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# THE FAST ALCOHOL SCREENING TEST

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**Abstract** — Using the Alcohol Use Disorders Identification Test (AUDIT) as the gold standard, the Fast Alcohol Screening Test (FAST) was developed for use in busy medical settings. AUDIT questionnaires were completed by 666 patients in two London accident & emergency (A&E) departments. Using a principal components analysis, as well as sensitivity and specificity indices, a two-stage screening test was developed, using four of the AUDIT items. The first stage involved one item that identified >50% of patients as either hazardous or non-hazardous drinkers. The second stage made use of the other three items to categorize the rest. The performance of this four-item questionnaire was then tested across a range of settings. Opportunistic samples of 100 patients completed AUDIT questionnaires in each of the following National Health Service settings: A&E department, fracture clinic, primary health centre and a dental hospital. It was concluded that the four-item FAST questionnaire had good sensitivity and specificity, across a range of settings, when the AUDIT score was used as the gold standard. The FAST questionnaire is quick to administer, since >50% of patients are categorized using just one question.

## INTRODUCTION

Excessive alcohol consumption is a major risk factor for physical, social and mental health problems. In the UK, alcohol accounts for 80% of deaths from liver cirrhosis and is associated with increased levels of cancer and hypertension, as well as cardiovascular disease. Starting at low levels of intake, there is a steadily increasing risk of harmful social consequences such as assaults or family distress as levels of alcohol consumption increase (Raistrick *et al*., 1999). Quick and routine screening for alcohol-related problems within a wide range of health and social service settings has, therefore, become an important focus for research during the last decade.

Twenty-five years ago, the main focus of research workers and practitioners was severe alcohol dependence or alcoholism. It is only in recent years that there has been an attempt to broaden the base to include hazardous and harmful drinking as well as dependence (Institute of Medicine, 1990). This change is reflected in the screening instruments that were then developed, compared to those that have been developed more recently. The CAGE questionnaire (Mayfield *et al*., 1974) includes items such as guilt related to heavy drinking and taking alcohol first thing in the morning. There is no attempt to assess risky levels of consumption. The AUDIT questionnaire, on the other hand, includes questions about the quantity and frequency of alcohol consumption. It assesses hazardous and harmful, as well as dependent, drinking (Babor *et al*., 1989).

The AUDIT questionnaire is proving to be very useful in many community and hospital settings. It consists of just ten questions (see Appendix 1) and usually takes less than two minutes to complete. AUDIT was developed in a World Health Organization study and was validated across six countries. A solid body of evidence has demonstrated that sensitivity and specificity are high for criteria that define current hazardous use. Saunders *et al*. (1993) demonstrated that, for those diagnosed as having harmful or hazardous use, 92% had an AUDIT score of ≥8. For those with non-hazardous consumption 94% had a score of <8. Since its development, a number of independent studies have shown that the AUDIT questionnaire is a reliable and valid screening instrument (Barry and Fleming, 1993; Isaacson *et al*., 1994; Bohn *et al*., 1995; Schmidt *et al*., 1995; Allen *et al*., 1997; Volk *et al*., 1997; Bradley *et al*., 1998). It should be emphasized that, unlike most other alcohol screening tests, the AUDIT questionnaire was specifically designed to identify current hazardous alcohol consumption (as well as, at higher scores, harmful or dependent use). Mackenzie *et al*. (1996) compared sensitivities of the AUDIT, CAGE and the Brief Michigan Alcoholism Screening Test (MAST). Sensitivities for the identification of weekly drinking over recommended limits were 93, 79 and 35% respectively. Daeppen *et al*. (2000) provided further evidence of high sensitivity and specificity against an interview diagnosis of alcohol dependence (91.7 and 90.2% respectively), though low sensitivity for their diagnosis of 'at-risk drinking' based on consumption only. Similar results were obtained when the AUDIT items were incorporated into a General Health-Risk Screening Questionnaire. The AUDIT's test–retest reliability over a 6-week interval was assessed in this study and was found to be 0.88.

The AUDIT items have also been incorporated into a general population telephone survey (Ivis *et al*., 2000). In this study, it was demonstrated that changes in item ordering had no discernible effect on AUDIT scores.

It could therefore be concluded that the AUDIT questionnaire is a very useful and robust screening test. Nevertheless, there is an urgent need for a far shorter questionnaire that screens for hazardous drinking as well as dependence. This need is particularly strong in Accident and Emergency (A&E) departments and other medical settings where time pressure is a major factor (Hodgson *et al*., 2000*a*,*b*). Brief alcohol interventions as short as 5 min have been shown to be effective in reducing alcohol consumption within primary care settings (Wilk *et al*., 1997; Poikolainen, 1999). If alcohol misuse could be identified in <30 s then screening leading to a brief intervention is more likely to be a routine component of medical, mental health and social services.

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Using the AUDIT questionnaire as the gold standard, the aim of the present study was to consider the possibility that just a few of the AUDIT items can substitute for the full questionnaire. The high internal consistency of the questionnaire suggests that this should be the case. (Indices of internal consistency, including Cronbach's alpha are generally >0.80.) More specifically, is it possible to use each item as a sequential filter? If one question accounts for a large percentage of the variance, could this one question quickly identify a large percentage of the population as either hazardous or non-hazardous drinkers?

## MATERIALS AND METHODS

The development of the questionnaire involved the following six steps.

*Step 1*. AUDIT questionnaires were completed by 666 patients from two A&E departments in London, one inner city and the other suburban. The data were subjected to a principal components analysis, in order to identify the three highest loading items on the first component.

*Step 2*. The aim was to identify one question that would serve as a first filter. This was achieved by asking whether any of the three highest loading questions could identify >50% of participants as either true positives or true negatives with few false positives or false negatives ['positive' meaning scoring ≥8 on the 10-item AUDIT, which will be termed 'hazardous' (although including some higher scorers who might have reached criteria for harmful or even dependent drinking)].

*Step 3*. To develop a second filter, the other two highest loading questions were combined with each of the other seven AUDIT questions in order to identify the combination with the best sensitivity and specificity.

*Step 4*. The data for both filters were combined, so that the sensitivity and specificity of the test as a whole could be calculated.

*Step 5*. In order to ascertain whether this two-stage screening test would perform well in a range of settings, 100 AUDIT questionnaires were completed by an opportunistic sample of patients in each of the following National Health Service settings: a fracture clinic, a primary care health centre, an A&E department and a dental hospital, which follows up patients who have had maxillo-facial injuries.

*Step 6*. The last step involved fine-tuning. Could any of the questions be slightly modified in order to improve sensitivity or specificity? Could the percentage of participants identified as positive or negative by the first screening item be increased? This was investigated in a further sample recruited from the waiting rooms of two A&E departments, at an inner city hospital and in a market town in South Wales.

## RESULTS

### *Step 1*

AUDIT questionnaires (Appendix 1) were completed by 666 patients from the A&E departments (53% were male and 76% were aged ≥25 years). All of these questionnaires included a definition of one drink as '½ pint of beer or 1 glass of wine or 1 single measure of spirits'. The AUDIT data were subjected to a principal components analysis, in order to identify the three highest loading items on the first component. This first component accounted for 49% of the variance and the three highest loading items were as shown in Table 1. As a first step, this was very encouraging, especially since the three items covered hazardous, harmful and dependent drinking respectively.

### *Step 2*

AUDIT Question 3 turned out to be particularly useful, since it served as the best first filter in identifying those who were and were not at least hazardous drinkers. The pattern of responses for the London A&E data is displayed in Table 2. These data indicate that Question 3 (How often do you have six drinks or more on one occasion?) could be used as a filter in the following way. If the response is 'never' (score = 0), then there is no hazardous use. This resulted in 323 true negatives and seven false negatives when using the total AUDIT score as the gold standard (AUDIT score of ≥8 indicates hazardous drinking).

If the response is 'weekly'/'daily or almost daily' (score = 3 or 4), then there is probably hazardous use. This results in 103 true positives and four false positives. A total of 437 patients scored zero or 3/4 on Question 3. So this one question classifies 437 patients as either hazardous or non-hazardous drinkers, out of the total sample of 666 (i.e. 66%) with an accuracy of 97% (i.e. 323 plus 103 as a percentage of 437). Only the 34% of patients who responded 'less than monthly' or 'monthly' to Question 3 need to be asked further questions (i.e. the second row in Table 2).

### *Step 3*

Having classified 66% of patients as hazardous or non-hazardous drinkers using just Question 3, the next step was to explore how the other 34% can be sorted using Questions 5 plus 8 and possibly more. This involves calculating the sensitivity and specificity of each of the question combinations displayed in Table 3 when used to predict AUDIT positive and negative. Different cut-off scores were considered for each question combination and those cut-off scores that resulted in the best sensitivity and specificity are displayed in column 2 of Table 3. It is clear from these results that, using questions 5, 8 and 10 on the second screen is the best combination.

Table 1. Three highest loading items on the first principal component

| Question | Loading | Cumulative variance (%) |
|---|---|---|
| 3. How often do you have six or more drinks on one occasion? | 0.79 | 49 |
| 8. How often during the last year have you been unable to remember what happened the night before because you had been drinking? | 0.78 | 60 |
| 5. How often during the last year have you failed to do what was normally expected of you because of drinking? | 0.77 | 68 |

Table 2. The relationship between AUDIT Question 3 responses and total AUDIT score

| | AUDIT score | |
|---|---|---|
| Question 3 score | <8 | ≥8 |
| 0 | 323 | 7 |
| 1 or 2 | 158 | 71 |
| 3 or 4 | 4 | 103 |

*Step 4*

We now have a two-stage questionnaire with AUDIT Question 3 identifying 66% of A&E patients as either hazardous or non-hazardous drinkers and questions 5, 8 plus 10 sorting the rest. The sensitivity and specificity of this two-stage process can now be calculated by combining the data for these two stages as displayed in Table 4. Filter 1 (i.e. Question 3) sorts 437 patients. Filter 2 (i.e. questions 5, 8 and 10) sorts 229 patients. When both stages are combined the overall sensitivity of the test is 91% and the overall specificity is 93%, using the full AUDIT score as the gold standard.

*Step 5*

The next question to ask was whether this two-stage screening test performs as well in other settings. Approximately 100 AUDIT questionnaires were completed by an opportunistic sample of patients in each of the other settings. Consecutive admissions during weekdays were asked to participate and an attempt was made to collect a representative sample by emphasizing confidentiality and stressing that the study was simply a research survey. Information was not collected on number of refusals, but this was relatively small. The results are displayed in Table 5. (The gender and age distribution shown for the fracture clinic and the A&E department are taken from routine data; age and gender of study patients in these opportunistic samples was not recorded.)

We concluded that these four questions have good sensitivity and specificity, when predicting AUDIT-positive and -negative subjects, across a range of settings. Furthermore, across all settings, the first filter (AUDIT Question 3) categorized >50% of patients into hazardous or non-hazardous drinkers with an accuracy of >95%, using the full AUDIT score as the gold standard.

Table 3. The sensitivity and specificity of different question combinations as predictors of total AUDIT when used as the second screen

| Question combinations | Hazardous if greater than: | Sensitivity (%) | Specificity (%) |
|---|---|---|---|
| 5 + 8 | 0 | 72 | 82 |
| 5 + 8 + 1 | 3 | 70 | 80 |
| 5 + 8 + 2 | 1 | 84 | 73 |
| 5 + 8 + 4 | 0 | 80 | 80 |
| 5 + 8 + 6 | 0 | 75 | 82 |
| 5 + 8 + 7 | 0 | 82 | 71 |
| 5 + 8 + 9 | 0 | 83 | 81 |
| 5 + 8 + 10 | 0 | 87 | 82 |

Table 4. The performance of the two filters in correctly identifying hazardous drinkers as defined by AUDIT

| | AUDIT | | |
|---|---|---|---|
| | – | + | |
| Q3 | | | |
| – | 323 | 7 | Filter 1 |
| + | 4 | 103 | |
| Questions 5, 8 and 10 | | | |
| – | 130 | 9 | Filter 2 |
| + | 28 | 62 | |
| Combined | | | |
| – | 453 | 16 | Overall |
| + | 32 | 165 | |

*Step 6*

One of the strengths of the FAST questionnaire is that one question successfully identifies hazardous and non-hazardous use for >50% of most samples. Although the question 'How often do you have six or more drinks on one occasion' was a good first filter there were some doubts about face validity. Shepherd *et al*. (1990) found that a cut-off of 8 units of alcohol on one occasion differentiated male A&E patients with an alcohol-related injury, from a friend or relative who accompanied them to the trauma clinic. The next step was, therefore, to consider using 'How often do you have eight or more drinks on one occasion?' as the first filter for men. It is universally recognized that women face hazardous consequences at lower levels of consumption than men, and so the 'six drinks' question could be retained for them. The next step therefore compared the 'eight drinks' version of the FAST with the 'six drinks' version. This was accomplished by administering the AUDIT with the new 'eight drinks' question inserted either before or after Question 3. Attendees at two A&E departments were recruited, 58% male, and 69% aged >25 years.

Only seven out of 48 women had positive AUDIT scores, so calculating a sensitivity index for women would be inappropriate. Combining sensitivity and specificity data to obtain an accuracy index provided a more reliable measure for this relatively small sample. Accuracy is defined as true positives plus true negatives as a percentage of the total. For men, both the 'eight drinks' and 'six drinks' versions of FAST produced an accuracy index of 93%. For women, both versions resulted in an accuracy of 95%. So the accuracy of the test provided no grounds for deciding between them.

Although there were very few differences between the two versions of FAST, there were, in fact, good reasons for keeping six drinks for women and eight drinks for men. For women, the correlations between the AUDIT score and scores for the two versions of the test strongly favoured the 'six drinks' version (Spearman rho = 0.745 for the 'six drinks' version and 0.587 for the 'eight drinks' version). The main advantage of the 'eight drinks' version was the use of this question as a first filter for men. In this particular sample, the 'six drinks' question alone identified 56% of the men as hazardous or non-hazardous drinkers, whereas the 'eight drinks' question identified 63%. Since the aim of this investigation was to develop a quick alcohol-screening test, the ability to screen

Table 5. Sensitivity and specificity of the FAST questionnaire across four medical settings using AUDIT ≥8 as the gold standard

| | Fracture clinic ($n$ = 100)[a] AUDIT | | Primary care ($n$ = 100)[b] AUDIT | | Dental hospital ($n$ = 102)[c] AUDIT | | A&E ($n$ = 100)[d] AUDIT | |
|---|---|---|---|---|---|---|---|---|
| | – | + | – | + | – | + | – | + |
| FAST | | | | | | | | |
| – | 59 | 2 | 62 | 3 | 44 | 3 | 60 | 1 |
| + | 7 | 32 | 3 | 32 | 7 | 48 | 6 | 33 |
| Sensitivity (%) | 94 | | 91 | | 97 | | 94 | |
| Specificity (%) | 89 | | 95 | | 91 | | 86 | |

[a]57% male: 60% aged >25 years; [b]40% male: 74% aged >25 years; [c]59% male: 58% aged >25 years; [d]52% male: 76% aged >25 years.

out over 60% of a male sample with just one question is a major benefit. The 'six drinks' filter identified 58% of women so that, for men and women combined, the first FAST question identified 61% as hazardous or non-hazardous drinkers, with an accuracy of 95%.

Finally a minor modification was made to the question: Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down? In the AUDIT, this particular question is not confined to the previous year and can therefore result in false positives if the concern occurred a few years earlier.

The question and the responses were therefore altered to focus upon the last year. In the above sample, this made no difference to any of the conclusions, since only six participants noted that concern had been expressed 'but not in the last year'. All six remained in the same categories (hazardous versus non-hazardous) if their response was altered to 'never'.

## DISCUSSION

The final version of the FAST is reproduced in Appendix 2. Based upon the results of the final study described above, the 'six drinks' question has been retained for women but replaced by 'eight drinks' for men. Also the last question has been slightly modified to ensure that the focus is upon current drinking. This final questionnaire has sensitivity indices >90%. There are two slightly different methods of scoring. The first tends to result in a few more false positives and the second in a few more false negatives.

Scoring is quick and can be completed with just a glance at the pattern of responses as follows: Question 1: FAST negative if response is 'Never'; FAST positive if response is 'Weekly' or 'Daily or almost daily'. Only consider Questions 2, 3 and 4 if the response to Question 1 is 'Less than monthly' or 'Monthly'.

*Scoring method 1*. Questions 2, 3 and 4. FAST negative if responses to Questions 2 and 3 are 'Never' and Question 4 is 'No'; FAST positive for any other response, i.e. any hint of a problem.

*Scoring method 2*. Each question is scored 0 to 4 and a FAST positive if the total score for all four questions is ≥3.

The authors' preference is for scoring method 2, since this results in slightly fewer positives. In our experience, the AUDIT tends to be biased towards producing false positives, rather than false negatives. Not only does this quick test perform well against the AUDIT, but it also has good face validity. The main focus is upon the frequency of risky levels of alcohol consumption. This first question accurately identifies >50% of respondents as either hazardous drinkers (i.e. those who respond 'weekly' or 'daily or almost daily') or non-hazardous drinkers (i.e. those who respond 'never'). Those who respond with 'monthly' or 'less than monthly' to this question are then asked three questions related to dependence and harm. If there is a hint of dependence or harm, they are then assigned to the 'hazardous or harmful drinking' group. One reason why this questionnaire is so quick to administer (mean time 12 s: Hodgson *et al*., 2000*b*) is that most respondents only have to answer one question.

The FAST has proved to be useful in busy medical settings, but there are a number of further questions that need to be addressed. First, to what extent is the accuracy of the FAST influenced by ethnicity, and age? Cherpitel and Clark (1995) noted that no one screening instrument is consistent across all ethnic groups. Second, the FAST was tested against the AUDIT, which is itself a screening instrument. How would the FAST perform when compared with a longer diagnostic instrument such as the Composite International Diagnostic Interview (Robins *et al*., 1989). Third, the FAST, like the AUDIT, is designed to identify hazardous drinking, as well as alcohol-related harm and dependence. For health promotion or brief intervention projects, this will be ideal. Further research could explore the possibility of different cut-off scores for different projects. For example, screening for an intensive treatment service would require a higher level of hazardous drinking. It should be emphasized, however, that a screening test is not a diagnostic instrument. Screening will usually be followed by a further more detailed assessment.

There are now several very brief alcohol screening instruments in existence. One of them is a shortened version of the AUDIT proposed by Piccinelli *et al*. (1997). They recommend using five items, only two of which are included in the FAST. The short AUDIT and the FAST are strongly correlated (0.92 in our A&E data), but the main strength of the FAST is the use of one item as a first filter. The range of instruments includes the CAGE (Mayfield *et al*., 1974), the TWEAK (Russell *et al*., 1994), the brief MAST (Pokorny *et al*., 1972), the RAPS (Cherpitel, 2000), the five-shot test (Seppa *et al*., 1998), the short AUDIT (Piccinelli *et al*., 1997) and the PAT (Smith *et al*., 1996), not to mention the FAST and the AUDIT. Soderstrom *et al*. (1998) use the first two AUDIT questions to assess quantity and frequency of alcohol consumption, and the TICS (Brown *et al*., 1997) attempts to assess both alcohol and

drug misuse. Further work is now needed to explore which of these is the most useful and cost-effective instrument for which client groups and for what purpose.

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## APPENDIX 1. AUDIT QUESTIONNAIRE

Please circle the answer that is correct for you.

1. How often do you have a drink containing alcohol?
   Never | Monthly or less | Two to four times a month | Two to three times a week | Four or more times a week

2. How many drinks containing alcohol do you have on a typical day when you are drinking?
   1 or 2 | 3 or 4 | 5 or 6 | 6 to 9 | 10 or more

3. How often do you have six or more drinks on one occasion?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

4. How often during the last year have you found that you were not able to stop drinking once you had started?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

5. How often during the last year have you failed to do what was normally expected from you because of drinking?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

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?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

7. How often during the last year have you had a feeling of guilt or remorse after drinking?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

8. 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

9. Have you or someone else been injured as a result of your drinking?
   No | Yes, but not in the last year | Yes, during the last year

10. Has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?
    No | Yes, but not in the last year | Yes, during the last year

*Time taken _____ (mins) _____ (secs)*

## APPENDIX 2. FAST

For the following questions please circle the answer which best applies.

1 drink = ½ pint of beer or 1 glass of wine or 1 single spirits

1. MEN: How often do you have EIGHT or more drinks on one occasion?
   WOMEN: How often do you have SIX or more drinks on one occasion?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

2. 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

3. How often during the last year have you failed to do what was normally expected of you because of drinking?
   Never | Less than monthly | Monthly | Weekly | Daily or almost daily

4. In the last year has a relative or friend, or a doctor or other health worker been concerned about your drinking or suggested you cut down?
   No | Yes, on one occasion | Yes, on more than one occasion

Score questions 1–3: 0, 1, 2, 3, 4. Score question 4: 0, 2, 4.
A score ≥3 indicates probable hazardous drinking.