR	0.13
Senft, 1997[96]	Adults	IG1	12	Overall	414	5 (3.3)	4.7 (3.5)	-1.4 (NR)	-1.4 (NR)	NR	NR	0.20
Senft, 1997[96]	Adults	IG1	6	Men	303	NR	NR	FUP=3.4 (NR)	FUP=3.9 (NR)	NR	NR	0.05
Senft, 1997[96]	Adults	IG1	12	Men	293	NR	NR	FUP=3.8 (NR)	FUP=3.6 (NR)	NR	NR	0.37
Senft, 1997[96]	Adults	IG1	6	Women	125	NR	NR	FUP=2.8 (NR)	FUP=2.7 (NR)	NR	NR	0.38
Senft, 1997[96]	Adults	IG1	12	Women	121	NR	NR	FUP=3 (NR)	FUP=2.6 (NR)	NR	NR	0.17

* Mean (SD)

† For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Appendix E, Table 15. Results for the Outcome Drinks per Drinking Day from Trials Among Adults, Key Question 4

Abbreviations: AUD = alcohol use disorder; binom = binomial; BL = baseline; CG = control group; CI = confidence interval; FUP = followup; G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; MD in Chg = mean difference in change; mo = months; N = number of participants; NOS = not otherwise specified; NR = not reported; NS = not statistically significant; PP = outcome covers postpartum period, among studies in pregnant women; RR = risk ratio

Appendix E, Table 16. Results for Other Drinking Outcomes from Trials Among Adults (Sorted By Outcome), Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Scott, 1990[95]	Adults	Abnormal dependence score	IG1	12	Men	19/80 (23.8)	27/74 (36.5)	OR	0.54 (0.27 to 1.09)	NR, NS
Scott, 1990[95]	Adults	Abnormal dependence score	IG1	12	Women	13/33 (39.4)	13/39 (33.3)	OR	1.30 (0.50 to 3.41)	NR, NS
Watkins, 2017[103]	Adults	Abstinence, opioids or heavy drinking	IG1	6	Overall	59/138 (42.8)	50/123 (40.7)	OR	1.09 (0.67 to 1.79)	0.50
Marlatt, 1998[73]	Young adults	Alcohol Dependence	IG1	24	ADS negative	7/36 (19.4)	5/34 (14.7)	OR	1.40 (0.40 to 4.92)	NR
Marlatt, 1998[73]	Young adults	Alcohol Dependence	IG1	48	ADS negative	3/30 (10.0)	4/27 (14.8)	OR	0.64 (0.13 to 3.15)	NR
Ettner, 2014[51]	Older adults	Alcohol use with comorbidities	IG1	6	Overall	104/453 (23.0)	180/620 (29.0)	OR	0.73 (0.55 to 0.96)	≤0.01
Ettner, 2014[51]	Older adults	Alcohol use with comorbidities	IG1	12	Overall	92/439 (21.0)	165/610 (27.0)	OR	0.72 (0.53 to 0.96)	0.03
Ettner, 2014[51]	Older adults	Alcohol use with medication	IG1	6	Overall	172/453 (38.0)	304/620 (49.0)	OR	0.64 (0.50 to 0.81)	≤0.01
Ettner, 2014[51]	Older adults	Alcohol use with medication	IG1	12	Overall	158/439 (36.0)	281/610 (46.1)	OR	0.66 (0.51 to 0.85)	≤0.01
Ettner, 2014[51]	Older adults	Alcohol use with symptoms	IG1	6	Overall	104/453 (23.0)	217/620 (35.0)	OR	0.55 (0.42 to 0.73)	≤0.01
Ettner, 2014[51]	Older adults	Alcohol use with symptoms	IG1	12	Overall	97/439 (22.1)	195/610 (32.0)	OR	0.60 (0.46 to 0.80)	≤0.01
Stein, 2018[97]	Young adults	Any alcohol or cannabis use	IG1	6	Overall	NR	NR	IRR (negative binom.)	0.97 (0.69 to 1.38)	0.876
Stein, 2018[97]	Young adults	Any alcohol or cannabis use	IG1	9	Overall	NR	NR	IRR (negative binom.)	0.80 (0.56 to 1.14)	0.218
Stein, 2018[97]	Young adults	Any alcohol or cannabis use	IG1	12	Overall	NR	NR	IRR (negative binom.)	0.89 (0.61 to 1.30)	0.561
Stein, 2018[97]	Young adults	Any alcohol or cannabis use	IG1	15	Overall	-1 (NR)	-1.1 (NR)	IRR (negative binom.)	0.81 (0.56 to 1.17)	0.270
Crombie, 2018[44]	Adults	AUDIT Harmful or hazardous use (8+)	IG1	12	Overall	252/347 (72.6)	244/357 (68.3)	OR	1.34 (0.95 to 1.89)	0.095
Ntouva, 2019[81]	Adults	AUDIT Harmful or hazardous use (8+)	IG1	6	Overall	40/89 (44.9)	49/82 (59.8)	OR	0.55 (0.30 to 1.01)	0.053
Hilbink, 2012[59]	Adults	AUDIT Harmful use (16-19)	IG1	24	Overall	10/217 (4.6)	10/249 (4.0)	OR	1.15 (0.47 to 2.83)	0.31

Appendix E, Table 16. Results for Other Drinking Outcomes from Trials Among Adults (Sorted By Outcome), Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Barticevic, 2021[30]	Adults	AUDIT Hazardous use (8-15)	IG1	6	Overall	30/149 (20.1)	42/145 (29.0)	OR	0.60 (0.34 to 1.05)	0.07
Hilbink, 2012[59]	Adults	AUDIT Hazardous use (8-15)	IG1	24	Overall	127/217 (58.5)	118/249 (47.4)	OR	1.57 (1.09 to 2.26)	0.02
Hilbink, 2012[59]	Adults	AUDIT Possible dependence (20-40)	IG1	24	Overall	3/217 (1.4)	4/249 (1.6)	OR	0.86 (0.19 to 3.88)	0.84
Curry, 2003[47]	Adults	Chronic drinking	IG1	12	Overall	42/151 (27.8)	44/156 (28.2)	OR	0.98 (0.60 to 1.61)	0.27
Helstrom, 2014[58]	Adults	Daily alcohol use	IG1	8	Overall	-0.8 (2.6)	-0.8 (2.9)	MD in Chg	0.02 (-0.90 to 0.94)	NR, NS
Helstrom, 2014[58]	Adults	Daily alcohol use	IG1	12	Overall	-0.6 (2.4)	-1 (2.6)	MD in Chg	0.37 (-0.45 to 1.19)	NR, NS
Marlatt, 1998[73]	Young adults	Drinking days/week factor score	IG1	12	Overall	-0.2 (0.9)	.1 (0.9)	MD in Chg	0.20 (-0.44 to -0.04)	<0.05
Marlatt, 1998[73]	Young adults	Drinking days/week factor score	IG1	24	Overall	-0.3 (0.9)	-0.1 (0.9)	MD in Chg	0.09 (-0.34 to 0.06)	<0.05
Marlatt, 1998[73]	Young adults	Drinking days/week factor score	IG1	36	Overall	0 (0.9)	0.1 (1)	MD in Chg	NR	NR, NS
Marlatt, 1998[73]	Young adults	Drinking days/week factor score	IG1	48	Overall	-0.1 (1)	0 (0.9)	MD in Chg	0.06 (-0.33 to 0.11)	NR, NS
Watson, 2013[104]	Older adults	Drinks per day item	IG1	6	Overall	-0.9 (2.1)	-0.6 (2.1)	MD in Chg	-0.33 (-0.71 to 0.05)	0.09
Watson, 2013[104]	Older adults	Drinks per day item	IG1	12	Overall	-0.8 (2.2)	-0.9 (2.1)	MD in Chg	0.10 (-0.29 to 0.49)	NR, NS
Marlatt, 1998[73]	Young adults	Drinks/drinking day factor score	IG1	12	Overall	-0.3 (0.9)	0 (0.9)	MD in Chg	0.15 (-0.54 to -0.14)	NR
Marlatt, 1998[73]	Young adults	Drinks/drinking day factor score	IG1	24	Overall	-0.5 (0.9)	-0.1 (0.9)	MD in Chg	0.12 (-0.51 to -0.11)	NR
Marlatt, 1998[73]	Young adults	Drinks/drinking day factor score	IG1	36	Overall	-0.4 (0.9)	-0.2 (0.9)	MD in Chg	NR	NR
Marlatt, 1998[73]	Young adults	Drinks/drinking day factor score	IG1	48	Overall	-0.6 (0.9)	-0.4 (0.8)	MD in Chg	NR	<0.001
Turrisi, 2009[98]	Young adults	Drinks/weekend	IG1	10	Overall	2.3 (4.7)	3.1 (4.9)	MD in Chg	-0.83 (-1.61 to -0.05)	<0.05
Turrisi, 2009[98]	Young adults	Drinks/weekend	IG2	10	Overall	2.7 (4.8)	3.1 (4.9)	MD in Chg	-0.45 (-1.27 to 0.38)	NR, NS
Turrisi, 2009[98]	Young adults	Drinks/weekend	IG3	10	Overall	3.6 (116.5)	3.1 (4.9)	MD in Chg	0.43 (-12.66 to 13.52)	0.05

Appendix E, Table 16. Results for Other Drinking Outcomes from Trials Among Adults (Sorted By Outcome), Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Schaus, 2009[93]	Young adults	Drunk times/week	IG1	6	Overall	-0.4 (1.1)	0 (1.2)	MD in Chg	-0.42 (-0.65 to -0.19)	0.003
Schaus, 2009[93]	Young adults	Drunk times/week	IG1	9	Overall	-0.2 (1.3)	.2 (1.4)	MD in Chg	-0.42 (-0.70 to -0.15)	0.078
Schaus, 2009[93]	Young adults	Drunk times/week	IG1	12	Overall	0.2 (1.8)	0.6 (1.8)	MD in Chg	-0.42 (-0.79 to -0.05)	0.727
Larimer, 2007[69]	Young adults	Frequency item	IG1	12	Overall	0.2 (1.3)	0.3 (1.3)	MD in Chg	-0.11 (-0.24 to 0.02)	<0.01
Lewis, 2014[71]	Young adults	Frequency item	IG1	6	Overall	-0.8 (1.4)	-0.6 (1.5)	MD in Chg	-0.18 (-0.54 to 0.18)	NR, NS
Lewis, 2014[71]	Young adults	Frequency item	IG2	6	Overall	-0.8 (1.5)	-0.6 (1.5)	MD in Chg	-0.20 (-0.57 to 0.17)	NR, NS
Ettner, 2014[51]	Older adults	Others concerned about drinking	IG1	6	Overall	113/453 (24.9)	143/620 (23.1)	OR	1.11 (0.84 to 1.47)	0.39
Ettner, 2014[51]	Older adults	Others concerned about drinking	IG1	12	Overall	101/439 (23.0)	128/610 (21.0)	OR	1.13 (0.84 to 1.51)	0.45
Martens, 2010[74]	Young adults	Peak BAC	IG1	6	Overall	0 (NR)	0 (NR)	NR	NR	0.02
Martens, 2010[74]	Young adults	Peak BAC	IG2	6	Overall	0 (NR)	0 (NR)	NR	NR	NR, NS
Schaus, 2009[93]	Young adults	Peak drinks/day	IG1	6	Overall	-1.6 (4.9)	-0.7 (4.9)	MD in Chg	-0.93 (-1.94 to 0.08)	0.005
Schaus, 2009[93]	Young adults	Peak drinks/day	IG1	9	Overall	-1.4 (5.1)	-1.8 (4.4)	MD in Chg	0.32 (-0.66 to 1.30)	0.626
Schaus, 2009[93]	Young adults	Peak drinks/day	IG1	12	Overall	-1.4 (4.9)	-1.8 (4.5)	MD in Chg	0.32 (-0.65 to 1.29)	0.700
Carey, 2020[37]	Young adults	Peak number of drinks per day	IG1	6	Overall	-0.9 (NR)	-0.9 (NR)	Regression parameter	NR	0.960
Cunningham, 2012[46]	Adults	Peak number of drinks per day	IG1	6	Overall	-1.1 (5.4)	-0.7 (5.2)	MD in Chg	-0.40 (-1.00 to 0.20)	NR, NS
LaBrie, 2009[67]	Young adults	Peak number of drinks per day	IG1	6	Overall	-1.7 (3.9)	-0.5 (3.5)	MD in Chg	-1.21 (-2.14 to -0.28)	<0.05
LaBrie, 2013[68]	Young adults	Peak number of drinks per day	IG1	6	Overall	-1.8 (4)	-1.4 (4.2)	MD in Chg	-0.40 (-1.35 to 0.55)	NR, NS
LaBrie, 2013[68]	Young adults	Peak number of drinks per day	IG1	12	Overall	-1.6 (4)	-1.7 (3.9)	MD in Chg	0.10 (-0.81 to 1.01)	NR, NS
LaBrie, 2013[68]	Young adults	Peak number of drinks per day	IG2	6	Overall	-1.3 (4.1)	-1.4 (4.2)	MD in Chg	0.10 (-0.86 to 1.06)	NR, NS

Appendix E, Table 16. Results for Other Drinking Outcomes from Trials Among Adults (Sorted By Outcome), Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
LaBrie, 2013[68]	Young adults	Peak number of drinks per day	IG2	12	Overall	-1.9 (4.2)	-1.7 (3.9)	MD in Chg	-0.20 (-1.14 to 0.74)	NR, NS
Leeman, 2016[70]	Young adults	Peak number of drinks per day	IG1	6	Overall	-1.2 (4.4)	.7 (4.8)	MD in Chg	-1.87 (-3.76 to 0.02)	<0.05
Leeman, 2016[70]	Young adults	Peak number of drinks per day	IG2	6	Overall	-0.4 (5.4)	.7 (4.8)	MD in Chg	-1.07 (-3.23 to 1.09)	NR, NS
Leeman, 2016[70]	Young adults	Peak number of drinks per day	IG3	6	Overall	-1.2 (3.6)	.7 (4.8)	MD in Chg	-1.85 (-3.59 to -0.11)	<0.05
Karnik, 2023[63]	Young adults	Peak quantity (PEAK)	IG1	6	Overall	-1.8 (4.6)	-1.2 (4.1)	MD in Chg	-0.58 (-1.51 to 0.35)	0.43
Karnik, 2023[63]	Young adults	Peak quantity (PEAK)	IG1	12	Overall	-1.8 (4.7)	-1.1 (4)	MD in Chg	-0.75 (-1.69 to 0.19)	0.99
Neighbors, 2004[77]	Young adults	Peak quantity (PEAK)	IG1	6	Overall	-1.4 (4.9)	-0.3 (5)	MD in Chg	-1.19 (-2.41 to 0.03)	NR, NS
Chang, 2005[40]	Pregnant	Percent of days used alcohol	IG1	5 (G)	Overall	NR	NR	Beta coefficient	NR	NR
Chang, 2011[41]	Adults	Percent of days used alcohol	IG1	12	Overall	-4.3 (0.2)	-1.3 (1.7)	MD in Chg	3.00 (-0.10 to 6.00)	0.07
Drummond, 2009[49]	Adults	Percent of days with no alcohol use	IG1	6	Overall	4 (18.1)	6.2 (20.9)	MD in Chg	-0.70 (-1.80 to 3.20)	NR, NS
Williams, 2019[105]	Adults	Percent of days with no alcohol use	IG1	12	Overall	10 (32.6)	21 (36.8)	MD in Chg	-11.00 (-23.26 to 1.26)	0.024
Marlatt, 1998[73]	Young adults	Resolved Dependence	IG1	24	ADS positive	25/117 (21.4)	22/126 (17.5)	OR	1.28 (0.68 to 2.43)	NR
Marlatt, 1998[73]	Young adults	Resolved Dependence	IG1	48	ADS positive	49/115 (42.6)	38/116 (32.8)	OR	1.52 (0.89 to 2.60)	NR
Chang, 2011[41]	Adults	Weeks exceeded sensible drinking limits	IG1	12	Overall	-0.7 (5.8)	-0.7 (0.6)	MD in Chg	0.27 (-1.20 to 0.65)	0.57

* For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: ADS = Alcohol Dependence Scale; AUD = alcohol use disorder; AUDIT = Alcohol Use Disorders Identification Test; BAC = blood alcohol content; binom = binomial; BL = baseline; CG = control group; CI = confidence interval; FUP = followup; G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; IRR = incidence rate ratio; MD in Chg = mean difference in change; mo = months; n = number of participants; N = number in group; NOS = not otherwise specified; NR = not reported; NS = not statistically significant; OR = odds ratio

Appendix E, Table 17. Results for Other Behavioral Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	IG results*	CG results*	Stat	Effect (95% CI)	p
Curry, 2003[47]	Adults	Drinking and driving (driving after >2 drinks in the past month)	IG1	12	30/151 (19.9)	55/156 (35.3)	OR	0.46 (0.27 to 0.76)	0.009
Ettner, 2014[51]	Older adults	Driving within two hours of drinking ≥3 drinks	IG1	6	63/453 (13.9)	105/620 (16.9)	OR	0.79 (0.56 to 1.11)	0.27
Ettner, 2014[51]	Older adults	Driving within two hours of drinking ≥3 drinks	IG1	12	48/439 (10.9)	98/610 (16.1)	OR	0.64 (0.44 to 0.93)	0.06
Schaus, 2009[93]	Young adults	Number of times drove after ≥3 drinks	IG1	6	-3.8 (8.9)	-6.6 (15.8)	MD in Chg	2.81 (0.16 to 5.46)	0.549
Schaus, 2009[93]	Young adults	Number of times drove after ≥3 drinks	IG1	9	-3.7 (9)	-6.4 (15.9)	MD in Chg	2.78 (0.12 to 5.44)	0.998
Schaus, 2009[93]	Young adults	Number of times drove after ≥3 drinks	IG1	12	-2.5 (8.7)	-4.2 (15.3)	MD in Chg	1.79 (-0.77 to 4.35)	0.542
Schaus, 2009[93]	Young adults	Number of times taken foolish risks	IG1	6	-3.9 (8.8)	-4.9 (10.6)	MD in Chg	0.97 (-1.03 to 2.97)	0.685
Schaus, 2009[93]	Young adults	Number of times taken foolish risks	IG1	9	-4 (8.8)	-4.3 (13.7)	MD in Chg	0.31 (-2.06 to 2.68)	0.485
Schaus, 2009[93]	Young adults	Number of times taken foolish risks	IG1	12	-2.3 (10.3)	-1.8 (15.2)	MD in Chg	-0.51 (-3.18 to 2.16)	0.261
Chander, 2021[38]	Adults	Days of condomless sex	IG1	6	-0.1 (4.8)	-0.1 (5.2)	MD in Chg	-0.63 (-1.81 to 0.56)	NR, NS
Chander, 2021[38]	Adults	Days of condomless sex	IG1	12	-0.7 (4.3)	-1.1 (4.7)	MD in Chg	-0.28 (-1.28 to 0.71)	NR, NS
Chander, 2021[38]	Adults	days of condomless sex	IG2	6	-1 (4.5)	-0.1 (5.2)	MD in Chg	-1.28 (-2.42 to -0.14)	<0.05
Chander, 2021[38]	Adults	days of condomless sex	IG2	12	-0.5 (4.8)	-1.1 (4.7)	MD in Chg	0.15 (-0.92 to 1.21)	NR, NS
Ondersma, 2015[84]	Pregnant	Seeking any services of any kind for alcohol use, including 12-step groups	IG1	6 (G)	1/20 (5.0)	0/19 (0.0)	OR	3.00 (0.11 to 78.27)	NR
Chander, 2021[38]	Adults	Days of condomless sex under the influence of alcohol or drugs	IG1	6	-1.3 (3.9)	-1.1 (4.4)	MD in Chg	-0.05 (-0.91 to 0.81)	NR, NS
Chander, 2021[38]	Adults	Days of condomless sex under the influence of alcohol or drugs	IG1	12	-1.7 (3.6)	-1.3 (4.3)	MD in Chg	-0.25 (-1.03 to 0.53)	NR, NS
Chander, 2021[38]	Adults	Days of condomless sex under the influence of alcohol or drugs	IG2	6	-1 (3.8)	-1.1 (4.4)	MD in Chg	-0.26 (-1.17 to 0.66)	NR, NS
Chander, 2021[38]	Adults	Days of condomless sex under the influence of alcohol or drugs	IG2	12	-1.1 (3.5)	-1.3 (4.3)	MD in Chg	-0.18 (-1.00 to 0.65)	NR, NS

Appendix E, Table 17. Results for Other Behavioral Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	IG results*	CG results*	Stat	Effect (95% CI)	p
Karnik, 2023[63]	Young adults	Number of times of condomless insertive anal sex while under influence of alcohol or drugs	IG1	6	NR	NR	IRR (negative binom.)	0.41 (0.12 to 1.38)	0.15
Karnik, 2023[63]	Young adults	Number of times of condomless insertive anal sex while under influence of alcohol or drugs	IG1	12	NR	NR	IRR (negative binom.)	0.15 (0.05 to 0.44)	0.001
Crawford, 2014[43]	Adults	Number of participants reporting unprotected sex after drinking	IG1	6	108/291 (37.1)	136/301 (45.2)	OR	0.79 (0.33 to 1.75)	0.174
Karnik, 2023[63]	Young adults	Number of times of condomless receptive anal sex while under the influence of alcohol or drugs	IG1	6	NR	NR	IRR (negative binom.)	0.74 (0.32 to 1.71)	0.48
Karnik, 2023[63]	Young adults	Number of times of condomless receptive anal sex while under the influence of alcohol or drugs	IG1	12	NR	NR	IRR (negative binom.)	1.10 (0.42 to 2.91)	0.84
Crawford, 2014[43]	Adults	Number of participants reporting unprotected sex after feeling drunk	IG1	6	57/291 (19.6)	56/301 (18.6)	OR	1.15 (0.17 to 2.14)	0.504

* For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: binom = binomial; CG = control group; CI = confidence interval; FUP = followup; G = outcome covers gestational/prenatal period, among studies in pregnant women; IG = intervention group; IRR = incidence rate ratio; MD in Chg = mean difference in change; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio

Appendix E, Table 18. Results for Other Substance Use Outcomes from Trials Among Adults, Key Question 4

Appendix E, Table 18. Results for Other Substance Use Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results	CG results	Stat	Effect (95% CI)	p
Alegria, 2019[29]	Adults	ASI Lite-Drug	IG1	6	Overall	NR	NR	Beta coefficient	NR	NR, NS

Abbreviations: ASI = Addiction Severity Index; CG = control group; CI = confidence interval; FUP = followup; IG = intervention group; NR = not reported; NS = not statistically significant

Appendix E, Table 19. Results for the Outcome General Alcohol-Related Problems or Consequences From Trials Among Adults

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Bertholet, 2015[32]	Young adults	Consequences NOS (Range: 0-12)	IG1	6	Overall	-0.7 (1.7)	-0.6 (1.7)	MD in Chg	-0.10 (-0.36 to 0.16)	NR, NS
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG1	6	Overall	-0.8 (5.8)	-0.1 (7.1)	MD in Chg	-0.70 (-2.95 to 1.55)	NR, NS
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG1	12	Overall	-1.8 (5.9)	-3 (5.4)	MD in Chg	1.20 (-0.81 to 3.21)	NR, NS
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG2	6	Overall	-0.3 (6.6)	-0.1 (7.1)	MD in Chg	-0.20 (-2.53 to 2.13)	NR, NS
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG2	12	Overall	-1.9 (5.6)	-3 (5.4)	MD in Chg	1.10 (-0.86 to 3.06)	NR
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG3	6	Overall	-1.9 (5.7)	-0.1 (7.1)	MD in Chg	-1.80 (-4.00 to 0.40)	NR, NS
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG3	12	Overall	-1.5 (6)	-3 (5.4)	MD in Chg	1.50 (-0.50 to 3.50)	NR, NS
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG4	6	Overall	-2.7 (6.8)	-0.1 (7.1)	MD in Chg	-2.60 (-5.02 to -0.18)	<0.05
Carey, 2006[36]	Young adults	RAPI (Range: 0-23)	IG4	12	Overall	-3.7 (6.8)	-3 (5.4)	MD in Chg	-0.70 (-2.85 to 1.45)	NR
Carey, 2020[37]	Young adults	BYAACQ (Range: 0-24)	IG1	6	Overall	-0.6 (NR)	-0.6 (NR)	Regression parameter	NR	0.948
Collins, 2014[42]	Young adults	RAPI (Range: 0-23)	IG1	6	Overall	-0.2 (7.7)	-0.6 (5.9)	MD in Chg	0.41 (-0.94 to 1.76)	0.48
Collins, 2014[42]	Young adults	RAPI (Range: 0-23)	IG1	12	Overall	-0.7 (6.9)	-0.8 (5.8)	MD in Chg	0.08 (-1.24 to 1.40)	NR, NS
Collins, 2014[42]	Young adults	RAPI (Range: 0-23)	IG2	6	Overall	-1.8 (6.9)	-0.6 (5.9)	MD in Chg	-1.24 (-2.50 to 0.02)	0.01
Collins, 2014[42]	Young adults	RAPI (Range: 0-23)	IG2	12	Overall	-2.1 (6.6)	-0.8 (5.8)	MD in Chg	-1.30 (-2.60 to 0.00)	<0.05
Drummond, 2009[49]	Adults	APQ (Range: 0-23)	IG1	6	Overall	-1.5 (1.9)	-1.1 (2.9)	MD in Chg	0.30 (-0.60 to 1.80)	NR, NS
Fleming, 2010[55]	Young adults	RAPI (Range: 0-69)	IG1	6	Overall	-5.5 (9.7)	-4.9 (10.1)	MD in Chg	-0.60 (-1.84 to 0.64)	NR, NS
Fleming, 2010[55]	Young adults	RAPI (Range: 0-69)	IG1	12	Overall	-7.4 (9.3)	-6.8 (9.9)	MD in Chg	-0.60 (-1.80 to 0.60)	0.033
Helstrom, 2014[58]	Adults	SIP (Range: NR)	IG1	8	Overall	-1.5 (5.6)	-2.4 (4.8)	MD in Chg	0.83 (-0.90 to 2.56)	NR, NS
Helstrom, 2014[58]	Adults	SIP (Range: NR)	IG1	12	Overall	-1.9 (5.3)	-1.9 (5.9)	MD in Chg	-0.01 (-1.88 to 1.86)	NR, NS

Appendix E, Table 19. Results for the Outcome General Alcohol-Related Problems or Consequences From Trials Among Adults

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Kypri, 2004[64]	Young adults	APS (Range: 0-14)	IG1	6	Overall	NR	NR	RR (negative binom.)	0.76 (0.60 to 0.97)	0.03
Kypri, 2008[65]	Young adults	APS (Range: 0-14)	IG1	6	Overall	NR	NR	RR (negative binom.)	0.87 (0.71 to 1.07)	0.20
Kypri, 2008[65]	Young adults	APS (Range: 0-14)	IG1	12	Overall	NR	NR	RR (negative binom.)	0.81 (0.66 to 1.00)	0.05
Kypri, 2008[65]	Young adults	APS (Range: 0-14)	IG2	6	Overall	NR	NR	RR (negative binom.)	0.86 (0.70 to 1.06)	0.17
Kypri, 2008[65]	Young adults	APS (Range: 0-14)	IG2	12	Overall	NR	NR	RR (negative binom.)	0.82 (0.67 to 1.01)	0.07
Kypri, 2009[66]	Young adults	APS (Range: 0-15)	IG1	6	Overall	NR	NR	RR (negative binom.)	-0.01 (-0.07 to 0.05)	0.59
LaBrie, 2013[68]	Young adults	RAPI (Range: 0-100)	IG1	6	Overall	0.4 (7.6)	-0.5 (4.7)	MD in Chg	0.90 (-0.57 to 2.37)	NR, NS
LaBrie, 2013[68]	Young adults	RAPI (Range: 0-100)	IG1	12	Overall	-0.7 (6.9)	-0.7 (4.4)	MD in Chg	0.00 (-1.34 to 1.34)	NR, NS
LaBrie, 2013[68]	Young adults	RAPI (Range: 0-100)	IG2	6	Overall	-0.8 (3.8)	-0.5 (4.7)	MD in Chg	-0.30 (-1.29 to 0.69)	NR, NS
LaBrie, 2013[68]	Young adults	RAPI (Range: 0-100)	IG2	12	Overall	-1.1 (4.1)	-0.7 (4.4)	MD in Chg	-0.40 (-1.40 to 0.60)	NR, NS
Larimer, 2007[69]	Young adults	RAPI (Range: 0-25)	IG1	12	Overall	0.1 (4)	0.4 (4)	MD in Chg	-0.33 (-0.73 to 0.07)	NR, NS
Leeman, 2016[70]	Young adults	RAPI (Range: 0-23)	IG1	6	Overall	-1.1 (4.3)	-0.3 (4.1)	MD in Chg	-0.80 (-2.54 to 0.94)	NR, NS
Leeman, 2016[70]	Young adults	RAPI (Range: 0-23)	IG2	6	Overall	-0.4 (4.7)	-0.3 (4.1)	MD in Chg	-0.15 (-2.00 to 1.70)	NR, NS
Leeman, 2016[70]	Young adults	RAPI (Range: 0-23)	IG3	6	Overall	0.4 (4.6)	-0.3 (4.1)	MD in Chg	0.63 (-1.18 to 2.44)	NR, NS
Lewis, 2014[71]	Young adults	BYAACQ (Range: 0-24)	IG1	6	Overall	-1.5 (5.1)	-1.7 (5.4)	MD in Chg	0.22 (-1.11 to 1.55)	NR, NS
Lewis, 2014[71]	Young adults	BYAACQ (Range: 0-24)	IG2	6	Overall	-2.4 (5.6)	-1.7 (5.4)	MD in Chg	-0.72 (-2.12 to 0.68)	NR, NS
Marlatt, 1998[73]	Young adults	RAPI (Range: 0-23)	IG1	12	Overall	-3.5 (5.3)	-2.1 (5.4)	MD in Chg	-1.40 (-2.62 to -0.18)	<0.05
Marlatt, 1998[73]	Young adults	RAPI (Range: 0-23)	IG1	24	Overall	-4.2 (5.2)	-2.9 (5.4)	MD in Chg	-1.30 (-2.50 to -0.10)	<0.05
Marlatt, 1998[73]	Young adults	RAPI + ADS (Range: 0-70)	IG1	36	Overall	FUP=0.5 (1.1)	FUP=0.8 (1.3)	MD in Chg	NR	<0.05

Appendix E, Table 19. Results for the Outcome General Alcohol-Related Problems or Consequences From Trials Among Adults

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Marlatt, 1998[73]	Young adults	RAPI + ADS (Range: 0-70)	IG1	48	Overall	FUP=0.4 (1.1)	FUP=0.7 (1.3)	MD in Chg	NR	<0.01
Marlatt, 1998[73]	Young adults	Resolved alcohol-related problems (Range:)	IG1	24	RAPI positive	52/108 (48.1)	46/122 (37.7)	OR	1.53 (0.91 to 2.60)	NR
Marlatt, 1998[73]	Young adults	Alcohol-related problems (Range:)	IG1	24	RAPI negative	3/45 (6.7)	8/38 (21.1)	OR	0.27 (0.07 to 1.09)	NR
Martens, 2010[74]	Young adults	BYAACQ (Range: 0-24)	IG1	6	Heavy Drinkers	NR	NR	F value	0.38 (2.00 to 48.00)	0.16
Martens, 2010[74]	Young adults	BYAACQ (Range: 0-24)	IG1	6	Overall	NR	NR	F value	0.29 (2.00 to 198.00)	0.63
Neighbors, 2004[77]	Young adults	RAPI (Range: 0-23)	IG1	6	Overall	-1.5 (6.8)	-0.8 (7.6)	MD in Chg	-0.64 (-2.42 to 1.14)	NR, NS
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG1	6	Overall	0.9 (NR)	-1.7 (NR)	Beta coefficient	NR	0.19
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG1	12	Overall	-1.4 (NR)	-2.5 (NR)	Beta coefficient	NR	0.19
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG1	18	Overall	0.1 (NR)	-2.1 (NR)	Beta coefficient	NR	0.19
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG1	24	Overall	-1.3 (NR)	-2 (NR)	Beta coefficient	NR	0.19
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG2	6	Overall	-0.6 (NR)	-1.7 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG2	12	Overall	-0.4 (NR)	-2.5 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG2	18	Overall	-1.1 (NR)	-2.1 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG2	24	Overall	-1.6 (NR)	-2 (NR)	Beta coefficient	NR	0.38
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG3	6	Overall	-0.4 (NR)	-1.7 (NR)	Beta coefficient	NR	0.11
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG3	12	Overall	0 (NR)	-2.5 (NR)	Beta coefficient	NR	0.11
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG3	18	Overall	-0.9 (NR)	-2.1 (NR)	Beta coefficient	NR	0.11
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG3	24	Overall	-1.7 (NR)	-2 (NR)	Beta coefficient	NR	0.11
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG4	6	Overall	-0.1 (NR)	-1.7 (NR)	Beta coefficient	NR	0.79

Appendix E, Table 19. Results for the Outcome General Alcohol-Related Problems or Consequences From Trials Among Adults

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG4	12	Overall	0.5 (NR)	-2.5 (NR)	Beta coefficient	NR	0.79
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG4	18	Overall	1.4 (NR)	-2.1 (NR)	Beta coefficient	NR	0.79
Neighbors, 2010[78]	Young adults	RAPI (Range: 0-23)	IG4	24	Overall	0.7 (NR)	-2 (NR)	Beta coefficient	NR	0.79
Neighbors, 2016[79]	Young adults	YAAPST (Range: 0-37)	IG1	6	Overall	-0.7 (3.6)	-1 (3.1)	MD in Chg	0.28 (-0.42 to 0.98)	NR, NS
Neighbors, 2016[79]	Young adults	YAAPST (Range:)	IG2	6	Overall	-1.4 (3.1)	-1 (3.1)	MD in Chg	-0.39 (-1.04 to 0.26)	NR, NS
Neighbors, 2019[80]	Young adults	RAPI (Range: 0-100)	IG1	6	Overall	-2.8 (3.4)	-1.1 (4.7)	MD in Chg	-1.70 (-2.81 to -0.59)	<0.05
Neighbors, 2019[80]	Young adults	RAPI (Range: 0-100)	IG2	6	Overall	-2.2 (4.8)	-1.1 (4.7)	MD in Chg	-1.10 (-2.38 to 0.18)	NR, NS
Neighbors, 2019[80]	Young adults	RAPI (Range: 0-100)	IG3	6	Overall	-1.9 (4.1)	-1.1 (4.7)	MD in Chg	-0.80 (-1.98 to 0.38)	NR, NS
Neighbors, 2019[80]	Young adults	RAPI (Range: 0-100)	IG4	6	Overall	-1.7 (5.9)	-1.1 (4.7)	MD in Chg	-0.60 (-2.03 to 0.83)	NR, NS
Schaus, 2009[93]	Young adults	RAPI (Range: 0-23)	IG1	6	Overall	-9.1 (11.4)	-9.6 (11.6)	MD in Chg	0.41 (-1.96 to 2.78)	0.028
Schaus, 2009[93]	Young adults	RAPI (Range: 0-23)	IG1	9	Overall	-9.5 (11.4)	-9.9 (11.7)	MD in Chg	0.41 (-1.97 to 2.79)	0.041
Schaus, 2009[93]	Young adults	RAPI (Range: 0-23)	IG1	12	Overall	-8.3 (11.4)	-8.7 (11.6)	MD in Chg	0.44 (-1.92 to 2.80)	0.556
Turrisi, 2009[98]	Young adults	RAPI (Range: 0-23)	IG1	10	Overall	.6 (3.1)	1 (3.2)	MD in Chg	-0.46 (-0.96 to 0.05)	<0.05
Turrisi, 2009[98]	Young adults	RAPI (Range: 0-23)	IG2	10	Overall	1 (3.1)	1 (3.2)	MD in Chg	-0.04 (-0.58 to 0.49)	NR, NS
Turrisi, 2009[98]	Young adults	RAPI (Range: 0-23)	IG3	10	Overall	1.5 (3.1)	1 (3.2)	MD in Chg	0.46 (-0.06 to 0.97)	<0.05
Watkins, 2017[103]	Adults	SIP (Range: 0-15)	IG1	6	Overall	-2.1 (5.5)	-3.4 (5.2)	MD in Chg	1.30 (0.00 to 2.60)	0.08
Watson, 2013[104]	Older adults	DPI (Range: 0-17)	IG1	6	Overall	-0.9 (2.8)	-0.7 (3.3)	MD in Chg	-0.18 (-0.73 to 0.37)	0.25
Watson, 2013[104]	Older adults	DPI (Range: 0-17)	IG1	12	Overall	-0.7 (3)	-0.8 (3.2)	MD in Chg	0.09 (-0.47 to 0.65)	0.74
Williams, 2019[105]	Adults	SIP (Range: 1-45)	IG1	12	Overall	NR	NR	NR	NR	0.84

Appendix E, Table 19. Results for the Outcome General Alcohol-Related Problems or Consequences From Trials Among Adults

* For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: ADS = Alcohol Dependence Scale; APQ = Alcohol Problems Questionnaire; APS = Alcohol Problems Scale; BYAACQ = Brief Young Adult Alcohol Consequences Questionnaire; CG = control group; CI = confidence interval; DPI = Drinking Problems Index; FUP = followup; IG = intervention group; KQ = key question; MD in Chg = mean difference in change; mos = months; n = number of participants; N = number in group; NOS = not otherwise specified; NR = not reported; NS = not statistically significant; RAPI = Rutgers Alcohol Problems Index; RR = risk ratio; SIP = Short Inventory of Problems; YAAPST = Young Adult Alcohol Problems Screening Test

Appendix E, Table 20. Results for the Outcome Alcohol-Related Problems or Consequences in Specific Areas from Trials Among Adults, Key Question 4

Appendix E, Table 20. Results for the Outcome Alcohol-Related Problems or Consequences in Specific Areas from Trials Among Adults, Key Question 4.

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	Stat	Effect (95% CI)	p
Burge, 1997[34]	Adults	ASI - Family (Range: 0-1)	IG1	12	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Employment (Range: 0-1)	IG1	12	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Employment (Range: 0-1)	IG1	18	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Family (Range: 0-1)	IG1	18	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Employment (Range: 0-1)	IG2	12	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Family (Range: 0-1)	IG2	12	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Employment (Range: 0-1)	IG2	18	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Family (Range: 0-1)	IG2	18	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Family (Range: 0-1)	IG3	12	Overall	NR	NR	NR	NR	0.003
Burge, 1997[34]	Adults	ASI - Employment (Range: 0-1)	IG3	12	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Employment (Range: 0-1)	IG3	18	Overall	NR	NR	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Family (Range: 0-1)	IG3	18	Overall	NR	NR	NR	NR	0.003
Kypri, 2004[64]	Young adults	AREAS (Range: 0-35)	IG1	6	Overall	NR	NR	RR (negative binom.)	0.72 (0.51 to 1.02)	0.06
Kypri, 2008[65]	Young adults	AREAS (Range: 0-35)	IG1	6	Overall	NR	NR	RR (negative binom.)	0.78 (0.65 to 0.93)	0.005
Kypri, 2008[65]	Young adults	AREAS (Range: 0-35)	IG1	12	Overall	NR	NR	RR (negative binom.)	0.75 (0.62 to 0.90)	0.002
Kypri, 2008[65]	Young adults	AREAS (Range: 0-35)	IG2	6	Overall	NR	NR	RR (negative binom.)	0.76 (0.64 to 0.91)	0.003
Kypri, 2008[65]	Young adults	AREAS (Range: 0-35)	IG2	12	Overall	NR	NR	RR (negative binom.)	0.80 (0.66 to 0.97)	0.02
Kypri, 2009[66]	Young adults	ASI - Academic (Range: 0-15)	IG1	6	Overall	NR	NR	RR (negative binom.)	0.93 (0.82 to 1.06)	0.87

Appendix E, Table 20. Results for the Outcome Alcohol-Related Problems or Consequences in Specific Areas from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	Stat	Effect (95% CI)	p
Scott, 1990[95]	Adults	Abnormal social score (Range: NA)	IG1	12	Men	12/80 (15.0)	14/74 (18.9)	OR	0.76 (0.32 to 1.76)	NR, NS
Scott, 1990[95]	Adults	Abnormal social score (Range: NA)	IG1	12	Women	5/33 (15.2)	3/39 (7.7)	OR	2.14 (0.47 to 9.74)	NR, NS

Abbreviations: ASI = Addiction Severity Index; AREAS = Academic Role Expectations and Alcohol Scale; binom = binomial; CG = control group; IG = intervention group; NA = not applicable; NR = not reported; NS = not statistically significant; OR = odds ratio; RR = risk ratio

Appendix E, Table 21. Results for the Emergency or Inpatient Healthcare Utilization Outcomes from Trials Among Adults, Key Question 4

Appendix E, Table 21. Results for the Emergency or Inpatient Healthcare Utilization Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	Stat	Effect (95% CI)	p
Ettner, 2014[51]	Older adults	ED visits	IG1	12	Overall	70/439 (15.9)	153/610 (25.1)	OR	0.57 (0.41 to 0.78)	≤0.01
Fleming, 1997[52]	Adults	ED visits	IG1	48	Overall	302 events/392 persons	376 events/382 persons	IRR	0.78 (0.67 to 0.91)	NR, NS
Fleming, 1997[52]	Adults	ED visits	IG1	48	Young adults (18-30 yrs)	103 events/114 persons	177 events/112 persons	IRR	0.57 (0.45 to 0.73)	<0.01
Johnson, 2018[60]	Adults	ED visits	IG1	12	Overall	NR/300	NR/335	RR (negative binom.)	0.70 (0.49 to 1.01)	0.05
Watkins, 2017[103]	Adults	ED visits	IG1	6	Overall	27/138 (19.6)	28/123 (22.8)	OR	0.83 (0.46 to 1.50)	NR, NS
Ettner, 2014[51]	Older adults	Hospitalizations	IG1	12	Overall	57/439 (13.0)	98/610 (16.1)	OR	0.78 (0.55 to 1.11)	0.09
Fleming, 1997[52]	Adults	Hospital days	IG1	48	Overall	420 events/392 persons	664 events/382 persons	IRR	0.62 (0.55 to 0.70)	<0.05
Fleming, 1997[52]	Adults	Hospital days	IG1	48	Young adults (18-30 yrs)	131 events/114 persons	150 events/112 persons	IRR	0.86 (0.68 to 1.08)	NR, NS
Johnson, 2018[60]	Adults	Hospitalizations	IG1	12	Overall	NR/300	NR/335	RR (negative binom.)	0.80 (0.54 to 1.18)	0.27
Senft, 1997[96]	Adults	Hospitalizations	IG1	12	Overall	29/196 (14.8)	30/215 (14.0)	OR	1.07 (0.62 to 1.86)	0.70
Senft, 1997[96]	Adults	Hospitalizations	IG1	24	Overall	55/260 (21.2)	56/254 (22.0)	OR	0.95 (0.62 to 1.44)	0.81
Senft, 1997[96]	Adults	Hospitalizations	IG1	24	Men	45/187 (24.1)	36/175 (20.6)	OR	1.22 (0.74 to 2.01)	0.43
Senft, 1997[96]	Adults	Hospitalizations	IG1	24	Women	10/73 (13.7)	20/79 (25.3)	OR	0.47 (0.20 to 1.08)	0.07
Williams, 2019[105]	Adults	Hospitalizations	IG1	12	Overall	6/61 (9.8)	7/63 (11.1)	OR	0.87 (0.28 to 2.76)	0.19
Fleming, 2010[55]	Young adults	Inpat, ED, Urgent, Detox care	IG1	6	Overall	99/493 (20.1)	98/493 (19.9)	OR	1.01 (0.74 to 1.38)	0.937
Fleming, 2010[55]	Young adults	Inpat, ED, Urgent, Detox care	IG1	12	Overall	91/493 (18.5)	90/493 (18.3)	OR	1.01 (0.73 to 1.40)	0.934
Martino, 2018[75]	Adults	MH/substance-related ED visits	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.00 (NR)	0.999
Martino, 2018[75]	Adults	MH/substance-related ED visits	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.15 (NR)	0.097
Martino, 2018[75]	Adults	MH/substance-related hospitalizations	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	-0.07 (NR)	0.355

Appendix E, Table 21. Results for the Emergency or Inpatient Healthcare Utilization Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	Stat	Effect (95% CI)	p
Martino, 2018[75]	Adults	MH/substance-related hospitalizations	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.05 (NR)	0.360
Martino, 2018[75]	Adults	Non-MH/substance-related ED visits	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	-0.16 (NR)	0.571
Martino, 2018[75]	Adults	Non-MH/substance-related ED visits	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	-0.19 (NR)	0.486
Martino, 2018[75]	Adults	Non-MH/substance-related hospitalizations	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.07 (NR)	0.661
Martino, 2018[75]	Adults	Non-MH/substance-related hospitalizations	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	-0.05 (NR)	0.792

Abbreviations: binom = binomial; CG = control group; CI = confidence interval; Detox = detoxification; ED = emergency department; FUP = followup; IG = intervention group; Inpat = inpatient; IRR = incidence rate ratio; MH = mental health; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio; RR = risk ratio; yrs = years

Appendix E, Table 22. Results for the Outcomes of Accidents and Injuries from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	Stat	Effect (95% CI)	p
Fleming, 1997[52]	Adults	Motor vehicle crash w/fatalities	IG1	48	Overall	0 events/392 persons	2 events/382 persons	NR	NR	NR, NS
Fleming, 1997[52]	Adults	Motor vehicle crash w/non-fatal injuries	IG1	48	Overall	20 events/392 persons	31 events/382 persons	IRR	0.63 (0.36 to 1.10)	NR, NS
Fleming, 1997[52]	Adults	Motor vehicle crash w/property damage only	IG1	48	Overall	67 events/392 persons	72 events/382 persons	IRR	0.91 (0.65 to 1.26)	NR, NS
Fleming, 1997[52]	Adults	Motor vehicle crash w/fatalities	IG1	48	Young adults (18-30 yrs)	0 events/114 persons	1 events/112 persons	NR	NR	NR, NS
Fleming, 1997[52]	Adults	Motor vehicle crash w/non-fatal injuries	IG1	48	Young adults (18-30 yrs)	9 events/114 persons	20 events/112 persons	IRR	0.44 (0.20 to 0.97)	<0.05
Fleming, 1997[52]	Adults	Motor vehicle crash w/property damage only	IG1	48	Young adults (18-30 yrs)	19 events/114 persons	28 events/112 persons	IRR	0.67 (0.37 to 1.19)	NR, NS
Fleming, 1997[52]	Adults	Total motor vehicle events	IG1	48	Overall	281 events/392 persons	307 events/382 persons	IRR	0.90 (0.76 to 1.05)	NR
Fleming, 1997[52]	Adults	Total motor vehicle events	IG1	48	Young adults (18-30 yrs)	114 events/114 persons	149 events/112 persons	IRR	0.75 (0.59 to 0.96)	<0.05
Martino, 2018[75]	Adults	Total motor vehicle events	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.00 (NR)	0.999
Martino, 2018[75]	Adults	Total motor vehicle events	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.07 (NR)	0.370
Scott, 1990[95]	Adults	Abnormal accident score	IG1	12	Men	2/80 (2.5)	6/74 (8.1)	OR	0.29 (0.06 to 1.49)	NR, NS
Scott, 1990[95]	Adults	Abnormal accident score	IG1	12	Women	0/33 (0.0)	1/39 (2.6)	OR	0.38 (0.02 to 9.72)	NR, NS

Abbreviations: CG = control group; CI = confidence interval; FUP = followup; IG = intervention group; IRR = incidence rate ratio; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio; w/ = with; yrs = years

Appendix E, Table 23. Results for the Legal Outcomes from Trials Among Adults, Key Question 4

Appendix E, Table 23. Results for the Legal Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Burge, 1997[34]	Adults	ASI - Legal (Range: 0-1)	IG1	12	Overall	0.1 (0.2)	0.1 (0.1)	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Legal (Range: 0-1)	IG1	18	Overall	0.1 (0.2)	0.1 (0.1)	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Legal (Range: 0-1)	IG2	12	Overall	0.1 (0.1)	0.1 (0.1)	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Legal (Range: 0-1)	IG2	18	Overall	0.1 (0.1)	0.1 (0.1)	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Legal (Range: 0-1)	IG3	12	Overall	0.1 (0.1)	0.1 (0.1)	NR	NR	NR, NS
Burge, 1997[34]	Adults	ASI - Legal (Range: 0-1)	IG3	18	Overall	0.1 (0.1)	0.1 (0.1)	NR	NR	NR, NS
Fleming, 1997[52]	Adults	Assault/Battery/Child abuse	IG1	48	Overall	8/392 persons	11/382 persons	IRR	0.71 (0.29 to 1.76)	NR, NS
Fleming, 1997[52]	Adults	Controlled substance, liquor violation	IG1	48	Overall	2/392 persons	11/382 persons	IRR	0.18 (0.04 to 0.80)	<0.05
Fleming, 1997[52]	Adults	Criminal damage, property damage	IG1	48	Overall	2/392 persons	1/382 persons	IRR	1.95 (0.18 to 21.49)	NR, NS
Fleming, 1997[52]	Adults	DWI Citation	IG1	48	Overall	25/392 persons	25/382 persons	IRR	0.97 (0.56 to 1.70)	NR, NS
Fleming, 1997[52]	Adults	Other arrests	IG1	48	Overall	5/392 persons	9/382 persons	IRR	0.54 (0.18 to 1.62)	NR, NS
Fleming, 1997[52]	Adults	Other moving violations (driving)	IG1	48	Overall	169/392 persons	177/382 persons	IRR	0.93 (0.75 to 1.15)	NR, NS
Fleming, 1997[52]	Adults	Resist/Obstruct officer/Disorderly conduct	IG1	48	Overall	8/392 persons	6/382 persons	IRR	1.30 (0.45 to 3.74)	NR, NS
Fleming, 1997[52]	Adults	Theft/Robbery	IG1	48	Overall	3/392 persons	3/382 persons	IRR	0.97 (0.20 to 4.83)	NR, NS
Fleming, 1997[52]	Adults	Assault/Battery/Child abuse	IG1	48	Young adults (18-30 yrs)	6/114 persons	6/112 persons	IRR	0.98 (0.32 to 3.05)	NR, NS
Fleming, 1997[52]	Adults	Controlled substance, liquor violation	IG1	48	Young adults (18-30 yrs)	0/114 persons	8/112 persons	NR	NR	<0.01
Fleming, 1997[52]	Adults	Criminal damage, property damage	IG1	48	Young adults (18-30 yrs)	1/114 persons	3/112 persons	IRR	0.33 (0.03 to 3.15)	NR, NS
Fleming, 1997[52]	Adults	DWI Citation	IG1	48	Young adults (18-30 yrs)	8/114 persons	10/112 persons	IRR	0.79 (0.31 to 1.99)	NR, NS
Fleming, 1997[52]	Adults	Other arrests	IG1	48	Young adults (18-30 yrs)	2/114 persons	3/112 persons	IRR	0.65 (0.11 to 3.92)	NR, NS

Appendix E, Table 23. Results for the Legal Outcomes from Trials Among Adults, Key Question 4

Study	Population	Outcome	Group	FUP, mo	Analysis	IG results*	CG results*	Stat	Effect (95% CI)	p
Fleming, 1997[52]	Adults	Other moving violations (driving)	IG1	48	Young adults (18-30 yrs)	78/114 persons	81/112 persons	IRR	0.95 (0.69 to 1.29)	NR, NS
Fleming, 1997[52]	Adults	Resist/Obstruct officer/Disorderly conduct	IG1	48	Young adults (18-30 yrs)	6/114 persons	3/112 persons	IRR	1.96 (0.49 to 7.86)	NR, NS
Fleming, 1997[52]	Adults	Theft/Robbery	IG1	48	Young adults (18-30 yrs)	1/114 persons	3/112 persons	IRR	0.33 (0.03 to 3.15)	NR, NS
Fleming, 1997[52]	Adults	Total legal events	IG1	48	Young adults (18-30 yrs)	16/114 persons	26/112 persons	IRR	0.60 (0.32 to 1.13)	NR, NS
Martino, 2018[75]	Adults	Arrests	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.00 (NR)	0.999
Martino, 2018[75]	Adults	Moving violations	IG1	6	Alcohol as primary substance	NR	NR	Regression coefficient	-0.08 (NR)	0.368
Martino, 2018[75]	Adults	Arrests	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	-0.15 (NR)	0.211
Martino, 2018[75]	Adults	Moving violations	IG2	6	Alcohol as primary substance	NR	NR	Regression coefficient	0.00 (NR)	0.999

* For continuous outcomes, mean change from baseline (SD) is shown if available, or follow-up value only if change was not available and could not be calculated (labeled as "FUP"); for dichotomous outcomes, number of events/number of participants (percent) is shown

Abbreviations: ASI = Addiction Severity Index; CG = control group; CI = confidence interval; DWI = driving while intoxicated; FUP = followup; IG = intervention group; IRR = incidence rate ratio; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; SD = standard deviation; yrs = years

Appendix E, Table 24. Results for Other Health Outcomes, Key Question 4

Outcome Category	Outcome	Study	Population	FUP, mo	Analysis	IG results, n/N (%)	CG results, n/N (%)	OR (95% CI)	p
Mortality	All-cause mortality	Fleming, 1997[52]	Adults	48	Overall	3/392 (0.8)	7/382 (1.8)	0.41 (0.11 to 1.61)	NR, NS
Other Health	Abnormal health score	Scott, 1990[95]	Adults	12	Men	31/74 (41.9)	27/70 (38.6)	1.15 (0.59 to 2.24)	NR, NS
Other Health	Abnormal health score	Scott, 1990[95]	Adults	12	Women	15/32 (46.9)	18/38 (47.4)	0.98 (0.38 to 2.52)	NR, NS
Pregnancy	Fetal mortality rate	O'Connor, 2007[83]	Pregnant	4	Overall	1/117 (0.9)	4/138 (2.9)	0.29 (0.03 to 2.62)	NR
Pregnancy	Healthy pregnancy	Ondersma, 2015[84]	Pregnant	6	Overall	19/23 (82.6)	14/23 (60.9)	3.30 (0.80 to 13.80)	0.09

Abbreviations: CG = control group; CI = confidence interval; FUP = followup; IG = intervention group; mo = months; n = number of participants; N = number in group; NR = not reported; NS = not statistically significant; OR = odds ratio

Appendix F. Association Between Reduced Alcohol Use and Health Outcomes

Epidemiological studies have confirmed that excessive alcohol use is associated with a range of negative health outcomes, including hypertension, liver disease, cancer, and all-cause mortality.[107-112] This evidence comes from animal studies, explication of plausible biologic mechanisms, and dose-response effects found in epidemiologic studies in humans, including prospective studies attempting to determine the level of alcohol consumption that is associated with all-cause mortality and other health outcomes. For example, a meta-analysis of 34 prospective studies found a 10 percent increase in relative risk of all-cause mortality with an average daily volume (ADV) of approximately 45 grams ethanol, corresponding to 3.2 drinks based on U.S. standard drink sizes[110] (**Appendix F, Table 1**). The threshold of alcohol consumption associated with an increased risk of coronary heart disease and stroke is higher, but the threshold for an increased risk of liver disease and several types of cancer is as low as 1 to 2 drinks.

Appendix F, Table 1. Level of alcohol consumption association with increased risk of mortality and other health outcomes

Outcome	Average daily volume, grams/day (drinks/day)* associated with increased risk
All-cause mortality[110] (10% increase in risk, estimated from figure of dose-response curve)	~45 (3.2) (Overall) ~33 (2.4) (Women) ~55 (3.9) (Men)
Coronary heart disease[107]	89 (6.4)
Hemorrhagic stroke[107]	50 (3.6)
Ischemic stroke[107]	100 (7.1)
Type 2 diabetes[113]	50 (3.6) (Women) 60 (4.3) (Men)
Liver disease (any)[114]	13 (0.9)
Liver cirrhosis[107, 115]	14-25 (1-1.8)
Cancer (any alcohol-related)[116]	15 (1.1) (Women) 30 (2.1) (Men)
Pharyngeal, oral, colon, rectal, esophageal, laryngeal, liver, and breast cancers[107, 115]	14-25 (1-1.8)
Esophageal squamous cell carcinoma, oral cavity and pharynx cancer, female breast cancer[117]	12.6 (0.9)
Injury and violence[107, 115]	14-25 (1-1.8)
Low birth weight, small-size-for-gestational-age[118]	10 (0.7) (during pregnancy)
Preterm birth[118]	18 (1.3) (during pregnancy)

* The conversion of average volume/day to drinks/day is based on the U.S. standard of 14g per drink

A recent draft report by the federal Interagency Coordinating Committee for the Prevention of Underage Drinking (ICCPUD) assessed the relationship between a number of health conditions and daily alcohol consumption (1, 2, and 3 drinks reported separately).[115] Their analysis showed that the risk of liver cirrhosis, some types of cancer, and unintentional injuries increases with as little as one drink per day, even among males (**Appendix F, Table 2)**.

Appendix F, Table 2. Health conditions with elevated risk by sex and daily consumption[115]

Condition	Males RR (95% CI)			Females RR (95% CI)		
Drinks/day	**1**	**2**	**3**	**1**	**2**	**3**
Liver cirrhosis	1.37 (1.18 to 1.62)	2.10 (1.68, 2.65)	3.58 (2.90, 4.48)	2.33 (1.74 to 3.17)	5.38 (3.81, 7.73)	10.67 (7.78, 14.63)
Laryngeal cancer	1.13 (1.07, 1.17)	1.27 (1.15, 1.37)	1.44 (1.23, 1.61)	1.32 (1.04, 1.68)	1.75 (1.09, 2.83)	2.31 (1.13, 4.76)
Esophageal cancer	1.51 (1.32, 1.71)	2.27 (1.75, 2.94)	3.42 (2.31, 5.04)	1.37 (1.20, 1.55)	1.87 (1.44, 2.41)	2.55 (1.73, 3.75)
Liver cancer	1.04 (1.01, 1.07)	1.09 (1.03, 1.15)	1.13 (1.04, 1.23)	1.28 (1.06, 1.52)	1.63 (1.12, 2.32)	2.08 (1.18, 3.53)
Breast cancer (post-menopausal)	--	--	--	1.17 (1.14, 1.20)	1.37 (1.31, 1.44)	1.61 (1.49, 1.73)
Road injuries (unintentional)	1.20 (1.17, 1.25)	1.43 (1.36, 1.56)	1.71 (1.59, 1.94)	1.20 (1.16, 1.28)	1.45 (1.34, 1.63)	1.74 (1.56, 2.09)
Self-harm (intentional)	1.13 (1.11, 1.16)	1.28 (1.23, 1.35)	1.44 (1.37, 1.57)	1.20 (1.15, 1.27)	1.43 (1.33, 1.61)	1.71 (1.54, 2.04)

Source: ICCPUD Draft Report, 2025[115]

Abbreviations: CI = confidence interval; ICCPUD = Interagency Coordinating Committee on the Prevention of Underage Drinking; RR = relative risk

In addition, growing evidence suggests that *reductions* in alcohol use may lead to improvements in health outcomes, particularly among heavy drinkers. For example, a 2017 systematic review and meta-analysis of 36 randomized controlled trials found that heavy drinkers (those drinking ≥6 drinks/day, where one drink=12 g) who reduced their drinking by 50 percent experienced significant improvements in systolic (mean difference [MD] -5.50 mm Hg [95% CI, -6.70 to -4.30]) and diastolic blood pressure (MD -3.97 [95% CI, -4.70 to -3.25]).[119] The effect sizes was smaller but still statistically significant for those who drank 4-5 drinks per day or 3 drinks per day and reduced their consumption to near abstinence (4-5 drinks/day: SBP MD, -3.00 [95% CI, -3.98 to -2.03; DBP MD, -1.88 [-2.62 to -1.15]; 3 drinks/day: SBP MD, -1.18 [95% CI, -2.32 to -0.04]; DBP MD, -1.09 [95% CI, -1.61 to -0.57]). However, this association did not hold true for those consuming 2 drinks per day (SBP MD, -0.18 [95% CI, -1.02 to 0.66]; DBP MD, 0.61 [95% CI, -0.04 to 1.26]).[119] A newer randomized controlled trial also found health benefits associated with reductions in alcohol use; this 2020 trial that found reductions in arrhythmia recurrences after 6 months among regular drinkers (10 or more drinks/week) with atrial fibrillation assigned to abstain from alcohol, compared to controls who were not instructed to abstain from alcohol use.[120]. In this study, those in the intervention group had reduced their weekly alcohol intake from 16.8 to 2.1 standard drinks while the control group reduced their weekly intake from 16.4 to 13.2 drinks. A secondary longitudinal observational analysis of a 2018 trial found improvements in systolic blood pressure, liver enzyme levels, and quality of life among individuals with alcohol dependence who reduced their alcohol use.[121] A separate 10-year longitudinal observational analysis of clinical trial data found lower rates of CVD among adults with diabetes who decreased their alcohol intake by at least 2 drinks per week for 1 year (hazard ratio [HR], 0.56 [95% CI, 0.36 to 0.87]), however this did not affect all-cause mortality (HR, 1.06 [95% CI, 0.67 to 1.67]).[122] In this study, mean (standard deviation) baseline consumption was 3.3 (5.9) for women and 10.3 (13.2) for men. In addition, recently published analyses from the National Epidemiologic Survey on Alcohol and Related Conditions found that among high-

or very high-risk drinkers, reductions in WHO risk drinking levels were associated with a reduced risk of CVD,[123] liver disease,[123] depression and anxiety disorders,[123] and drug use disorders.[124]

However, reductions in alcohol use may not ameliorate all alcohol-related health risks. For example, an analysis of data from the Nurses' Health Study and the Health Professionals Follow-up Study with more than 30 years of followup found that people with the highest drinking frequency and daily intake had the highest risk of colorectal cancer, and that former drinkers who quit or reduced their alcohol consumption did not experience a significant reduction in colorectal cancer risk.[125]

In addition to improvements in intermediate and health outcomes, prior research shows that reductions in alcohol use are associated with reductions in all-cause mortality. For example, a 2013 systematic review of 16 studies among individuals with alcohol use disorders at baseline found that mortality risk decreased by more than half in individuals who reduced their drinking to abstention compared with those who continued heavy drinking (OR 0.35 [95% CI, 0.20 to 0.60]).[126] Further, participants who reduced their drinking to below the study's definition of heavy consumption (which varied across studies), but did not attain abstinence, also reduced their risk of mortality compared with those who continued heavy drinking (OR 0.61; 95% CI, 0.39 to 0.94).[126]

Controversy around potential protective effects of low levels of alcohol use

Previously, some studies suggested that light-to-moderate drinking may have a protective effect on health conditions such as CVD,[127-129] dementia,[130, 131] and Alzheimer's disease,[131] and that this relationship could be a J-shaped curve, with a slightly elevated risk among abstainers, lower risk among light-to-moderate drinkers, and then progressively higher risk as drinking increases.[129, 132] However, this so-called "protective effect" remains controversial due to the potential misclassification of former heavy drinkers as abstainers, biasing the results in favor of light to moderate drinkers.[133, 134] For example, two meta-analyses published in 2023 and 2024 examined higher-quality studies that adjusted for the potential confounding effects of former drinker bias, sampling variation, and other quality criteria and found similar mortality risks for abstainers, occasional, and low-volume drinkers.[111, 135] Additional reasons for skepticism about the effects of low-dose alcohol consumption include the lack of controlled studies investigating the association, biological mechanisms for the health benefits being disconfirmed, evidence for adverse physiological effects of low-dose alcohol consumption, publication bias, and various confounding study population characteristics (e.g., benefits observed predominantly in Caucasian populations, moderate drinkers generally having healthier lifestyles, and systematic exclusion of unhealthy drinkers).[133] Indeed, the WHO has stated that "no safe amount of alcohol consumption for cancers and health can be established."[136]

Appendix G. Factors Affecting Access to Interventions

In addition to disparities in the prevalence and burden of unhealthy alcohol use, there are also disparities in access to interventions to reduce alcohol use, among people with AUD. According to data from the 2023 National Survey on Drug Use and Health (NSDUH), among people classified as needing treatment for substance use (alcohol or drug), are generally quite low, receipt of treatment is lower among males (23.1%) compared with females (28.7%), and lower among young adults ages 18 to 25 years (18.5%) compared with adults ages 26 and older (26.2%) and adolescents (40.4%).[137] In addition, Black and Asian populations have lower rates of receiving needed substance use treatment (21.1% and 21.7%, respectively) compared with White and Hispanic populations (26.1% and 28.0%, respectively).[137] Consistent with national estimates on lower rates of treatment receipt among Black populations, a separate analysis of people engaged in inpatient treatment in Northern Florida found that Black populations initiate treatment at later ages than White populations (mean age 35.6 versus 32.3), even after controlling for socioeconomic status.[138] This difference in age of treatment initiation occurs despite the fact that White populations have an earlier age of initiation of any alcohol use compared with Black populations (mean age 11.7 versus 12.7), and there are no other age differences between Black and White populations in the progression from initiating use through problematic use, after controlling for socioeconomic status.

The 2023 NSDUH data do not report rates of receiving needed substance use treatment for American Indian and Alaska Native populations due to small sample sizes. However, data from the National Epidemiological Survey on Alcohol and Related Conditions (NESARC-III) published in 2021 reported that American Indian and Alaska Native populations had the highest levels of alcohol-related treatment utilization among adults with a lifetime diagnosis of AUD (33.8%), compared with White (20.5%), Black (19.6%), Asian and Pacific Islander and Native Hawaiian (9.9%) and Latino (17.5%) populations.[139] In addition, some research suggests that American Indian and Alaska Native individuals with unhealthy alcohol use may be more likely than individuals from other racial and ethnic groups to be referred to the criminal justice system rather than to substance use treatment.[140, 141]

Among adolescents with diagnosed alcohol use disorders, receipt of interventions is low. According to NSDUH data from 2011 to 2019, fewer than 11% of adolescents ages 12 to 17 years with an alcohol use disorder (AUD) have received treatment for their condition.[142] Among adolescents with AUD, receipt of treatment is higher among Native American and Alaska Native adolescents compared with White adolescents, and among adolescents with major depression compared with those without major depression. There were no significant differences in receipt of AUD treatment by sex, age group, insurance type, family income, presence of mother or father in the household, or urban versus rural setting. For those who received treatment, outpatient rehabilitation services and self-help groups are the most common treatment types.[142]

Numerous barriers impede access to interventions to reduce unhealthy alcohol use. For example, some people with high-risk alcohol consumption, particularly those living in more socially deprived areas, may never receive proper documentation of their condition or referrals to treatment services.[143] Among those with an unmet need for substance use treatment in the past

year, data from the 2023 NSDUH shows that commonly reported reasons for not receiving treatment are believing one could handle substance use on one's own; not being ready to start treatment; not having enough time for treatment; concerns about cost, health insurance coverage, and privacy; not knowing how or where to get treatment; concerns about negative consequences such as losing one's job, home, or children; and issues related to transportation, childcare, or scheduling.[137] A separate survey of 1,200 White and Latino U.S. residents with recent alcohol use disorder found that Latino respondents were more likely than White respondents to report barriers to treatment related to a perceived lack of social support, logistical challenges, low perceived treatment efficacy, immigration concerns, and cultural factors.[144] Similarly, NESARC-III found that Latino respondents were more likely than White respondents to report language-related barriers to treatment.[139] NESARC-III also found that American Indian and Alaska Native populations were more likely to report transportation difficulties as a barrier to treatment and also reported a lower readiness to change compared with other racial and ethnic groups.[139]

Cultural factors may be particularly important for understanding barriers to treatment access among underserved populations. In the U.S. and other high-income English-speaking countries, substance use interventions often are designed to meet the needs of majority White populations and have not been developed for or tested among Indigenous populations or other underserved groups.[145, 146] A mixed methods study of American Indians with a lifetime diagnosis of alcohol dependence found that cultural barriers to treatment included a "lack of cultural interventions" (e.g., traditional healing) and feelings of cultural mismatch with treatment providers and other patients.[147] A separate study of persons hospitalized for alcohol use disorders across three U.S. states found that American Indians were 51 percent less likely than non-Hispanic White persons to have co-morbid mental illness diagnoses, particularly mood and anxiety disorders.[148] This study's rates of mental health diagnoses for American Indians were below national prevalence rates, suggesting likely underdiagnosis. The authors note that underdiagnosis of mental health comorbidities may reflect a variety of factors, including cultural divergence between patients and providers, linguistic differences, and negative alcohol-related stereotypes. These could be a source of mistrust between American Indian patients and Westernized medical providers and may act as barriers to effective treatment.

To improve treatment services for Indigenous populations and other underserved groups, some analyses recommend culturally safe care that is tailored to a specific context and considers the different needs and preferences of a particular population group.[149] For example, American Indian and Alaska Native young adults face challenges related to social and geographic fragmentation and limited opportunities for cultural involvement.[150] To address these challenges, a community-based participatory research partnership with American Indian and Alaska Native youth developed a series of culturally tailored virtual workshops based on traditional healing approaches.[151] In a mixed-methods evaluation of the program, participants rated the program highly and noted that the most important elements of the program were the virtual format and the opportunity to share personal stories and learn new information about social networks in a culturally safe and comfortable environment.[151] This is consistent with a separate needs assessment among urban and rural American Indian and Alaska Native adolescents, in which themes for needed substance use services included integrating cultural beliefs and practices, attention to family and community risk and resiliency factors, providing effective outreach and education, and focusing on the development of holistic wellness.[152] Some researchers have

focused on identifying protective factors that support prevention of and recovery from unhealthy alcohol use in Indigenous communities, which may inform culturally adapted interventions.[153, 154]

While some individual programs have shown promise, overall, there has been limited research on the effectiveness of interventions to improve access to treatment and reduce differences in alcohol-related harms. A 2015 evidence review commissioned by the government of Victoria, Australia, acknowledges this lack of empirical evidence and states that interventions with the greatest potential to reduce differences in alcohol-related harms are interventions tailored to vulnerable populations.[155] The review suggests that additional interventions that could hold promise include screening and brief interventions, early childhood interventions, and interventions that take place in schools, workplaces, and sports clubs. The review notes that digital interventions may be less effective in situations where populations have less access to digital technologies and lower digital literacy.[155]

Appendix H. Ongoing Studies

According to ClinicalTrials.gov there are five trials on screening and behavioral counseling for unhealthy alcohol use in adolescents and adults that are either: recruiting, not yet recruiting, active, or complete with no results available. They are described in the table below by expected completion date.

Identifier	Study Name	Country	Planned N	Aim	Relevant Outcome(s)	2025 Status
NCT03930342	Native-Changing High-risk Alcohol Use and Increasing Contraception Effectiveness Study	US	408	To determine the effectiveness of an adapted intervention to reduce the risk of alcohol exposed pregnancies in American Indians and Alaska Natives.	Alcohol exposed pregnancy, defined as no heavy or binge drinking while pregnant	Estimated completion 2024
NCT04552171	Game Plan: Testing the Efficacy of a Brief, Web-based Intervention in Reducing Heavy Drinking and Reducing Sexually transmitted Infections Among High-risk Men Completing Self-testing	US	500	This study aims to: (1) test whether using a brief, MI-inspired, web-based intervention (Game Plan) reduces (a) binge drinking, (b) the average number of drinks per drinking day over 12 months among heavy-drinking and high-risk, HIV-negative MSM, compared to providing access to a 24h helpline providing STI risk-reduction counseling alone, (2) test whether using Game Plan results in lower rates of (a) bacterial STIs, and (b) higher rates of PrEP uptake over 12 months	Number of alcohol drinking days in the past 30 days Number of heavy (5+ standard drinks) alcohol drinking days in the past 30 days Average number of standard drinks consumed on a drinking day in the past 30 days	Estimated completion 2025
NCT02408952	Screening for Youth Alcohol and Drug Use: A Study of Primary Care Providers	US	9084	To evaluate the implementation and effectiveness of two modalities of Screening, Brief Intervention and Referral to Treatment (SBIRT) to reduce adolescent alcohol and other drug (AOD) use in a large pediatrics clinic compared with usual care.	Alcohol use: The items in the EHR measure past and 6-month use of alcohol, including days of use, quantity consumed (any, 3+ and 5+ drinks), and days of binge drinking (3+ and 5+) Alcohol-related legal, school, and family problems	Estimated completion 2025

Identifier	Study Name	Country	Planned N	Aim	Relevant Outcome(s)	2025 Status
NCT04776278	Behavioral Economic and Wellness-based Approaches for Reducing Alcohol Use and Consequences Among Diverse Non-student Emerging Adults	US	525	To evaluate an intervention approach for non-student emerging adults reporting unhealthy alcohol use that attempts to reduce alcohol use by decreasing stress and increasing engagement in positive and goal-directed activities that provide meaningful alternatives to alcohol use.	Alcohol Consumption Alcohol-related Consequences Depression, Anxiety, and Stress Scales (DASS)	Estimated completion 2026
NCT05609344	Barbershop Talk: Reducing Excessive Alcohol Consumption Among Black Men	US	600	This project seeks to test the effectiveness of a Screening, Brief Intervention, and Referral to Treatment (SBIRT) intervention for use within barbershop settings by clinical health workers to reduce average drinking days and the number of unhealthy drinking days. Data from this study will further the understanding of how to reduce the risk of alcohol-related morbidity and mortality among Black men.	Alcohol Use - total number of drinking days Alcohol Use - number of unhealthy drinking days Depression Posttraumatic Stress Disorder (PTSD) Healthcare Utilization	Estimated completion 2027

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