The AUDIT Alcohol Consumption Questions (AUDIT-C)

An Effective Brief Screening Test for Problem Drinking

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Objective: To evaluate the 3 alcohol consumption questions from the Alcohol Use Disorders Identification Test (AUDIT-C) as a brief screening test for heavy drinking and/or active alcohol abuse or dependence.

Methods: Patients from 3 Veterans Affairs general medical clinics were mailed questionnaires. A random, weighted sample of Health History Questionnaire respondents, who had 5 or more drinks over the past year, were eligible for telephone interviews (N = 447). Heavy drinkers were oversampled 2:1. Patients were excluded if they could not be contacted by telephone, were too ill for interviews, or were female (n = 54). Areas under receiver operating characteristic curves (AUROCs) were used to compare mailed alcohol screening questionnaires (AUDIT-C and full AUDIT) with 3 comparison standards based on telephone interviews: (1) past year heavy drinking ($>$14 drinks/week or $\geq$5 drinks/occasion); (2) active alcohol abuse or dependence according to the *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition,* criteria; and (3) either.

Results: Of 393 eligible patients, 243 (62%) completed AUDIT-C and interviews. For detecting heavy drinking, AUDIT-C had a higher AUROC than the full AUDIT (0.891 vs 0.881; *P* = .03). Although the full AUDIT performed better than AUDIT-C for detecting active alcohol abuse or dependence (0.811 vs 0.786; *P*<.001), the 2 questionnaires performed similarly for detecting heavy drinking and/or active abuse or dependence (0.880 vs 0.881).

Conclusions: Three questions about alcohol consumption (AUDIT-C) appear to be a practical, valid primary care screening test for heavy drinking and/or active alcohol abuse or dependence.

HEAVY DRINKING and alcohol abuse and/or dependence are common among primary care patients,[1-3] and result in considerable suffering,[4-6] mortality,[4,5,7,8] and economic costs.[9] The risk of alcohol-related psychosocial, legal, and economic problems increases when drinking exceeds 14 drinks a week or 5 or more drinks per occasion for men.[10,11] Referral to specialized alcohol treatment is effective for alcohol-dependent patients.[12,13] Over the last 10 years, primary care interventions with heavy-drinking men have been shown to decrease consumption, blood pressure, levels of serum γ-glutamyl transferase, and days hospitalized.[14-17]

Unfortunately, primary care patients who might benefit from brief, alcohol-related interventions or referral are often unrecognized until serious complications of drinking have developed.[2,3] Despite the availability of standardized questionnaires that effectively screen for heavy and problem drinking in primary care settings[18-20] and compelling evidence of the benefits of screening and intervention,[14-17,21-23] physicians usually do not use these questionnaires in the absence of a clinicwide screening program.[2,24,25]

A major obstacle to routine screening for heavy drinking and/or alcohol abuse or dependence is the lack of a valid, practical screening test. The optimal screening test for problem drinking would be brief and acceptable to both clinicians and patients. It would also have excellent sensitivity for heavy drinking that had not yet resulted in adverse consequences, as well as for active alcohol abuse or dependence. To date, no screening questionnaire fully satisfies these criteria.

The 4-item CAGE is the briefest effective screening test for lifetime alcohol abuse and/or dependence,[26] but it is insensitive for detecting heavy drinking and does not distinguish between active and past problem drinking.[20,27,28] Moreover, although physicians appear to know the 4

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PATIENTS AND METHODS

SETTING

This study, conducted at 3 VA Medical Centers, was based on data from questionnaire validation studies performed as part of a larger study dealing with health status measurement and feedback in general medical clinics. The alcohol validation studies are described in detail elsewhere but are summarized briefly herein.[20]

PATIENTS

Of 9513 general medical patients, 330 (3%) were excluded because of lack of an accurate mailing address or other exclusion criteria such as residence in a nursing home or participation in a conflicting study, and 9183 were mailed baseline Health History Questionnaires (HHQs). A subset of 447 respondents who drank alcohol was selected for interviews (see below). Selected patients were excluded if they had no telephone (n = 24), did not answer calls over a 2-week period (n = 19), were too ill or deaf to participate in a telephone interview (n = 5), or were female (n = 6). Women were excluded because alcohol screening questionnaires function differently in men and women,[29] and we had an inadequate number of women on which to base any conclusions regarding questionnaire performance.

MEASURES

Demographic data were obtained from the VA Decentralized Hospital Computing Program. The VA Decentralized Hospital Computing Program data on ethnicity was missing for 34% of participants. However, 89% of participants with data available were white. The baseline HHQ included questions about alcohol consumption, beginning with, "Over the past year, have you had a total of 5 or more drinks?"

The Drinking Practices Questionnaire (DPQ) included the 10-item AUDIT, a retrospective drinking diary, and questions about previous provider advice to decrease alcohol consumption or abstain, and readiness to change (full questionnaire available from us). The DPQ began with the 3 following AUDIT consumption questions (AUDIT-C):

1. How often did you have a drink containing alcohol in the past year? Consider a "drink" to be a can or bottle of beer, a glass of wine, a wine cooler, or one cocktail or a shot of hard liquor (like scotch, gin, or vodka). Response options were never (0 points); monthly or less (1 point); 2 to 4 times a month (2 points); 2 to 3 times a week (3 points); 4 to 5 times a week (4 points); or 6 or more times a week (4 points).

2. How many drinks did you have on a typical day when you were drinking in the past year? Response options were 0 drinks (0 points); 1 to 2 drinks (0 points); 3 to 4 drinks (1 point); 5 to 6 drinks (2 points); 7 to 9 drinks (3 points); or 10 or more drinks (4 points).

3. How often did you have 6 or more drinks on one occasion in the past year? Response options were never (0 points); less than monthly (1 point); monthly (2 points); weekly (3 points); or daily or almost daily (4 points).

The AUDIT was scored in the traditional manner with questions 1 to 8 scored 0 to 4 points, and questions 9 and 10 scored 0, 2, or 4 points. Possible scores ranged from 0 to 40. The AUDIT-C was scored in the same way, with the scores summed for a possible score of 0 to 12. In addition, we evaluated the third AUDIT question as a 1-item screening test with a possible score of 0 to 4. The AUDIT was scored if 5 or more questions (at least half) were answered.

Telephone interviews included a modified version of the World Health Organization trilevel alcohol consumption interview, followed by the computerized version of the alcohol module of the Diagnostic Interview Schedule for *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition*.[41,42] Interviews were performed by 1 of 5 interviewers who were experienced in alcohol-related interviews and blinded to all questionnaire results.

Three comparison standards were defined based on telephone interviews. We considered patients to be heavy drinkers if they drank more than 14 drinks a week or 5 or more drinks on one occasion in the past or a typical month based on the trilevel alcohol consumption interview. These criteria were based on evidence that men who drink above these levels have increased psychosocial and other adverse consequences of drinking.[10,11] We considered patients to have active alcohol abuse and/or dependence if they met criteria for lifetime alcohol abuse and/or dependence and had 1

CAGE questions, they seldom ask a patient all 4.[24] The Alcohol Use Disorders Identification Test (AUDIT) was developed specifically to identify patients with recent heavy drinking, as well as alcohol dependence, and performed significantly better than the CAGE as a screen for heavy drinking and/or active alcohol abuse or dependence in our study of Veterans Affairs (VA) general medical patients.[20] However, despite the AUDIT's demonstrated validity,[19,29,30] the AUDIT's 10-question length makes it unlikely that primary providers will incorporate it into routine patient interviews, or that it will be embedded into general health history questionnaires.

Several 2- and 3-item alcohol screening questionnaires have been evaluated. A 3-item questionnaire about alcohol consumption performed adequately for identification of active alcohol abuse or dependence but is unlikely to be widely adopted because of its low face validity: drinking 6 or more drinks a week was the threshold for a positive screening test.[31] An encouraging initial report of a 2-question screening test has not been replicated.[32-35] Other brief screening questionnaires have also not been shown to have adequate sensitivity for heavy drinking and/or active alcohol abuse or dependence in primary care populations using standardized comparison standards.[36-39]

We hypothesized that the third AUDIT question, which asks about the frequency of drinking 6 or more drinks on one occasion, might be an effective brief screening question for both heavy drinking and/or active alcohol abuse or dependence. Reports of drinking 5 or more drinks on any occasion in the past year had a sensitivity of 0.90 for last year alcohol abuse or dependence in men and 0.77 in women, based on the National Health Interview Survey.[40] The corresponding specificities were 0.53 and 0.77, in men and women, respectively. Others[10,11] have also found a strong association between heavy drinking

or more alcohol-related symptom(s) in the last year according to the computerized version of the alcohol module of the Diagnostic Interview Schedule.[31] We chose this definition, previously used by Buchsbaum and colleagues,[31] instead of requiring 3 symptoms in the past year as required for *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition,* criteria for last year abuse or dependence, because we believe that primary care providers should intervene with patients with lifetime alcohol abuse and dependence who have even 1 recent symptom. The third comparison standard was a composite of the first 2, including patients who met criteria for either heavy drinking and/or active alcohol abuse and/or dependence.

SURVEY DESIGN

The baseline HHQ was returned by 6116 (67%) of 9183 eligible patients, and the DPQ was subsequently mailed to 2875 HHQ respondents who reported drinking 5 or more drinks over the past year ("drinkers"). A random weighted sample of 447 drinkers was selected for interviews from among HHQ respondents, with "heavy drinkers" oversampled 2:1 to allow validation of questionnaire measures in adequate numbers of heavy drinkers. Heavy drinkers were those who reported drinking 14 or more drinks per typical week or 5 or more drinks per typical day on the HHQ. Eligible patients were called for interviews either immediately before the mailing of the DPQ or within 3 weeks of its return. Although patients randomized to be interviewed before the DPQ were more likely to return the DPQ, timing of interviews was not associated with any significant differences in DPQ responses; thus, the groups were combined for analyses.[20]

Of 393 eligible patients, 110 (28%) did not return the DPQ and 18 (5%) did not complete AUDIT-C. Twenty-two (6%) of all 393 eligible individuals refused interviews or did not complete telephone interviews. The analyses below are based on 243 patients who completed AUDIT-C and interviews.

ANALYSES

Sensitivity, specificity, and positive and negative likelihood ratios were calculated for the full AUDIT, AUDIT-C and AUDIT question 3 alone, for each comparison standard (heavy drinking, active alcohol abuse or dependence, and either or both).[43,44] Sensitivity (true-positive rate) is the percentage of all patients with heavy drinking and/or active alcohol abuse or dependence based on interview criteria who score above a threshold score on a screening questionnaire; specificity (true-negative rate) is the proportion of patients who do not meet criteria based on interviews who score below the threshold score. One minus specificity is the false-positive rate. Positive likelihood ratios are the sensitivity divided by (1 – specificity), whereas negative likelihood ratios are (1 – sensitivity) divided by specificity.[44] Likelihood ratios allow clinicians to calculate the postscreening probability that a patient who screens positive (or negative) actually drinks heavily or has active alcohol abuse or dependence, depending on the estimated prevalence in the screened population.

Receiver operating characteristic curves plot sensitivity vs (1 – specificity). Curves toward the upper left-hand corner of a receiver operating characteristic graph represent stronger screening tests. The areas under receiver operating characteristic curves (AUROCs) are useful for choosing which screening test offers the optimal combination of sensitivity and specificity overall. The higher the AUROC, the stronger the performance of a screening test. Areas under receiver operating characteristic curves higher than 0.80 are generally considered excellent. Receiver operating characteristic curves comparing the 3 screening tests with each comparison standard are presented graphically with areas under the curves and SEs depicted on the graph; 95% confidence intervals (95% CIs) are the AUROC ± (1.96 × SE). To compare AUROCs, we used the *z* statistic corrected to account for the correlation of curves derived from the same population.[45]

HUMAN SUBJECTS

This study was approved by the institutional review boards at the 3 VA medical centers from which patients were drawn (Seattle, Wash; White River Junction, Vt; and Boston, Mass), and the VA Center for Cooperative Studies in Health Services Research, Hines, Ill.

on any recent occasion and the development of alcohol-related problems. Preliminary analyses of our data from VA general medical patients revealed that 35% of drinkers reported drinking 6 or more drinks at least once during the past year, while only 19% scored positive on the AUDIT at a screening threshold of 8 or more points.[20] The objective of the analyses reported herein was to evaluate the performance of the third question of the AUDIT combined with the preceding AUDIT questions about typical frequency and quantity of drinking, as a 3-item screening test for active alcohol abuse or dependence and/or heavy drinking. We refer to this 3-item screening test as AUDIT-C, short for AUDIT consumption questions.

RESULTS

Table 1 presents demographic and clinical characteristics of the study participants and nonparticipants. Based on responses to the baseline HHQ, the 243 patients in the study drank less often (*P* = .005), tended to drink less per drinking day (*P* = .06), and smoked fewer cigarettes (*P* = .02), compared with 204 nonparticipants (Kendall τ-b). Among the 243 male patients included in these analyses, 86 (35%) met interview criteria for heavy drinking, 52 (21%) met criteria for active alcohol abuse or dependence, and 100 (41%) met criteria for either or both.

Receiver operating characteristic curves are depicted in the **Figure**, with AUROCs and 95% confidence intervals in **Table 2**. For detection of heavy drinking, AUDIT-C performed better than the entire AUDIT (*P* = .03), whereas the full AUDIT had a higher AUROC for detection of active alcohol abuse and/or dependence (*P* < .001). For detection of either heavy drinking and/or active alcohol abuse or dependence, the AUDIT-C had an AUROC equivalent to that of the full 10-item AUDIT (*P* = .83).

Table 1. Demographic and Clinical Characteristics of Participants and Nonparticipants*

Characteristic	Participants (n = 243)	Nonparticipants (n = 204)
Male	243 (100)	198 (97)
Age, y		
<50	22 (9)	24 (12)
50-59	20 (8)	38 (19)
60-69	94 (39)	78 (38)
≥70	106 (44)	64 (31)
Cigarette use		
Nonsmoker	141 (58)	112 (55)
<1 pack per day	32 (13)	31 (15)
≥1 pack per day	36 (15)	43 (21)
Alcohol use		
Frequency, more than once a week	125 (51)	121 (59)
Quantity >2 drinks per typical day	94 (39)	94 (46)
Medical conditions		
Hypertension	133 (55)	108 (53)
Diabetes	45 (19)	42 (21)
Coronary artery disease	91 (37)	83 (41)
Chronic obstructive lung disease	55 (23)	50 (25)
Depression	60 (25)	55 (27)

Based on the Veterans Affairs Decentralized Hospital Computing Program and Health History Questionnaires. All values are number (percentage).

Sensitivities and specificities are given in **Table 3**, and demonstrate the tradeoff between sensitivity and specificity at each cutoff. In general, sensitivity should take priority over specificity for alcohol screening in primary care settings, since further assessment by primary care providers is relatively easy and inexpensive. The AUDIT-C was more sensitive and specific for heavy drinking than for active alcohol abuse or dependence at each cutoff. However, the AUDIT-C was nevertheless sensitive for active alcohol abuse or dependence. Using a cutoff of 3, of a total of 12 points, the AUDIT-C would identify 90% of patients with active alcohol abuse or dependence and 98% of patients with heavy drinking, although the specificity was only 60% (false-positive rate 40%). For a more specific test, a cutoff of 4 or more identified 86% of patients with heavy drinking and/or active alcohol abuse or dependence (sensitivity), with a specificity of 72%.

Although the third question of the AUDIT alone did not perform as well overall as the full AUDIT or the AUDIT-C, this single question had acceptable sensitivity and excellent specificity. A report of ever drinking 6 or more drinks on any occasion in the last year identified 79% of heavy drinkers and 81% of patients with active alcohol abuse or dependence. Only 17% of patients who did not drink heavily and/or have active alcohol abuse or dependence screened falsely positive.

Positive likelihood ratios for the AUDIT-C ranged from 2.38 to 26.46 for identifying heavy drinking and/or active alcohol abuse or dependence (Table 2). The positive likelihood ratio is multiplied by the prescreening odds of a condition, to arrive at the postscreening odds of the condition given a patient with a positive screen. The prescreening odds that a patient has a condition is the estimated prevalence divided by (1 – estimated prevalence). For instance, if the prevalence of heavy drinking and/or active alcohol abuse or dependence in our screened

population of male drinkers is estimated at 33%,[18,46-48] the prescreening odds would be 1:2. Given this prevalence, a score of 4 or more points on the AUDIT-C (positive likelihood ratio, 3.07) would result in postscreening odds that the patient truly was a heavy drinker or had active alcohol abuse or dependence of about 3:2 (1:2 × 3.07), and a postscreening probability of about 60%. If, however, a patient responded to the third question of the AUDIT indicating that he drank 6 or more drinks at least monthly (positive likelihood ratio, 11.0), his postscreening odds of meeting interview criteria for heavy drinking or active alcohol abuse and/or dependence would be 11:2 (85% probability). Negative likelihood ratios can similarly be used to predict the postscreening probability that a patient who screens negative drinks heavily or has active alcohol abuse and/or dependence.


COMMENT

We found that the 3 questions of the AUDIT dealing with alcohol consumption (AUDIT-C) performed better than the full AUDIT for identification of heavy drinkers who might benefit from brief primary care interventions.[14] In addition, there was no significant difference between the 2 screening questionnaires for identification of patients with heavy drinking and/or active alcohol abuse or dependence. For identification of active alcohol abuse and/or dependence alone, however, the full AUDIT performed slightly better than the AUDIT-C. However, the AUDIT-C performed better than the commonly recommended CAGE screen (AUROC, 0.717), which identified only 56% of patients in the same population with heavy drinking and/or active alcohol abuse or dependence using the standard cutoff of 2 or more.[20]

This study had several limitations. We studied predominantly white, male veterans (mean age, 67 years) with multiple medical problems. Analyses were restricted to drinkers who responded to a mailed DPQ and we measured statistically significant response bias; nonparticipants smoked more cigarettes and drank alcohol more often than participants. Some patients may have been misclassified by questionnaires or interviews. We evaluated mailed questionnaires that were sometimes completed by proxy respondents. We also could not assure privacy during completion of questionnaires or telephone interviews, possibly leading to social desirability bias. Finally, this report evaluates a hypothesis that was generated after data were reviewed and therefore has all the potential weaknesses of posthoc analyses.

For these reasons, it will be essential to confirm our findings in other, less biased populations. Future research should also evaluate the third AUDIT question modified to reflect recent sex-specific data. For men, 5 or more drinks has been associated with symptoms related to drinking, whereas for women, 4 or more drinks per occasion has been found to increase the risk of alcohol-related problems.[10,11] Future studies should also evaluate the use of asking the third question of the AUDIT alone, outside the context of the complete AUDIT.[49-51]

Despite the limitations of our study, several factors lead us to believe that our findings will be replicated in other settings and populations. Our finding of a strong association between episodic heavy drinking and alcohol-
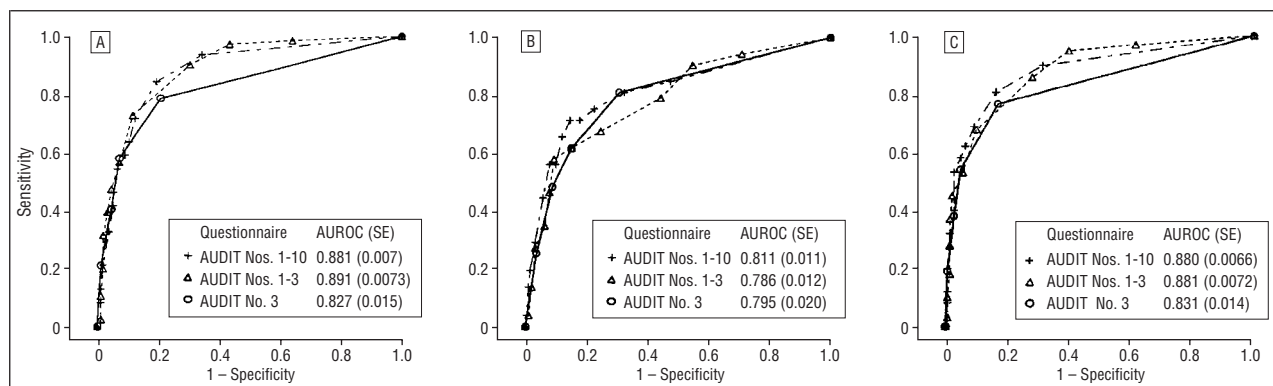
AUDIT Nos. 1 to 10 refers to the full 10-item Alcohol Use Disorders Identification Test; AUDIT Nos. 1 to 3, AUDIT consumption questions (AUDIT-C); AUDIT No. 3, the third question of the AUDIT alone; AUROC, areas under the receiver operating characteristic curves; A, heavy drinking; B, active alcohol abuse or dependence; and C, active alcohol abuse or dependence and/or heavy drinking. Comparison standards are defined in the "Methods" section of the text.

Table 2. AUROCs and Corresponding Statistics*

	Heavy Drinking	Active Alcohol Abuse or Dependence	Heavy Drinking and/or Active Alcohol Abuse or Dependence
AUDIT Questions 1-10	0.881 (0.007) (0.867-0.895)	0.811 (0.011) (0.789-0.833)	0.880 (0.007) (0.866-0.893)
AUDIT-Consumption Questions (AUDIT-C)	0.891 (0.007) (0.877-0.904)	0.786 (0.012) (0.762-0.810)	0.881 (0.007) (0.867-0.984)
AUDIT Question 3 alone	0.827 (0.015) (0.792-0.856)	0.795 (0.020) (0.795-0.834)	0.831 (0.014) (0.804-0.858)

*All values are areas under receiver operating characteristic curves (SE) and 95% confidence intervals. AUDIT indicates Alcohol Use Disorders Identification Test.

related symptoms or dependence is supported by several other studies.[10,11,40] In fact, we likely underestimated the sensitivity of alcohol screening questionnaires, resulting in conservative estimates of AUROCs. Unlike most studies of such questionnaires, we did not administer screening questionnaires and interviews at the same sitting to avoid consistency response bias that can inflate the performance of screening questionnaires. Excluding nondrinkers[30] and using self-administered questionnaires[20] may also have lowered the performance of screening questionnaires in our study. Because response bias probably exists in all screening and intervention studies relating to heavy drinking, it is a strength of this study that we were able to measure it.[52,53]

We suspect the AUDIT-C will gain increasing acceptance as a screening test among clinicians given the straightforwardness of the questions and evidence linking frequency of heavy drinking to alcohol abuse or dependence.[40,54] Recent studies reveal that many clinicians still do not ask about alcohol use,[25,55] or recognize and refer patients with heavy drinking or alcohol abuse and/or dependence.[2] We believe that the most effective approaches to screening will not involve primary care clinicians, but will rely instead on the use of surveys or ancillary staff to screen patients for multiple high-risk behaviors including heavy and dependent drinking. The AUDIT-C is easily integrated into general health history questionnaires for use in such programs.

For medical interviews, the third question of the AUDIT alone is potentially a more practical screen for identification of active drinking problems than the AUDIT-C, as response options and scoring for the latter may be difficult for clinicians to remember. Patients could be asked how often in the last year they had a drink containing alcohol. For patients who responded "never," screening would be complete. However, if patients reported any drinking in the last year, clinicians could then ask how much they typically drank as a lead-in to, "How often in the past year have you had 6 or more drinks on one occasion?" Ever drinking 6 or more drinks should be considered a positive screening test.

In summary, for the many clinicians who do not currently use a validated alcohol screening questionnaire, it is reasonable to begin asking patients who drink questions about typical frequency and quantity of drinking, and the frequency of drinking 6 or more drinks on one occasion. Previous research has demonstrated a strong association between the frequency of heavy drinking and alcohol dependence, and in our population, the AUDIT question about frequency of heavy drinking alone performed better than the CAGE and almost as well as the 10-question AUDIT for identification of heavy drinking and/or active alcohol abuse or dependence. Although sensitivities and specificities need to be confirmed in other populations, until that time our findings suggest appropriate thresholds for a positive AUDIT-C. A score of 3 or more points on the AUDIT-C, or a report of drinking 6 or more drinks on one occasion ever in the last year, should lead to a more in-depth assessment of drinking and related problems. Based on in-depth assessments, patients can be offered brief interventions or referrals as appropriate.[56,57]

Table 3. Performance of Screening Questionnaires Compared With 3 Comparison Standards*

Questionnaire Scores	Sensitivity, %	Specificity, %	+LR (95% CIs)	−LR (95% CIs)
Heavy Drinking				
AUDIT Questions 1-10				
≥4	94	66	2.75 (2.20-3.45)	0.09 (0.04-0.21)
≥5	85	81	4.39 (3.14-6.12)	0.19 (0.11-0.31)
≥6	72	88	5.88 (3.78-9.14)	0.32 (0.23-0.45)
≥7	64	90	6.20 (3.79-10.12)	0.40 (0.30-0.54)
≥8	59	91	6.57 (3.87-11.15)	0.45.(0.34-0.58)
≥9	55	94	8.47 (4.51-15.90)	0.48.(0.38-0.61)
AUDIT Consumption Questions (AUDIT-C)				
≥3	98	57	2.26 (1.88-2.71)	0.04 (0.01-0.16)
≥4	91	70	2.99 (2.33-3.83)	0.13 (0.07-0.26)
≥5	73	88	6.31 (4.01-9.92)	0.30 (0.21-0.43)
≥6	57	93	8.03 (4.41-14.6)	0.46 (0.36-0.59)
≥7	48	95	10.56 (4.95-22.50)	0.55 (0.45-0.67)
≥8	40	97	12.26 (4.98-30.18)	0.62 (0.53-0.74)
AUDIT Question 3 Alone				
≥Ever	79	79	3.83 (2.76-5.31)	0.26 (0.17-0.40)
≥Monthly	58	93	8.19 (4.51-14.89)	0.45 (0.35-0.58)
≥Weekly	41	95	9.01 (4.18-19.42)	0.62 (0.52-0.74)
Daily or almost	21	99	16.22 (3.86-68.25)	0.80 (0.72-0.89)
Active Alcohol Abuse or Dependence				
AUDIT Questions 1-10				
≥4	85	52	1.78 (1.47-2.14)	0.29 (0.15-0.56)
≥5	81	68	2.49 (1.95-3.18)	0.28 (0.16-0.50)
≥6	75	77	3.33 (2.45-4.53)	0.32 (0.20-0.52)
≥7	71	82	4.00 (2.82-5.67)	0.35 (0.23-0.54)
≥8	71	85	4.85 (3.31-7.12)	0.34 (0.22-0.52)
≥9	65	88	5.43 (3.53-8.36)	0.39 (0.27-0.57)
AUDIT-C				
≥3	90	45	1.64 (1.41-1.92)	0.21 (0.09-0.50)
≥4	79	56	1.77 (1.43-2.19)	0.38 (0.22-0.65)
≥5	67	75	2.74 (2.00-3.74)	0.43 (0.29-0.65)
≥6	62	85	4.05 (2.72-6.04)	0.45 (0.32-0.64)
≥7	58	91	6.12 (3.72-10.07)	0.47 (0.34-0.64)
≥8	46	92	5.88 (3.33-10.37)	0.58 (0.45-0.75)
AUDIT Question 3 Alone				
≥Ever	81	69	2.61 (2.04-3.36)	0.28 (0.16-0.49)
≥Monthly	62	85	4.05 (2.72-6.04)	0.45 (0.32-0.64)
≥Weekly	48	91	5.40 (3.17-9.22)	0.57 (0.44-0.74)
Daily or almost	25	96	6.82 (2.87-16.22)	0.78 (0.66-0.91)
Heavy Drinking and/or Active Alcohol Abuse or Dependence				
AUDIT Questions 1-10				
≥4	90	69	2.86 (2.23-3.67)	0.15 (0.08-0.27)
≥5	81	84	5.04 (3.42-7.41)	0.23 (0.15-0.34)
≥6	69	91	7.59 (4.45-12.96)	0.34 (0.25-0.46)
≥7	62	94	9.85 (5.14-18.89)	0.41 (0.31-0.52)
≥8	58	95	11.85 (5.64-24.87)	0.44 (0.35-0.56)
≥9	53	97	18.95 (7.09-50.67)	0.48 (0.39-0.60)
AUDIT-C				
≥3	95	60	2.38 (1.94-2.93)	0.08 (0.04-0.20)
≥4	86	72	3.07 (2.34-4.05)	0.19 (0.12-0.32)
≥5	68	90	6.95 (4.15-11.63)	0.35 (0.27-0.47)
≥6	53	94	9.47 (4.71-19.04)	0.50 (0.40-0.62)
≥7	45	98	21.45 (6.86-67.10)	0.56 (0.47-0.67)
≥8	37	99	26.46 (6.53-107.26)	0.64 (0.55-0.74)
AUDIT Question 3 Alone				
≥Ever	77	83	4.59 (3.14-6.71)	0.28 (0.19-0.40)
≥Monthly	54	95	11.0 (5.24-23.23)	0.48 (0.39-0.60)
≥Weekly	38	97	13.59 (5.01-36.86)	0.64 (0.55-0.75)
Daily or almost	19	99	27.17 (3.70-199.68)	0.82 (0.74-0.90)

LR indicates likelihood ratio; plus sign, positive; minus sign, negative; CIs, confidence intervals; and AUDIT, Alcohol Use Disorders Identification Test.

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