Behavioral Counseling After Screening for Alcohol Misuse in Primary Care: A Systematic Review and Meta-analysis for the U.S. Preventive Services Task Force

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Background: Alcohol misuse, which includes the full spectrum from risky drinking to alcohol dependence, is a leading cause of preventable death in the United States.

Purpose: To evaluate the benefits and harms of behavioral counseling interventions for adolescents and adults who misuse alcohol.

Data Sources: MEDLINE, EMBASE, the Cochrane Library, CINAHL, PsycINFO, International Pharmaceutical Abstracts, and reference lists of published literature (January 1985 through January 2012, limited to English-language articles).

Study Selection: Controlled trials at least 6 months' duration that enrolled persons with alcohol misuse identified by screening in primary care settings and evaluated behavioral counseling interventions.

Data Extraction: One reviewer extracted data and a second checked accuracy. Two independent reviewers assigned quality ratings and graded the strength of the evidence.

Data Synthesis: The 23 included trials generally excluded persons with alcohol dependence. The best evidence was for brief (10- to 15-minute) multicontact interventions. Among adults receiving behavioral interventions, consumption decreased by 3.6 drinks per week from baseline (weighted mean difference, 3.6 drinks/wk [95% CI, 2.4 to 4.8 drinks/wk]; 10 trials; 4332 participants), 12%

fewer adults reported heavy drinking episodes (risk difference, 0.12 [CI, 0.07 to 0.16]; 7 trials; 2737 participants), and 11% more adults reported drinking less than the recommended limits (risk difference, 0.11 [CI, 0.08 to 0.13]; 9 trials; 5973 participants) over 12 months compared with control participants (moderate strength of evidence). Evidence was insufficient to draw conclusions about accidents, injuries, or alcohol-related liver problems. Trials enrolling young adults or college students showed reduced consumption and fewer heavy drinking episodes (moderate strength of evidence). Little or no evidence of harms was found.

Limitations: Results may be biased to the null because the behavior of control participants could have been affected by alcohol misuse assessments. In addition, evidence is probably inapplicable to persons with alcohol dependence and selective reporting may have occurred.

Conclusion: Behavioral counseling interventions improve behavioral outcomes for adults with risky drinking.

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Alcohol misuse, which includes the full spectrum from risky or hazardous drinking to alcohol dependence (1–3), is associated with numerous health and social problems and more than 85 000 deaths per year in the United States (4, 5). Alcohol misuse is the third leading cause of preventable death in the United States, after tobacco use and being overweight (6). It contributes to hypertension, cirrhosis, gastritis, gastric ulcers, pancreatitis, breast cancer, neuropathy, cardiomyopathy, anemia, osteoporosis, cognitive impairment, depression, insomnia, anxiety, suicide, injury, and violence (7–9). The definitions of the spectrum of alcohol misuse (that is, unhealthy alcohol use [1]) continue to evolve. For this review, we use the definitions in **Table 1** (5, 10–12).

About 30% of the U.S. population misuse alcohol, with most engaging in what is considered risky drinking (1). Recent U.S.-based data (13) revealed that 21.3% of primary care patients reported risky drinking.

Cross-sectional and cohort studies have consistently related high average alcohol consumption and heavy per-occasion use to short- or long-term health consequences (14, 15). A meta-analysis examining the association between all-cause mortality and average alcohol consumption (16) found that men who drank an average of at least 4 drinks per day and women who drank an average of at least 2 drinks per day had increased mortality relative to nondrinkers. The National Institute on Alcohol Abuse and Alcoholism has proposed guidelines (17) to limit the risks for drinking-related consequences. The maximum recommended consumption is 3 or fewer standard drinks per day ($\leq$7 drinks/wk) for adult women and anyone older than 65 years, and 4 or fewer standard drinks per day ($\leq$14 drinks/week) for men (15, 17, 18). These guidelines do not apply to persons for whom alcohol intake is contraindicated, such as pregnant women, persons with alcohol dependence or medical conditions that can be worsened by drinking, or those receiving medications that interact with alcohol.

Behavioral counseling interventions include the range of personal counseling and related behavior-change interventions that are used to help patients change health-related behaviors (19). "Counseling" here denotes a cooperative method of work that demands active participation from both patient and clinician and aims to facilitate the

Table 1. Definitions of the Spectrum of Alcohol Misuse

Term (Reference)	Definition
Risky or hazardous use (5)	Consumption of alcohol above recommended daily, weekly, or per-occasion amounts Consumption levels that increase the risk for health consequences
Harmful use (10, 11)	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)
Alcohol abuse (12)	A maladaptive pattern of alcohol use leading to clinically significant impairment or distress, as manifested by ≥1 of the following within a 12-mo period: Recurrent alcohol use resulting in a failure to fulfill major obligations at work, school, or home (e.g., repeated absences or poor work performance related to alcohol use; alcohol-related absences, suspensions, or expulsions from school; or neglect of children or household) Recurrent alcohol use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine) Recurrent alcohol-related legal problems (e.g., arrests for alcohol-related disorderly conduct) Continued use despite persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol (e.g., arguments with spouse about consequences of intoxication or physical fights) The symptoms have never met the criteria for alcohol dependence
Alcohol dependence (alcoholism, alcohol addiction) (12)	A maladaptive pattern of alcohol use leading to clinically significant impairment or distress, as manifested by ≥3 of the following at any time in the same 12-mo period: Tolerance, as defined by either of the following: 　A need for markedly increased amounts of alcohol to achieve intoxication or desired effect 　Markedly diminished effect with continued use of the same amount of alcohol Withdrawal, as manifested by either of the following: 　The characteristic withdrawal syndrome for alcohol 　Alcohol (or a closely related drug) is taken to relieve or avoid withdrawal symptoms Alcohol is often taken in larger amounts or over a longer period than was intended A persistent desire or unsuccessful efforts to cut down or control alcohol use A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects Important social, occupational, or recreational activities are given up or reduced because of alcohol use Use continues despite knowledge of a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol (e.g., continued drinking despite recognition that an ulcer was made worse by alcohol consumption)

patient's independent initiative (19). The goal of behavioral interventions for alcohol misuse is to eliminate risky drinking practices (for example, by encouraging fewer drinks per occasion or not drinking before driving) rather than to achieve abstinence.

For the Effective Health Care Program of the Agency for Healthcare Research and Quality (AHRQ) and to assist the U.S. Preventive Services Task Force (USPSTF) in updating its 2004 recommendation statement (20), we conducted a systematic review and meta-analysis of the effectiveness of screening followed by behavioral counseling, with or without referral, for alcohol misuse in primary care settings (21). The full report (21) addressed 7 questions (**Appendix Table 1**, available at www.annals.org).

METHODS

We developed and followed a standard protocol. A technical report that details methods and includes search strategies and additional evidence tables is available at www.effectivehealthcare.ahrq.gov/reports/final.cfm.

Key Questions and Analytic Framework

The USPSTF and the AHRQ determined the focus of this review. Investigators developed key questions and created an analytic framework that incorporated the key questions and outlined patient populations, interventions, comparators, outcomes (including adverse effects), and settings (**Appendix Figure 1**, available at www.annals.org). This

report focuses on the key questions related to benefits and harms of behavioral interventions.

Data Sources and Searches

We searched MEDLINE, EMBASE, the Cochrane Library, CINAHL, PsycINFO, and the International Pharmaceutical Abstracts from 1 January 1985 to 31 January 2012, limited to English-language articles. The start date was selected on the basis of the earliest publication date found in previous reviews and expert opinion. We used Medical Subject Headings as search terms when available and keywords when appropriate, focusing on terms to describe relevant populations, screening, and behavioral interventions.

Study Selection

We developed inclusion and exclusion criteria with respect to populations, interventions, comparators, outcomes, timing, settings, and study designs (22, 23). For the question related to behavioral interventions, we included randomized, controlled trials of at least 6 months' duration that enrolled adults or adolescents with alcohol misuse identified by screening in primary care settings and that evaluated whether a counseling intervention improved behavioral or health outcomes.

Two investigators independently reviewed titles and abstracts, and then another 2 investigators independently reviewed the full text of all articles marked for possible inclusion during the initial review to determine final inclu-

sion or exclusion. Disagreements were resolved with an experienced team member.

Data Extraction and Quality Assessment

We designed and used structured forms to extract pertinent information from each article, including information about the methods and populations, interventions, comparators, outcomes, timing, settings, and study designs. All data extractions were reviewed for completeness and accuracy by a second team member.

We assessed the quality (internal validity) of studies using predefined criteria based on those developed by the USPSTF (ratings of good, fair, or poor) (24) and the University of York Centre for Reviews and Dissemination (25). These included assessment of the adequacy of randomization, allocation concealment, similarity of groups at baseline, masking, attrition, and whether intention-to-treat analysis was used. Two independent reviewers assigned quality ratings for each study. Disagreements were resolved by an experienced member of the team.

Data Synthesis and Analysis

We stratified evidence by population (adults, older adults, young adults or college students, and pregnant women). Quantitative analyses were conducted of outcomes reported by a sufficient number of studies that were homogeneous enough to justify combining their results. We used random-effects models. For the outcome of alcohol consumption, the effect measure was mean difference between the intervention and control groups for change from baseline in drinks per week. The percentages of patients who had episodes of heavy drinking and those who achieved recommended drinking limits were compared (between intervention and control groups) with a risk difference. Because follow-up periods varied, the analysis for all-cause mortality was based on deaths per person-year and the comparison between intervention and control groups was calculated as a risk ratio. Analyses were conducted by using Comprehensive Meta Analysis, version 2.2.055 (Bio-Stat, Englewood, New Jersey).

We used subgroup analyses to explore whether results differed by intensity, sex, country, deliverer of the intervention, or setting. The chi-square and I^2 statistics were calculated to assess heterogeneity in effects between studies (26, 27). When quantitative analyses were not appropriate (for example, because of heterogeneity, insufficient number of similar studies, or insufficient or varied outcome reporting), we synthesized the data qualitatively.

To assess the differential effects of using more or less time and single or multiple contacts, we grouped interventions by intensity of counseling, as measured by the duration and number of contacts: very brief (≤5 minutes, single-contact), brief (6 to 15 minutes, single-contact), extended (>15 minutes, single-contact), brief multicontact (each contact ≤15 minutes), or extended multicontact (some contacts >15 minutes).

We then graded the strength of evidence (SOE) as high, moderate, low, or insufficient on the basis of the guidance established for the Evidence-based Practice Center Program (**Appendix Table 2**, available at www.annals .org) (28). Two reviewers assessed each domain for each key outcome, and differences were resolved by consensus.

Role of the Funding Source

This review was funded by AHRQ. Staff of AHRQ and members of the USPSTF participated in developing the scope of the work and reviewed draft manuscripts. Approval from AHRQ for copyright assertion was required before the manuscript could be submitted for publication, but the authors are solely responsible for the content and the decision to submit it for publication.

RESULTS

We included 38 articles reporting on 23 randomized, controlled trials (**Appendix Figure 2**, available at www .annals.org). Sample sizes ranged from 72 to 1559, and study durations ranged from 6 to 48 months (**Appendix Table 3**, available at www.annals.org). Eleven studies were done solely in the United States, 2 focused on older adults, 5 focused on young adults or college students, and 1 enrolled pregnant women. We identified no studies of adolescents.

Fourteen of the interventions (29–50) were delivered by a primary care physician alone or with a health educator or nurse. Three (51–54) were delivered by a nurse or physician assistant, 1 by a psychologist (55–57), 2 by a researcher (58–62), and 1 by unspecified interventionists (63). Two interventions in college students (64–66) were conducted via a computer. Most trials tested brief multicontact interventions (31–34, 42, 46, 50, 51, 53, 64, 65) or brief interventions (29, 49, 52, 58, 60, 62–66); fewer tested very brief (45, 63), extended (30), or extended multicontact interventions (38, 45, 48, 55, 60). Interventions were heterogeneous and included various counseling approaches, such as brief advice, feedback, or motivational interviews, and cognitive behavioral strategies, such as self-completed action plans, written health education or self-help materials, drinking diaries, or problem-solving exercises to complete at home (**Appendix Table 4**, available at www.annals.org). Most comparator groups received screening or assessment followed by usual care or by provision of a general health pamphlet. A few studies included additional components in comparator groups that could have biased results toward the null, such as recording screening or assessment results on the chart (45) or forwarding them to physicians (60), advice from nurses on reducing drinking and a leaflet with benchmark alcohol guides (52), a pamphlet on the health effects of alcohol consumption (64–66), or a booklet about preventing alcohol problems (48). We summarize the main findings by population and outcome and report the SOE for each.

Table 2. Effectiveness and Strength of Evidence of Behavioral Interventions Compared With Controls for Improving Intermediate Outcomes, by Population*

Population	Mean Consumption†		Heavy Drinking Episodes‡		Recommended Drinking Limits	
	Results	Strength of Evidence	Results	Strength of Evidence	Results	Strength of Evidence
Adults	3.6 fewer drinks/wk (95% CI, 2.4–4.8 drinks/wk); 10 trials; 4332 participants	Moderate	12% fewer participants reported heavy drinking episodes (95% CI, 7%–16%); 7 trials; 2737 participants	Moderate	Achieved by 11% more participants (95% CI, 8%–13%); 9 trials; 5973 participants	Moderate
Older adults	1.7 fewer drinks/wk (95% CI, 0.6–2.8 drinks/wk); 2 trials; 776 participants	Moderate	–	Insufficient	Achieved by 9% more participants (95% CI, 2%–16%); 2 trials; 776 participants	Low
Young adults/ college students	1.7 fewer drinks/wk (95% CI, 0.7–2.6 drinks/wk); 3 trials; 1421 participants	Moderate§	0.9 fewer heavy drinking day per month (95% CI, 0.3–1.5 fewer); 3 trials; 1448 participants‖	Moderate§	–	Insufficient
Pregnant women	Data from 1 study found no difference	Low	–	Insufficient	–	Insufficient
Adolescents	–	Insufficient	–	Insufficient	–	Insufficient

* All outcomes are at 12 mo unless indicated. All percentages are absolute risk differences from our meta-analyses.
† Baseline consumption, adults: mean, about 23 drinks/wk; median, about 19 drinks/wk; range, 8–62 drinks/wk (data from 16 trials). Baseline consumption, older adults: 15.2–16.6 drinks/wk (data from 2 trials). Baseline consumption, young adults/college students: mean, about 15 drinks/wk; median, about 17 drinks/wk; range, 8–18 drinks/wk (2 of the 5 trials did not report).
‡ Generally defined as consumption of ≥5 standard drinks for men and ≥4 for women.
§ These data are 6-mo outcomes. For consumption for young adults, we could not calculate pooled point estimates for 12-mo data, but the range of reduction was 1.2–4.1 drinks/wk at 12 mo (moderate strength); for heavy drinking days for young adults, differences were not statistically significant at 12 mo (low strength).
‖ Baseline heavy drinking days for young adults/college students, about 6–7 d over the past month.

Screening

We found no studies meeting inclusion criteria that randomly assigned participants, practices, or providers to screening and a comparator (no studies addressing questions 1 or 3) (**Appendix Table 1**). We found adequate evidence that several screening instruments can detect alcohol misuse in adults with acceptable sensitivity and specificity (21). The full technical report includes additional details about the accuracy of screening tests.

Effectiveness for Improving Intermediate Outcomes

Table 2 summarizes the results of meta-analyses for consumption, heavy drinking, and recommended drinking limits, by population. The **Figure** shows the forest plots for 12-month outcomes from our meta-analyses for adults. Overall, evidence supports the effectiveness of behavioral interventions for improving several intermediate outcomes for adults, older adults, and young adults or college students. For pregnant women, the included study (250 participants) (30) did not provide evidence of effectiveness for improving intermediate outcomes over 6 months or longer (low or insufficient SOE, depending on the outcome). Subgroup analyses identified no significant differences between men and women. Brief multicontact interventions had the best evidence of effectiveness across populations and outcomes and had follow-up data spanning several years. Meta-analyses of studies in adults found very brief and brief single-contact interventions to be ineffective for some outcomes and less effective than brief multicontact interventions for others.

Effectiveness for Reducing Morbidity, Reducing Mortality, or Changing Other Outcomes

Table 3 summarizes results, by population. Our meta-analyses found no statistically significant reduction in all-cause mortality for adults (rate ratio, 0.64 [95% CI, 0.24 to 1.7]; 4 trials) or for all age groups combined (rate ratio, 0.52 [CI, 0.22 to 1.2]; 6 trials). Point estimates trended toward favoring interventions, but few studies reported mortality and few long-term data were available. No studies that enrolled pregnant women and reported these outcomes were found (insufficient SOE).

Potential Adverse Effects

We found no evidence of direct harms, aside from opportunity costs associated with interventions, which ranged from 5 minutes to 2 hours dispersed over several in-person or telephone visits (moderate SOE). We searched for evidence of potential adverse effects, such as illegal substance use, increased smoking, anxiety, stigma, labeling, discrimination, or interference with the physician–patient relationship. We found no evidence for most of these potential harms and very limited evidence reporting no difference between groups for smoking rates and anxiety (low SOE). Other than the results for opportunity costs, our results are limited by the few trials that reported any information; 5 of 23 reported smoking (29, 33, 34, 39, 41, 49, 50), and 2 reported anxiety (29, 49).

Health Care System Influences

Where the study was conducted (United States vs. non–United States) had no impact on the effectiveness of

Figure. **Forest plots for alcohol consumption, heavy drinking, and achieving recommended drinking limits for groups receiving behavioral counseling interventions compared with control groups.**

Change in Alcohol Consumption From Baseline to 12 mo (drinks/wk)

Study (Reference)	BCI Subgroup	Difference in Means (95% CI)	P Value	Difference in Means (95% CI)
Richmond et al (45)	Very brief	2.700 (−5.212 to 10.612)	0.50	
Subgroup total		2.700 (−5.212 to 10.612)	0.50	
Anderson and Scott (29)	Brief	−4.740 (−9.544 to 0.064)	0.053	
Scott and Anderson (49)	Brief	−1.600 (−8.227 to 5.027)	0.64	
Lock et al (52)	Brief	−0.190 (−8.935 to 8.555)	0.97	
ELM trial (59–61)	Brief	−4.430 (−8.545 to −0.315)	0.035	
Subgroup total		−3.660 (−6.349 to −0.970)	0.008	
Project TrEAT (33, 35–37, 39)	Brief, multicontact	−4.180 (−5.887 to −2.473)	0.000	
Project Health (42–44)	Brief, multicontact	−2.700 (−5.156 to −0.244)	0.031	
Rubio et al (46)	Brief, multicontact	−3.560 (−4.898 to −2.222)	0.000	
Wallace et al (50) (men)	Brief, multicontact	−10.100 (−14.400 to −5.800)	0.000	
Wallace et al (50) (women)	Brief, multicontact	−5.200 (−10.252 to −0.148)	0.044	
Subgroup total		−4.407 (−6.084 to −2.730)	0.000	
Richmond et al (45)	Extended, multicontact	−2.200 (−11.331 to 6.931)	0.64	
ELM trial (59–61)	Extended, multicontact	−1.811 (−5.182 to 1.560)	0.29	
SIP trial (55–57) (full care)	Extended, multicontact	−3.420 (−7.826 to 0.986)	0.128	
SIP trial (55–57) (stepped care)	Extended, multicontact	−3.010 (−7.430 to 1.410)	0.182	
Subgroup total		−2.546 (−4.767 to −0.325)	0.025	
Total		−3.573 (−4.758 to −2.389)	0.000	

Heterogeneity statistics: $Q = 15.066$; $P = 0.303$; $I^2 = 13.714$

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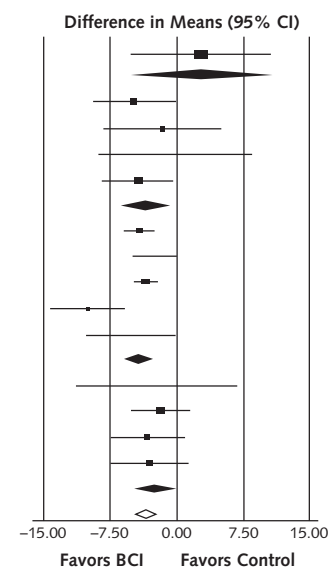
Achieved Recommended Drinking Limit at 12 mo

Study (Reference)	BCI Subgroup	Risk Difference (95% CI)	P Value	Risk Difference (95% CI)
WHO BISG (63) (men)	Very brief	0.080 (0.012 to 0.148)	0.021	
WHO BISG (63) (women)	Very brief	0.080 (−0.058 to 0.218)	0.26	
Subgroup total		0.080 (0.019 to 0.141)	0.010	
WHO BISG (63) (men)	Brief	0.080 (0.015 to 0.145)	0.015	
WHO BISG (63) (women)	Brief	0.040 (−0.099 to 0.179)	0.57	
Anderson and Scott (29)	Brief	0.130 (0.032 to 0.228)	0.009	
Senft et al (62); Freeborn et al (58)	Brief	0.070 (−0.003 to 0.143)	0.060	
Scott and Anderson (49)	Brief	0.010 (−0.195 to 0.215)	0.92	
Subgroup total		0.079 (0.039 to 0.120)	0.000	
Curry et al (31)	Brief, multicontact	0.140 (0.029 to 0.251)	0.013	
Project TrEAT (33, 35–37, 39)	Brief, multicontact	0.134 (0.072 to 0.196)	0.000	
Project Health (42–44)	Brief, multicontact	0.050 (−0.043 to 0.143)	0.29	
Rubio et al (46)	Brief, multicontact	0.187 (0.117 to 0.256)	0.000	
Wallace et al (50) (men)	Brief, multicontact	0.182 (0.110 to 0.254)	0.000	
Wallace et al (50) (women)	Brief, multicontact	0.185 (0.070 to 0.300)	0.002	
Subgroup total		0.149 (0.109 to 0.188)	0.000	
Total		0.109 (0.083 to 0.134)	0.000	

Heterogeneity statistics: $Q = 17.366$; $P = 0.136$; $I^2 = 30.900$

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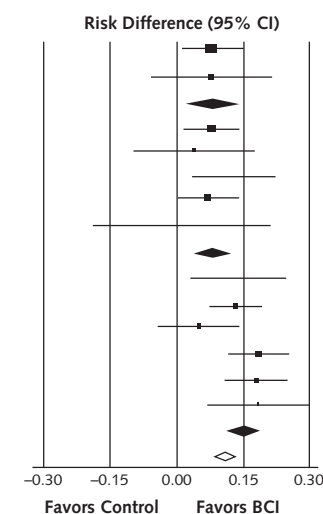
No Heavy Drinking Episodes at 12 mo

Study (Reference)	BCI Subgroup	Risk Difference (95% CI)	P Value	Risk Difference (95% CI)
Anderson and Scott (29)	Brief	0.167 (0.023 to 0.311)	0.023	
Scott and Anderson (49)	Brief	0.030 (−0.128 to 0.188)	0.71	
Subgroup total		0.102 (−0.032 to 0.236)	0.134	
Curry et al (31)	Brief, multicontact	0.050 (−0.033 to 0.133)	0.24	
Project TrEAT (33, 35–37, 39)	Brief, multicontact	0.141 (0.074 to 0.208)	0.000	
Project Health (42–44)	Brief, multicontact	0.060 (−0.033 to 0.153)	0.20	
Rubio et al (46)	Brief, multicontact	0.149 (0.080 to 0.218)	0.000	
Subgroup total		0.106 (0.056 to 0.157)	0.000	
SIP trial (55–57) (full care)	Extended, multicontact	0.189 (0.020 to 0.358)	0.029	
SIP trial (55–57) (stepped care)	Extended, multicontact	0.193 (0.031 to 0.355)	0.020	
Subgroup total		0.191 (0.074 to 0.308)	0.001	
Total		0.118 (0.074 to 0.162)	0.000	

Heterogeneity statistics: $Q = 8.457$; $P = 0.294$; $I^2 = 17.232$

−0.50 −0.25 0.00 0.25 0.50
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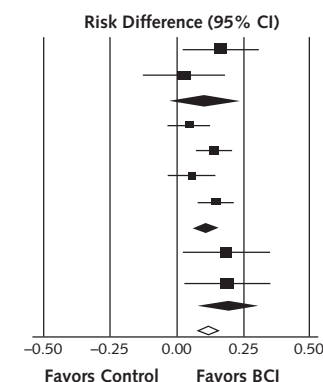
BCI = behavioral counseling intervention; ELM = Early Lifestyle Modification; SIP = Screening and Intervention in Primary Care; TrEAT = Trial for Early Alcohol Treatment; WHO BISG = World Health Organization Brief Intervention Study Group.

Table 3. Effectiveness and Strength of Evidence of Behavioral Interventions Compared With Controls for Improving Health, Utilization, and Other Outcomes, by Population*

Outcomes	Adults		Older Adults	Young Adults/College Students	
	Results	Strength of Evidence	Strength of Evidence	Results	Strength of Evidence
Health outcomes					
Mortality	Rate ratio, 0.64 (95% CI, 0.24 to 1.7); 4 trials; 2006 participants†	Low	Insufficient	1 death reported in a control group	Insufficient
Alcohol-related accidents‡	–	Insufficient	Insufficient	Fewer motor vehicle crashes with nonfatal injuries (9 vs. 20 crashes; $P < 0.05$) and fewer total motor vehicle events (114 vs. 149 events; $P < 0.05$) after 48 mo§	Low
Alcohol-related liver problems	–	Insufficient	Insufficient	–	Insufficient
Utilization outcomes					
Hospitalization	Fewer hospital days in the past 6 mo at 6, 12, and 48 mo: 35 vs. 180 d, 91 vs. 146 d, and 420 vs. 664 d, respectively; all $P < 0.05$§	Low	Insufficient	Fewer hospital days but no statistically significant difference (131 vs. 150 d; P = not significant)§	Low
Emergency visits	No statistically significant difference‖	Low	Insufficient	Fewer emergency department visits (103 vs. 177 visits; $P < 0.01$)§	Low
Primary care visits	No significant difference (weighted mean difference, −0.14 visits [95% CI, −0.5 to 0.2 visits]; 4 trials; 946 participants)	Low	Insufficient	–	Insufficient
Other outcomes					
Academic problems	–	–	–	Fewer consequences related to academic role expectations: rate ratio between 0.70 and 0.80¶	Moderate
Legal problems**	No significant difference over 48 mo for most legal problems but fewer controlled substance/liquor violations (2 vs. 11 violations; $P < 0.05$)§	Low	Insufficient	No significant difference for most legal problems but fewer controlled substance/liquor violations (0 vs. 8 violations; $P < 0.01$)§	Low
Quality of life	No difference found in 3 trials (353 participants)	Low	Insufficient	–	Insufficient

* Data are reported for 12-mo outcomes unless otherwise noted.
† A meta-analysis that combined all age groups (adults, older adults, and young adults/college students) also found no statistically significant reduction in mortality (rate ratio, 0.52 [95% CI, 0.22 to 1.2]; 6 trials; 2255 participants), although point estimates trended toward favoring behavioral interventions. Few trials reported mortality, additional studies would be needed to increase precision, and few long-term data are available.
‡ "Accidents" indicates motor vehicle events and injuries.
§ Data are from Project TrEAT (Trial for Early Alcohol Treatment) (33, 35, 36), the best available evidence. The data for young adults are from Project TrEAT subgroup analyses (226 participants).
‖ Results trended in favor of the intervention group at 6, 12, and 48 mo: 47 vs. 70 visits ($P > 0.10$), 60 vs. 62 visits ($P > 0.10$), and 302 vs. 376 visits ($P < 0.10$), respectively (33, 35, 36).
¶ Evidence from 2 trials (576 and 104 participants) conducted in New Zealand.
** Includes assault, battery, or child abuse; resisting or obstructing an officer or disorderly conduct; criminal or property damage; theft or robbery; and other arrests.

interventions for consumption outcomes. Data showed a tendency toward greater reduction in consumption for interventions delivered in academic- or research-oriented settings than for those delivered in community-based settings (weighted mean difference, −5.0 drinks/wk [CI, −7.6 to −2.5 drinks/wk] vs. −3.2 drinks/wk [CI, −4.3 to −2.2 drinks/wk]; 3 vs. 7 trials). Interventions delivered mostly by primary care providers showed a tendency toward greater reduction in consumption than did those delivered primarily by research personnel (weighted mean difference, −4.0 drinks/wk [CI, −5.4 to −2.6 drinks/wk] vs. −3.0 drinks/wk [CI, −5.0 to −1.0 drinks/wk]; 7 vs. 2 trials). Our consumption meta-analysis included only 1 intervention delivered by a nurse (52), and the reduction was not statistically significant in that study (weighted mean difference, −0.2 drinks/wk [CI, −8.9 to 8.6 drinks/wk]). Two

other studies, each of which provided insufficient data for our consumption meta-analysis, reported benefits of interventions delivered primarily by nurses (51) or by nurses and physician assistants (53) for some consumption outcomes. In addition, 2 interventions conducted by computer reported some evidence of effectiveness for reduced consumption in college students (64–66).

DISCUSSION

We found no studies that directly addressed our overarching question (key question 1)—no studies randomly assigned patients, practices, or providers to screening and comparator groups and subsequently provided interventions for those with positive screening results. All of the

included studies randomly assigned patients after they had received positive screening results.

We found that behavioral counseling interventions improved drinking behavior outcomes (moderate SOE) and reduced hospital days (low SOE) for adults with risky drinking. For most health outcomes, available evidence either found no difference between intervention and control groups, such as for mortality (low SOE), or was insufficient to draw conclusions, such as for alcohol-related liver problems (insufficient SOE). Long-term outcomes from 2 studies (33, 35–37, 39, 42, 43) revealed that participants in the intervention groups maintained reductions in consumption or continued to reduce consumption, but differences between intervention and control groups were no longer statistically significant by 48 months. Studies identified delayed reduction in consumption in control groups that could reflect the natural history of alcohol consumption, the cumulative effect of follow-up with the health care system, differential attrition (if more participants lost to follow-up in the control group were risky drinkers), or (late) regression to the mean.

The evidence for effectiveness in adults is strongest for brief multicontact interventions. The effect sizes for these interventions were greater than those for other intensities (although CIs often overlapped). In addition, the best studies show that the effect of brief multicontact interventions remains for several years (35, 36, 43) and also show improvement for some utilization outcomes, such as fewer hospital days (35, 36) and costs (benefit–cost ratio of 39:1 over 48 months [CI, 5.4 to 72.5]) (36).

The brief multicontact interventions generally lasted 10 to 15 minutes per contact. All of the brief multicontact interventions in our meta-analyses of behavioral outcomes at 12 months were delivered by primary care providers, sometimes with additional intervention from a nurse or health educator. For example, the intervention in Project TrEAT (Trial for Early Alcohol Treatment) (33) included two 15-minute visits with a primary care provider 1 month apart and two 5-minute follow-up phone calls from a nurse 2 weeks after each visit. The intervention also included feedback about health behaviors, a review of problem drinking prevalence, a list of the adverse effects of alcohol, a worksheet on drinking cues, a drinking agreement or prescription, and drinking diary cards. Of note, 2 studies of brief multicontact interventions in adults, both of which provided insufficient data for our meta-analyses, reported benefits of interventions delivered primarily by nurses (51) or by nurses and physician assistants (53) for some consumption outcomes.

Evidence suggests that very brief interventions (up to 5 minutes, single-contact) and brief interventions (up to 15 minutes, single-contact) are less effective or ineffective, depending on the outcome. Although extended multicontact interventions seem to be effective for improving intermediate outcomes, we found no evidence that they are more effective than brief multicontact interventions.

The only included study that enrolled pregnant women (250 participants) (30) found no difference in reduced consumption between groups but did find higher rates of continued abstinence among women who were abstinent before the assessment in the intervention group than among those in the control group. Our searches identified other studies focusing on pregnant women that did not meet our inclusion criteria (67–84). Several took place in such settings as jails or specialized drug and alcohol treatment centers (75), and others lacked a control group or followed participants for fewer than 6 months (73, 84). Several of these studies reported benefits of interventions, including reduced consumption (73, 84), reduced risk for an alcohol-exposed pregnancy (75), higher rates of abstinence (79), and better fetal and newborn outcomes (higher birth weights and lengths and reduced fetal mortality rates [79]).

We have described several categories of alcohol misuse (such as risky or hazardous use and alcohol dependence). These categories are not all discrete (an individual may meet the definition for more than one). Included trials generally enrolled participants with risky or hazardous drinking, but the trials used varying terminology to describe the populations and often enrolled heterogeneous samples. Nevertheless, most investigators excluded participants with alcohol dependence or constructed their inclusion and exclusion criteria to substantially limit the number of such participants. Our best assessment is that our overall findings apply to risky or hazardous drinkers but not to persons with alcohol dependence. It is uncertain whether our findings apply to harmful drinkers or persons with alcohol abuse.

All interventions required support systems to provide screening; screening-related assessment; and in some cases, provider prompting. Screening assessments were often multistep processes that included interviews with research personnel that lasted up to 30 minutes. Less time would be required for screening and screening-related assessments in primary care practice. We estimate that 5 to 10 minutes would be required for persons who had positive screening results, with most of the time used to assess whether such persons have alcohol abuse or dependence (and should probably be referred for specialized treatment) as opposed to risky or hazardous drinking (for which behavioral counseling interventions in primary care may be effective). Nevertheless, support systems are probably required for effective screening and intervention. In addition, most interventions required training providers or staff.

It is unclear whether our findings apply to persons with certain comorbid conditions, and some researchers have suggested that brief behavioral interventions may be ineffective or less effective in people with comorbid psychiatric conditions. A subgroup analysis from a German study (56) found that brief interventions did not reduce drinking among 88 participants with comorbid anxiety or depression. Although most trials in our review did not exclude

persons with depression, anxiety, or chronic pain, it is unclear how many participants with these conditions were included in most trials.

A previous systematic review (85) found no evidence of efficacy for brief behavioral interventions in patients with alcohol dependence in primary care settings. Our review also found no such evidence. Included studies that enrolled more than 10% of participants with alcohol dependence reported interventions to be ineffective or less effective than studies that did not enroll alcohol-dependent participants.

Screening for alcohol misuse will inevitably identify some alcohol-dependent individuals; thus, providers and those making recommendations need information about whether effective interventions are available for alcohol dependence. If complete abstinence is used as an outcome, 15% to 35% of patients have been reported to achieve 1 year of sobriety after such treatment approaches (86) as pharmacotherapy, motivational enhancement therapy, cognitive behavioral therapy, 12-step facilitation, and therapy at alcoholism-treatment centers. Similar sobriety outcomes at 3 to 5 years or longer have been reported (9).

Our review has limitations. First, the scope of our review was limited to primary care settings. Second, most evidence involved self-report of alcohol use. Investigators in some trials verified self-reported use with other persons (such as family members). Self-report of alcohol use has been found to be accurate if collected carefully (87, 88). Third, the assessments conducted in the included trials could have concealed benefits of interventions (and biased results toward the null) by causing behavior changes. Control participants generally reduced alcohol consumption. Possible explanations include increased awareness of drinking, discussions with their provider about drinking that were prompted by the screening questions, receipt of some minimal intervention (control groups in the included studies often received some printed educational materials), or regression to the mean. A recent systematic review (89) concluded that answering questions on drinking in brief intervention trials seems to alter subsequent self-reported behavior, potentially generating bias by exposing nonintervention control groups to an integral component of the intervention. Finally, publication bias and selective reporting may be present.

In conclusion, behavioral counseling interventions improve intermediate outcomes, such as alcohol consumption, heavy drinking episodes, and drinking above recommended amounts (moderate SOE) and may reduce hospital days (low SOE) for adults with risky or hazardous drinking. For most health outcomes, available evidence found no difference between intervention and control groups, such as for mortality (low SOE), or was insufficient to draw conclusions about the effectiveness of behavioral interventions, such as for alcohol-related accidents or quality of life (insufficient SOE). Brief multicontact interventions (about 10 to 15 minutes per contact) have the best evidence of effectiveness for adults.

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Appendix Table 1. **Key Questions for This Systematic Review**

1. What is the direct evidence that screening for alcohol misuse followed by a behavioral counseling intervention, with or without referral, leads to reduced morbidity (e.g., alcohol-related morbidity or alcohol-related accidents and injuries), reduced mortality, or changes in other long-term (≥6 mo) outcomes (e.g., health care utilization, sick days, costs, legal issues, or employment stability)?

2. How do specific screening modalities compare with one another for detecting alcohol misuse?

3. What adverse effects are associated with screening for alcohol misuse and screening-related assessment?

4a. How do behavioral counseling interventions, with or without referral, compare with usual care for improving intermediate outcomes (e.g., change in mean number of drinks per drinking day or heavy drinking episodes) for people with alcohol misuse as identified by screening?

4b. How do specific behavioral counseling approaches, with or without referral, compare with one another for improving intermediate outcomes for people with alcohol misuse as identified by screening?

5. What adverse effects are associated with behavioral counseling interventions, with or without referral, for people with alcohol misuse as identified by screening?

6. How do behavioral counseling interventions, with or without referral, compare with one another and with usual care for reducing morbidity (e.g., alcohol-related morbidity or alcohol-related accidents and injuries), reducing mortality, or changing other long-term (≥6 mo) outcomes (e.g., health care utilization, sick days, costs, legal issues, or employment stability) for people with alcohol misuse as identified by screening?

7. To what extent do health care system influences promote or hinder effective screening and interventions for alcohol misuse?
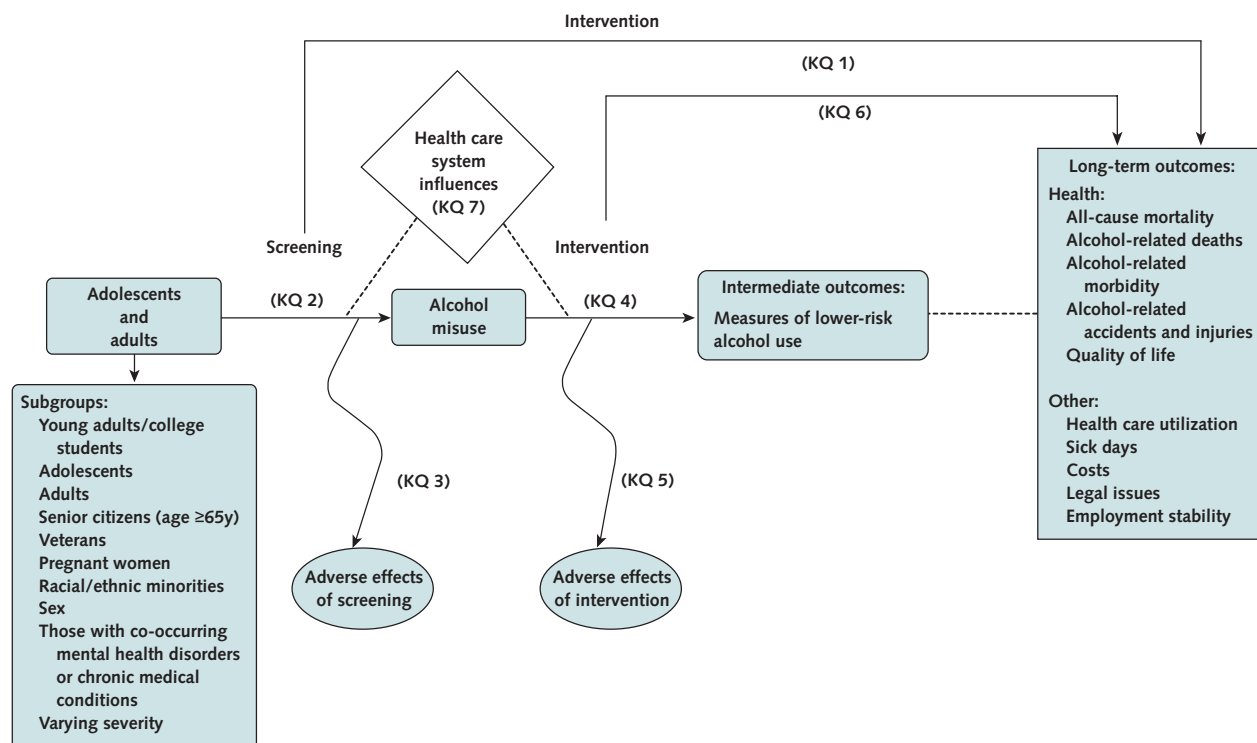
KQ = key question.

Grade	Definition
High	High confidence that the evidence reflects the true effect. Further research is very unlikely to change our confidence in the estimate of effect.
Moderate	Moderate confidence that the evidence reflects the true effect. Further research may change our confidence in the estimate of the effect and may change the estimate.
Low	Low confidence that the evidence reflects the true effect. Further research is likely to change our confidence in the estimate of the effect and is likely to change the estimate.
Insufficient	Evidence either is unavailable or does not permit estimation of an effect.

* From reference 28.

Records identified through database searches (*n* = 8993)
    MEDLINE: 3980
    International Pharmaceutical Abstracts,
      CINAHL, and PsycINFO: 468
    EMBASE: 1819
    The Cochrane Library: 2726

Records identified through other sources (*n* = 443)
    Hand searches of reference lists: 227
    ClinicalTrials.gov: 282 trials (216 publications)

Duplicates removed (*n* = 3159)

Records screened (*n* = 6277)

Excluded (*n* = 5559)

Full-text articles assessed for eligibility (*n* = 718)

Full-text articles excluded (*n* = 680)
    Non–English-language: 9
    Wrong publication type: 201
    Wrong populations, interventions,
      comparators, outcomes, timing,
      settings, or study design: 454
    Poor quality: 10
    Systematic review or meta-analysis
      older than 5 y: 6

Trials included in qualitative synthesis (*n* = 23 [38 articles])

Trials included in quantitative synthesis (*n* = 19)

Study, Year (Reference)	Participants (Alcohol-Dependent), n (%)	Duration, mo	Country or State	Setting	Mean Age, y*	Women, %*	Nonwhite, %*	Baseline Alcohol Consumption, drinks/wk*	Quality
Adults									
Anderson and Scott, 1992 (29)	154 (NR)	12	United Kingdom	8 PC group practices	43–45.1	0	NR	37.9–38.8	Fair
WHO BISG, 1996 (63)	1559 (0)	9	8, including United States	Outpatient medical settings	35.9–36.9	19.2	NR	NR	Fair
SIP Trial (55–57)	408 (30.4)	12	Germany	85 general practices	35.9–36.8	31.9	NR	21–25.2	Fair
Curry et al, 2003 (31)	307 (NR)	12	Washington	23 PCPs in an HMO and an urban clinic	47	35	20	14.2	Fair
Project TrEAT (33, 35–37, 39)	774 (NR)†	48	Wisconsin	17 community PC practices	NR‡	38	5.6–11.9	18.9–19.1	Good
Fleming et al, 2008 (51), and Wilton et al, 2009 (54)	235 (NR)	6	Wisconsin	34 obstetric practices	Median, 28	100	18.3	8–8.5	Good
Lock et al, 2006 (52)	127 (0)	12	United Kingdom	General practices	44.1	50	NR	23–26.48	Fair
ELM Trial (59–61)	301 (NR)	12	Pennsylvania	12 PC clinics	45.6	30.2	23.3	15.5–18.6	Fair
Noknoy et al, 2010 (53)	117 (13.8–15.3)§	6	Thailand	Rural PC units	37	8.5	100 (Thai)	15.15	Fair
Project Health (42–44)	530 (2)	48	Massachusetts	4 PC sites (93 clinicians)	43.5–44.2	32.1–38.7	4.3–6.6	16.6–18.9	Fair
Richmond et al, 1995 (45)	378 (35)‖	12	Australia	40 PC practices	37.7	43	NR	38.5	Fair
Rubio et al, 2010 (46)	752 (0)	12	Spain	20 PC centers in Madrid	NR; >70% were 31–40	34.7	NR	26.90–27.42	Fair
Saitz et al, 2003 (47)	312 (NR)	6	Massachusetts	Urban academic PC practice	42.2–43.7	29–43	80–82	Mean, 5.5–5.6 drinks per drinking day	Fair
Scott and Anderson, 1991 (49)	72 (NR)	12	United Kingdom	8 PC group practices	44.4–47.2	100	NR	25.8–26.7	Fair
Freeborn et al, 2000 (58), and Senft et al, 1997 (62)	516 (0)	24	Oregon	3 PC clinics in an HMO	41.9–43	28.1–31.1	17.4–18.7	16.5	Fair
Wallace et al, 1988 (50)	909 (NR)	12	United Kingdom	47 group practices	41.7–44.6	29.1–29.8	NR	35.1 (women) and 62.2 (men)	Fair
Older adults									
Fleming et al, 1999 (34), and Mundt et al, 2005 (41)	158 (0)	24	Wisconsin	24 PC practices	NR; >92% were 65–75	33.5	NR	15.5–16.6	Fair
Lin et al, 2010 (38), and Moore et al, 2011 (40)	631 (NR)	12	California	PC practices (145 PCPs)	68.4	29	13	15.2	Fair
Young adults/college students									
Fleming et al, 2010 (32)	986 (0)	12	United States and Canada	5 college health clinics	21	50.5–51.3	8.1–10.5	17.3–17.8	Good
Grossberg et al, 2004 (37)	226 (NR)¶	48	Wisconsin	17 community PC practices	NR**	51	14	16.2–18.3	Good¶
Kypri et al, 2007 (64), and Kypri et al, 2008 (65)	576 (NR)	12	New Zealand	University primary health care service	20.1–20.3	52	NR	NR	Good
Kypri et al, 2004 (66)	104 (NR)	6	New Zealand	University student health service	19.9–20.4	50	NR	NR	Fair
Schaus et al, 2009 (48)	363 (0)	12	Florida	College student health center	20.6	52	22	8.4–9.6	Fair
Pregnant women									
Chang et al, 1999 (30)	250 (0 current)††	About 6	Massachusetts	Obstetric practices	30.7	100	22	Mean, 0.6–0.9 drinks per drinking day‡‡	Fair

ELM = Early Lifestyle Modification; NR = not reported/unclear; PC = primary care; PCP = primary care physician; SIP = Screening and Intervention in Primary Care; TrEAT = Trial for Early Alcohol Treatment; WHO BISG = World Health Organization Brief Intervention Study Group.

* When data were not reported for the total sample but were presented for each study group, the range of the means for the various study groups are reported.

† According to a medical record audit, 6 participants received formal alcohol treatment during the 1-y follow-up; those 6 may ultimately have received a diagnosis of alcohol dependence.

‡ Group 1, men: age 18–30 y, 20.2%; 31–40 y, 27.2%; 41–50 y, 23.9%; 51–65 y, 28.8%. Group 1, women: age 18–30 y, 43.5%; 31–40 y, 25.9%; 41–50 y, 15.6%; 51–65 y, 15.0%. Group 2, men: age 18–30 y, 26.0%; 31–40 y, 25.1%; 41–50 y, 21.3%; 51–65 y, 27.7%. Group 2, women: age 18–30 y, 35.7%; 31–40 y, 35.7%; 41–50 y, 18.2%; 51–65 y, 10.5%.

§ Based on an Alcohol Use Disorders Identification Test score >25.

‖ Percentage with moderate physical dependence based on the physical dependence score from the Comprehensive Drinker Profile. The study excluded participants with evidence of severe alcohol dependence (physical dependence score >10) or those with severe levels of alcohol-related problems (Michigan Alcohol Screening Test score >20).

¶ In this subgroup analysis of TrEAT (33), 226 of 774 enrolled participants were young adults (aged 18 to 30 y).

** Age 18–21 y, 21%; 22–25 y, 37%; and 26–30 y, 47%.

†† None of the 250 participants satisfied *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised,* criteria for current alcohol abuse or dependence (not reported separately) and 3 participants had been treated for an alcohol problem.

‡‡ While pregnant, including abstainers. The reported mean excluding abstainers was 1.5–2.1 drinks per drinking day while pregnant.

Appendix Table 4. Description of Behavioral Counseling Interventions, by Intervention Intensity

Population and Type of Intervention	Study, Year (Reference)	Intervention	Delivered By	Delivery Method	Contacts, n	Length of Each Contact
Adults						
Very brief	Richmond et al, 1995 (45)	Group 2: Physician advice and a self-help manual (after assessment)	PCP	In person	1	5 min
	WHO BISG, 1996 (63)	Group 1: Advice and an illustrated pamphlet	Various clinic staff	In person	1	5 min
Brief	Anderson and Scott, 1992 (29)	Brief advice, feedback about own consumption and norms, and a self-help booklet	PCP	In person	1	10 min
	Lock et al, 2006 (52)	Brief advice (drink-less protocol) on standard drink units, recommended consumption levels, benefits of cutting down, tips on reducing consumption, advice on goal-setting, action plan, and self-help booklet/diary	Nurse or PA	In person	1	5–10 min
	ELM Trial (59–61)	Brief advice that emphasized feedback from baseline results and implications for drinking, coupled with advice about a goal to reduce or stop alcohol consumption	Research staff	In person	1	10–15 min
	Scott and Anderson, 1991 (49)	Brief advice, feedback about own consumption and norms, and a self-help booklet	PCP	In person	1	10 min
	Freeborn et al, 2000 (58), and Senft et al, 1997 (62)	30-s message from PCP and 15-min session with health counselor immediately after PCP visit	PCP and study health counselor	In person	1	About 15 min
	WHO BISG, 1996 (63)	Group 2: Brief intervention and 30-page, illustrated problem-solving manual	Various clinic staff	In person	1	15 min
Brief multicontact	Curry et al, 2003 (31)	Brief motivational message from PCP during regularly scheduled visit, self-help manual, written personalized feedback, and ≤3 outreach phone counseling calls from health educator	PCP and research health educator	In person and phone	Up to 4	1–5 min PCP; mean for phone calls, 14 min
	Project TrEAT (33, 35–37, 39)	Two visits with PCP, 1 mo apart, and a follow-up phone call from the clinic nurse 2 wk after each visit; workbook containing feedback about current health behaviors, review of prevalence of problem drinking, list of adverse effects of alcohol, worksheet on drinking cues, drinking agreement or prescription, and drinking diary cards	PCP and nurse	In person and phone	4	15 min for PCP contacts; NR for phone calls
	Fleming et al, 2008 (51), and Wilton et al, 2009 (54)	Two visits, each with phone follow-up, and a workbook containing scripted messages with feedback about current health behaviors, prevalence of problem drinking, list of adverse effects of alcohol focused on women and pregnancy, worksheet on drinking cues, drinking agreement in the form of a prescription, and drinking diary cards	Nurse (90%) or obstetrician	In person and phone	4	15 min for in-person contacts; NR for phone calls
	Noknoy et al, 2010 (53)	Motivational enhancement protocol: Brief counseling sessions that used a patient-centered interviewing style and considered stages of change	Nurse or PA	In person	3	15 min
	Project Health (42–44)	Tailored consultation with a clinician plus follow-up visit, counseling (entailed talking about number of drinks/wk, heavy drinking episodes, or both), patient alcohol consumption information and education materials attached to the patient's chart by research assistants at regular office visit, and receipt of a health booklet at enrollment	PCP	In person	2	5–10 min
	Rubio et al, 2010 (46)	Brief advice given by using an intervention workbook containing a review of alcohol-related health effects, a pie chart displaying frequency of types of at-risk drinkers, list of methods for cutting down, a treatment contract, and cognitive behavioral exercises; phone reinforcement by a nurse, and a general health booklet	PCP	In person	2	10–15 min
	Wallace et al, 1988 (50)	Brief advice, an information booklet ("That's the Limit"), sex-based recommendations for limiting drinking, a drinking diary, and follow-up sessions	PCP	In person	1 to 5*	NR†
Extended multicontact	Bischof et al, 2008 (55)	Group 1 (full care) comprised immediate computerized postassessment feedback and multiple sessions of counseling by a psychologist	Trained psychologists from research team	Phone	4	Scheduled for 30 min each; mean received, 80.3 min
		Group 2 (stepped care) comprised immediate computerized postassessment feedback and a maximum of 3 counseling sessions with a psychologist; sessions were discontinued if patients indicated consumption below study criteria and high self-efficacy to maintain desired behavior	Trained psychologists from research team	Phone	Up to 4	Scheduled for 30–40 min each
	Richmond et al, 1995 (45)	Group 1 (the Alcoholscreen program) comprised 5 short consultations (introduction, patient education, 3 follow-ups) designed to reduce drinking to recommended limits and included a self-help manual, daily alcohol diary, and personalized patient education and counseling	PCP	In person	5	15–20 min (initial); 5–25 min (follow-ups)

Appendix Table 4—Continued

Population and Type of Intervention	Study, Year (Reference)	Intervention	Delivered By	Delivery Method	Contacts, n	Length of Each Contact
	ELM Trial (55–57)	Motivational enhancement: longer, main initial session; 2 shorter booster sessions; use of empathy and other techniques to enhance motivation; focus on feedback of assessment data and setting alcohol-use goals	Research staff	In person	3	30–45 min (main); 15–20 min (boosters)
Not reported or unknown	Saitz et al, 2003 (47)	Providing physicians with positive alcohol screening results and specific recommendations for their patients at a visit	PCP	In person	NR/unknown‡	NR/unknown‡
Older adults						
Brief multicontact	Fleming et al, 1999 (34), and Mundt et al, 2005 (41)	General health booklet plus drinking behavior feedback (workbook), review of problem-drinking prevalence, reasons for drinking, adverse effects of alcohol, drinking cues, a "prescribed" drinking agreement, and drinking diary cards	PCP and nurse	In person and phone	4	10–15 min for PCP contacts; NR for phone calls
Extended multicontact	Lin et al, 2010 (38), and Moore et al, 2011 (40)	Personalized risk report and diary for tracking alcohol use; PCP gave oral and written advice in prescription style via an alcohol education booklet, followed by additional feedback and counseling with motivational interviewing from a health educator at weeks 2, 4, and 8	PCP and health educator	In person and phone	4	15–20 min
Young adults/college students						
Brief	Kypri et al, 2007 (64), and 2008 (65)	Web-based assessment and personalized feedback on drinking	Self	Computer	1	10–15 min
	Kypri et al, 2004 (66)	Web-based assessment and personalized feedback on drinking	Self	Computer	1	10–15 min
Brief multicontact	Fleming et al, 2010 (32)	Two visits 1 month apart with PCP and a follow-up phone call or e-mail from the PCP after each visit; feedback about current behaviors, review of prevalence of high-risk drinking among college students, list of alcohol's adverse consequences relevant to college students, lists of personal likes and dislikes of drinking, worksheets on drinking cues, BAC level calculator, life goals and alcohol effects, prescription agreement, and drinking diary cards	PCP	In person	4	15 min
	Grossberg et al, 2004 (37)	Subgroup analysis of young adults enrolled in Project TrEAT (Fleming et al, 1997 [33])	PCP and nurse	In person	4	15 min
	Kypri et al, 2007 (64), and 2004 (66)	Web-based assessment and personalized feedback on drinking	Self	Computer	3	10–15 min
Extended multicontact	Schaus et al, 2009 (48)	Motivational intervention sessions that combined patient-centered motivational interviewing and cognitive–behavioral skills training plus a booklet on alcohol prevention	PCP	In person	2	20 min
Pregnant women						
Extended	Chang et al, 1999 (30)	Review of lifestyle changes made since pregnancy, articulation of drinking goals, identification of circumstances in which participant might be tempted to drink, alternatives to drinking in such situations, take-home manual with tailored notes, and U.S. Surgeon General recommendation	PCP and researcher	In person	1	2-h assessment, 45-min intervention

BAC = blood alcohol content; ELM = Early Lifestyle Modification; NR = not reported; PA = physician assistant; PCP = primary care physician; TrEAT = Trial for Early Alcohol Treatment; WHO BISG = World Health Organization Brief Intervention Study Group.
* All participants received an invitation to a 1-mo follow-up; other follow-up was offered at 4, 7, and 10 mo at the discretion of the practitioner.
† Not reported in the article. Physicians were trained to do "up to 15 minutes," and the author believes sessions were generally 10–15 min (Wallace P. Personal communication.).
‡ No particular behavioral intervention was required; the intervention was to provide physicians with positive screening results. On the basis of assessment immediately after the visit, some discussion about drinking was reported for 51% (residents) to 74% (faculty) of visits in the intervention group and 70% (residents) and 51% (faculty) in the control group.