

## International research

# Which screening test for alcohol consumption is best associated with 'at risk' drinking in older primary care attenders?

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### ABSTRACT

**Aims** To measure the criterion validity of the AUDIT (Alcohol Use Disorders Screening Test) and SMAST-G (Short Michigan Alcoholism Screening Test-Geriatric Version) in older people in primary care against Royal College of Psychiatrists' criteria for 'at risk' drinking, and to compare older 'at risk' drinkers in primary care with normal drinkers.

**Method** Surgery attendees in primary care in South East London aged over 65 years completed a questionnaire including the AUDIT and SMAST-G, and questions about alcohol consumption. Age, sex, marital status and ethnicity were recorded. Receiver operating characteristic (ROC) analysis was carried out on the AUDIT and SMAST-G questionnaires against drinking in excess of Royal College guidelines. Those drinking above and below Royal College guidelines were compared.

**Results** A total of 500 participants completed questionnaires; 33 (6.6%) admitted drinking above Royal College guidelines: 23 (4.6%) were AUDIT

positive and 52 (10.4%) SMAST-G positive. 'At risk' drinking was associated with being male, younger and *not* being widowed. The area under the curves was 0.96 for the AUDIT and 0.83 for the SMAST-G, indicating significantly better criterion validity for the former. Best cut-off points for men (5/6) and women (3/4) were lower than for younger people.

**Conclusions** The AUDIT performed significantly better than the SMAST-G against UK Royal College of Psychiatrists' guidelines on safe levels of alcohol consumption in this sample of 500 primary care attendees aged over 65 years. Although the AUDIT was not designed specifically as a screening questionnaire for 'at risk' drinking in older people, our study suggests that it performs well in older adult populations using different cut-off points for men and women.

**Keywords:** alcohol, old age, screening

## Background

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Population studies show that in general, older people drink less alcohol and are more often abstinent than younger people, although cohort, sex, age and ascertainment effects may apply. However the UK General Household Survey indicated that drinking in older people has increased in the last decade, with 15% of men over the age of 65 years drinking more than recommended by Royal College guidelines in 2002 compared with 13% in 1988.<sup>1</sup> Royal College guidelines for safe drinking are 14 units a week for women and 21 units a week for men. The corresponding figures for women were 7% in 2002 and compared with 4% in 1988.<sup>1</sup> However people over 75 years old may drink less.<sup>2</sup> Different methods of categorising drinking in older people may lead to varying prevalence estimates. The National Psychiatric Morbidity Survey in 2000 used the Alcohol Use Disorder Identification test (AUDIT),<sup>3</sup> and reported that 19.5% of men and 6% of women between the ages of 65 and 74 years and living at home had AUDIT scores above 9.<sup>4</sup> A Liverpool community study found that 6.1% of men and 2.4% of women were drinking above Royal College limits, while a Newcastle study of elderly primary care patients reported that 23% of men and 11% of women were CAGE positive.<sup>5-7</sup> A general practice study in Oxford found that 3.3% of older people were drinking above the Royal College guidelines; this study also reported a lower rate of drinking in people aged over 75 years.<sup>8</sup>

It seems likely that the absolute number of older people with alcohol problems will continue to rise. Between 1995 and 2030 the number of people in the UK over the age of 65 years is set to increase from under 10 million to about 15 million, after which it will stabilise.<sup>9</sup> As there are no signs of a decline in alcohol consumption in cohorts younger than 75 years, this is likely to lead to greater numbers of older people with alcohol-related medical and psychiatric morbidity, and thus greater strain on health service resources.

Detection of alcohol problems in older people may require a different approach from that in younger people.<sup>10</sup> Cohort, cultural and contextual differences require attention in the application of a questionnaire approach. For instance, the Michigan Alcoholism Screening Test-Geriatric Version (MAST-G) appears to perform well as a screening test in American older populations and the AUDIT less well.<sup>11,12</sup> UK-based studies appear to show the opposite, with the MAST-G performing poorly,<sup>13</sup> and the AUDIT being more effective in a secondary healthcare setting – in this study a five-item version of the AUDIT performed better than the full ten-item version.<sup>14</sup> The Alcohol Related Problems Survey

(ARPS) was shown to be more effective in American primary care populations than the shorter version of the MAST-G- (the SMAST-G) or the AUDIT.<sup>15,16</sup> A recent systematic review of the use of screening instruments in older people concluded that specific studies in this age group were overdue, but that their performance was likely to vary with the setting in which screening took place.<sup>10</sup>

Primary healthcare is the most rational setting for screening for alcohol problems in older people. Illiffe described the drinking patterns of older people in general practice and found that drinkers were no more likely to be depressed, to have sustained a fall in the last three months or to have attended medical inpatient or outpatient care than non-drinkers. Interestingly he found that cognitive impairment was significantly associated with abstinence in men.<sup>8</sup> He did not report any categorisation of drinking into harmful or non-harmful patterns.

Brief interventions for 'hazardous' drinkers (more than 35 units per week for men or 25 units per week for women) have been shown to be effective in younger adults in the primary care setting.<sup>17</sup> An important step towards testing the generalisability of these and other efficacy studies to older patients is to establish which of the available questionnaires is the most appropriate in the detection of the elderly 'at risk' drinkers in primary care. We therefore examined the relationship between the two most frequently used screening questionnaires in the elderly – the AUDIT and the SMAST-G – and whether or not drinking was above Royal Colleges of Psychiatrists', Physicians' and General Practitioners' guidelines for safety in a sample of older people attending general practitioners in South London. We also set out to examine the impact of sex, age, ethnic group and living circumstances on these relationships.

## Method

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Screening took place in five primary care practices in the Borough of Lewisham and four in the Borough of Southwark in South East London over a period of 13 months. It was not feasible to randomly select practices for inclusion in the study. For pragmatic reasons we approached several practices and included those who agreed to participate in the study. One of us (AR) attended morning surgeries in order to screen all attendees over the age of 65. Subjects were approached in the waiting room and asked to complete a questionnaire, which included the AUDIT (ten items) and SMAST-G (ten items), and questions regarding weekly units consumed. Questions about

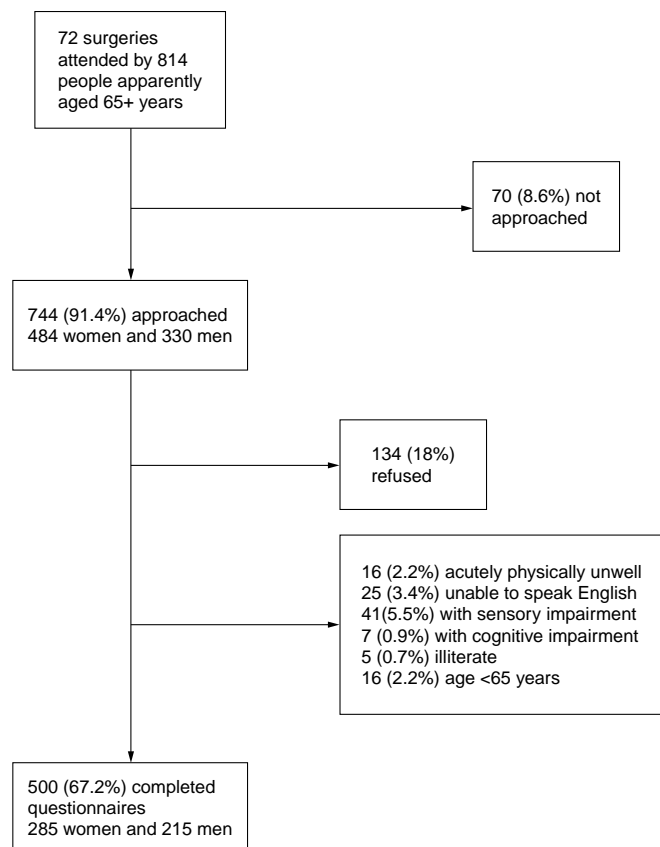
quantities and frequency of alcohol consumed, the SMAST-G and AUDIT were asked in a variety of sequences, in order to investigate any primacy or recency effects. The questionnaire also contained questions on age, sex, marital status and ethnicity. The date of birth and sex of attendees who did not complete the questionnaire during the surgery were obtained from the practice computer. The number needed to study in order to distinguish a difference between the screening questionnaires of 5% in either sensitivity or specificity (with a reference target of 80%) in a paired sample was 369. Methods to calculate the sample size necessary for comparisons of the area under the receiver operating characteristic (ROC) curve (see below) were not readily available, so it was decided that data collection would continue until 500 subjects had completed questionnaires.

The data were analysed using SPSS version 10. Drinking in excess of Royal College guidelines was categorised as 'at risk' drinking. ROC analysis was carried out on the two questionnaires, in order to assess their criterion validity in screening for 'at risk' drinking. The areas under the curves indicate greater criterion validity. Demographic data were compared between those drinking above and below Royal College guidelines for safe drinking. The Ethics of Research Committee of the South London and Maudsley NHS Trust approved the project.

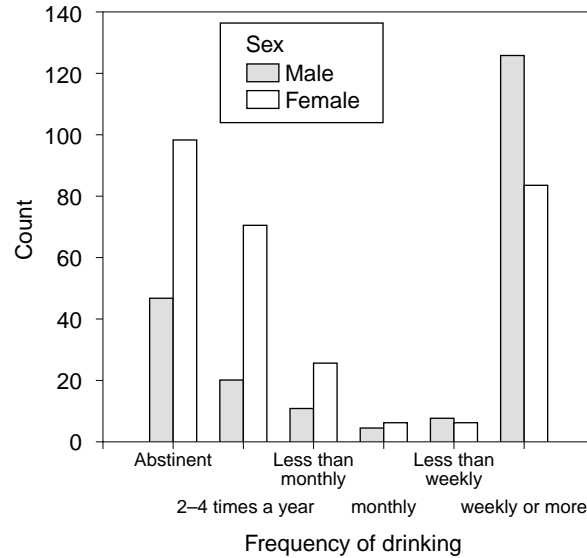
## Results

The researcher visited 72 surgery sessions in the nine primary care practices. The derivation of the sample is shown in Figure 1. These sessions were attended by 814 people aged over 65 years, of whom 744 were approached and asked to participate. One-hundred and thirty-four (134) declined, and 110 were found to be ineligible before 500 agreed to complete the questionnaires. There was no significant difference in age and sex between those completing and those not completing the questionnaire, but there was a slight trend for younger attendees or women not to complete the questionnaires (mean age of non-completers 74.0 (95% confidence interval (CI) 73.2–74.7) versus 75.0 in completers (95% CI 74.4–75.8), non-completers 61.3% women (95% CI 55.8–66.9) versus completers 57.2% women (95% CI 52.8–61.6)). There was no significant primacy or recency effect in the order in which the screening questionnaires and enquiry about drinking above Royal College guidelines were administered.

Two-hundred and twenty-nine respondents (45.8%) were either married or cohabiting, of whom 14 were living alone at the time of the survey. Fifty of the 271 (18.5%) without a formal partner were living with someone else.



**Figure 1** Derivation of the sample

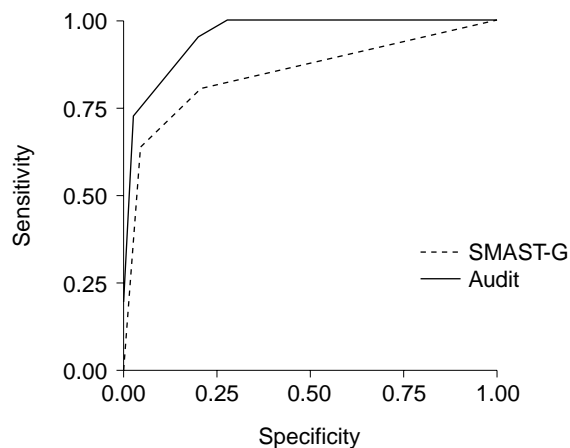


**Figure 2** Patterns of drinking in 500 general practice attenders aged 65+ years

Of the 500 participants who completed questionnaires, 33 (6.6%) admitted to drinking above Royal College guidelines ('at risk' drinking), 23 (4.6%) were AUDIT positive and 52 (10.4%) SMAST-G positive. The frequency of drinking is shown in Figure 2. No AUDIT-positive respondent drank less often than weekly, but six SMAST-G-positive respondents drank less than weekly, including two who drank only 2–4 times a year.

### Validation of AUDIT and SMAST-G against 'at risk' drinking

ROC curves for the two screening tests against excess drinking are shown in Figure 3. The area under the curves was 0.96 for the AUDIT (95% CI 0.93–0.98) and 0.83 for the SMAST-G (95% CI 0.75–0.92),

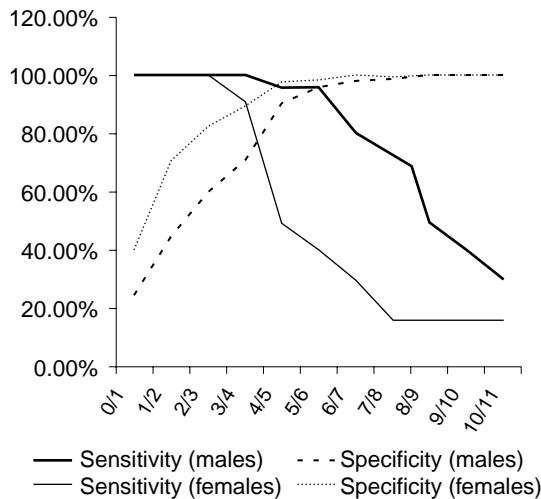


**Figure 3** ROC curve against drinking above Royal College guidelines

indicating significantly better criterion validity for the former. Further analyses showed that the areas under the curve for the AUDIT were greater for men than women, and for those aged 65–69 years compared with older respondents. Figure 4 shows the sensitivity and specificity of the AUDIT using various cut-off points against Royal College guidelines, by sex, showing a difference in performance between older men and women. For men the optimal cut-off point was 5/6, giving a sensitivity of 95.0% and specificity of 94.4%. For women the optimal cut-off point was 3/4 giving a sensitivity of 92.3% and specificity of 88.6%. These cut-off points gave positive and negative predictive values of 63.3% and 99.5% for older men, and 27.9% and 99.6% respectively for older women.

### Associations with drinking above Royal College guidelines ('at risk' drinking)

In univariate analysis of the whole sample 'at risk' drinking was associated with being male (chi square = 4.47; degrees of freedom (df) = 1;  $P = 0.035$ ), being younger ( $F = 4.06$ ;  $df = 1$ ;  $P = 0.046$ ) and *not* being widowed (chi square = 4.993;  $df = 1$ ;  $P = 0.02$ ). Living alone, being single and of an ethnic group were not associated with excess drinking. In univariate analysis for men and women separately no variable was associated with 'at risk' drinking for men, and not being widowed for women was the only variable that was significantly associated (chi square = 5.018  $df = 1$ ;  $P = 0.025$ ) with 'at risk' drinking. In logistic regression analyses predicting excess drinking separately in men and women, no variable was independently predictive in men, but there was a trend for



**Figure 4** Sensitivity and specificity of AUDIT in older general practice attendees against Royal College guidelines

not living alone to be associated with excess drinking in women independently of the other variables.

## Discussion

This study found that the AUDIT performed significantly better than the SMAST-G against UK Royal College of Psychiatrists' guidelines in identifying 'at risk' drinking in a sample of 500 primary care attendees aged over 65 years. However there are a number of limitations to the study. Firstly, the Royal College guidelines are not themselves directly validated against actual harm or hazard, and represent merely an expert consensus, albeit one associated with excess population mortality.<sup>18</sup> Nevertheless they are widely accepted (in 1986 and 1987 by the Royal Colleges of Psychiatrists, Physicians and General Practitioners, and re-endorsed by all three Colleges in 1995). Secondly, it might be suggested that the Royal College guidelines are so simple that no screening test is necessary. However disorders of alcohol use encompass dimensions of 'problems' and dependence in addition to the dimension of consumption. A screening questionnaire that informs all three aspects is of intrinsic value. Thirdly, the screening tests and criterion were not assessed independently in this study. However this applied to both tests equally, and varying the order in which the tests and the criterion were assessed made no difference to levels of agreement. Fourthly, the AUDIT contains more items related to current frequency

and quantities of alcohol consumed than the SMAST-G, so better agreement is likely. However, the latter may also have been disproportionately positive because its wording is unclear about the period covered, so false-positive responses may have occurred in respondents with no current problems. Fifthly, it was not feasible to carry out the study on a representative sample of general practitioners (GPs) in a defined area, nor was it possible to use a sampling frame to obtain a representative sample of attendees, so the results may not be generalisable to other UK practices. However this study is the largest UK primary care-based direct study of alcohol use disorders in the over 65-year age group. Finally, as with all alcohol research, there may have been under-reporting and informant information was not used to verify the data.

## Comparison with other relevant studies

Our prevalence rates of excess drinking were 9.3% for men and 4.6% for women, somewhat lower than those found for older people in the General Household Survey (16% of men and 6% of women).<sup>1</sup> This probably reflects a difference between the primary care population and the general population, and raises the possibility that those who drink to excess are less likely to attend their GP. Similarly, our 4.6% AUDIT positive rate was lower than that of the Psychiatric Morbidity Survey of 5.7% for older people,<sup>4</sup> but they used an upper age limit of 74 years. Our prevalence rates are higher than those of the only other primary care study,<sup>8</sup> but this is probably a reflection of our lower age limit (65 years as opposed to 75 years). It might be argued that the lower prevalence rate of 'at risk' drinking found in general practice argues against concentrating efforts in this setting, but primary care surgery attendance is clearly a better opportunity for intervention than any sort of domestic screening. The ROC results for the AUDIT in our study were very similar to those obtained by Philpot *et al* in their study of older mental health service patients.<sup>14</sup>

The incidental finding that women admitting to 'at risk' drinking were less likely to be living alone was surprising, especially as it seemed to be independent of age. Sulander *et al* also found, with much lower thresholds for excess drinking, a slight tendency for both men and women who were married to be drinking more than those who were not, despite the well-known relationship between being unmarried and problem drinking – a relationship that may not be direct.<sup>19,20</sup> What is clear is that harmful drinking levels are different for men and women of all ages, and sex seems to be related to the associations of such drinking – as it may do in cessation success in

older people.<sup>21</sup> Our study suggests that it also affects the performance of screening test cut-off points.

## Conclusion

Our study supports the conclusions of O'Connell *et al* that the AUDIT, although not designed specifically as a screening questionnaire for 'at risk' drinking in older people, appears to be an effective screening instrument in older primary care patients.<sup>10</sup> However, the most effective cut-off point seems to be lower than that for younger patients, and to differ for older men (5/6) and older women (3/4). Once effective screening can be established, evaluating the efficacy of brief interventions in efficacy studies can be considered in this important population.

## ACKNOWLEDGEMENTS

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## CONFLICTS OF INTEREST

None.

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## Appendix 1: AUDIT (Alcohol Use Disorders Screening Test)

We would like to ask some specific questions regarding your alcohol consumption over the past 12 MONTHS. Please TICK the box which most nearly applies to 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   
7 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 yourself 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 drink first thing 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 in 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?  
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, a doctor or other health worker been concerned about your drinking or suggested that you cut down?  
No  Yes, but not in the last year   
Yes, during the last year

## Appendix 2: SMAST-G (Short Michigan Alcoholism Screening test- Geriatric Version)

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We would like to ask you some questions concerning your alcohol consumption, please answer the following questions by TICKING yes or no in the boxes.

- 1 When talking with others, do you ever underestimate how much you actually drink?  
Yes  No
- 2 After a few drinks, have you sometimes not eaten or been able to skip a meal because you didn't feel hungry?  
Yes  No
- 3 Does having a few drinks help decrease your shakiness or tremors?  
Yes  No
- 4 Does alcohol sometimes make it hard for you to remember parts of the day or night?  
Yes  No
- 5 Do you usually take a drink to relax or calm your nerves?  
Yes  No
- 6 Do you drink to take your mind off your problems?  
Yes  No
- 7 Have you ever increased your drinking after experiencing a loss in your life?  
Yes  No
- 8 Has a doctor or nurse ever said they were worried or concerned about your drinking?  
Yes  No
- 9 Have you ever made rules to manage your drinking?  
Yes  No
- 10 When you feel lonely, does having a drink help?  
Yes  No



