Screening and Brief Interventions for Prevention and Early Identification of Alcohol Use Disorders in Adults and Young People

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About the ScHARR Public Health Collaborating Centre

The School of Health and Related Research (ScHARR), in the Faculty of Medicine, Dentistry and Health, University of Sheffield, is a multidisciplinary research-led academic department with established strengths in health technology assessment, health services research, public health, medical statistics, information science, health economics, operational research and mathematical modelling, and qualitative research methods. It has close links with the NHS locally and nationally and an extensive programme of undergraduate and postgraduate teaching, with Masters courses in public health, health services research, health economics and decision modelling.

ScHARR is one of the two Public Health Collaborating Centres for the Centre for Public Health Excellence (CPHE) in the National Institute for Health and Clinical Excellence (NICE) established in May 2008. The Public Health Collaborating Centres work closely with colleagues in the Centre for Public Health Excellence to produce evidence reviews, economic appraisals, systematic reviews and other evidence based products to support the development of guidance by the public health advisory committees of NICE (the Public Health Interventions Advisory Committee (PHIAC) and Programme Development Groups).

Contribution of Authors

Rachel Jackson was the author, Maxine Johnson, Fiona Campbell, Josie Messina were additional reviewers. Louise Guillaume developed and undertook literature searches. Petra Meier provided topic expertise. Elizabeth Goyder, Jim Chilcott and Nick Payne were the senior leads.

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CONTENTS

1. LIST OF ABBREVIATIONS

A list of abbreviations used throughout this report is presented below.

LIST OF ABBREVIATIONS

AAF	Alcohol-attributable fraction
A&E	Accident & Emergency
AMI	Adaptations of motivational interviewing
AUDIT	Alcohol Use Disorders Identification Test
AuROC	Area Under Receiver Operating Characteristic Curve
BI	Brief intervention
CDT	Carbohydrate-deficient transferrin
CI	Confidence Interval
CTRL	Control
DSM	Diagnostic and Statistical Manual of Mental Disorders
EBI	Extended brief intervention
ED	Emergency Department
FME	Forensic Medical Examiner
G	Gram
GGT	Gamma-glutamyltransferase
GP	General Practitioner
Hr	Hour
HRQL	Health Related Quality of Life
ICD	International Classification of Diseases
ICER	Incremental cost effectiveness ratios
ITT	Intention to Treat
L	Litre
MAST	Michigan Alcohol Screening Test
MCV	Mean corpuscular volume
MI	Motivational interviewing
Ml	Millilitre
MNI	Minimal intervention
MVA	Motor vehicle accident
Min	Minute
NHS	National Health Service
NICE	National Institute for Health and Clinical Excellence

NNT	Number Needed to Treat
NPV	Negative predictive value
NS	Not Significant
OR	Odds Ratio
PDG	Programme Development Group
PPV	Positive predictive value
QUOROM	Quality Of Reporting Of Meta-analyses
RCT	Randomised Controlled Trial
RR	Relative Risk
SASSI	Substance Abuse Subtle Screening Inventory
WHO	World Health Organisation
Wk	Week
U	Unit
Vs	Versus

2. EXECUTIVE SUMMARY

Background

Alcohol misuse is associated with significant clinical and social consequences. The National Institute for Health and Clinical Excellence has been asked by the Department of Health to develop public health guidance to promote the prevention and early identification of alcohol-use disorders in adults and adolescents.

Objectives

To undertake an assessment of the clinical and cost-effectiveness of i) measures to detect alcohol misuse amongst adults and young people; ii) brief interventions to manage alcohol misuse among adults and young people; and iii) interventions to improve management of England's alcohol market.

Methods

Systematic reviews of effectiveness evidence to address the above areas have been undertaken.

Results

This report includes the findings of the systematic reviews relating to patterns of alcohol consumption, screening, brief interventions, and barriers and facilitators to implementation of screening and brief interventions.

Review 4: Patterns of alcohol consumption

Information from recent UK reports of good quality was used to identify patterns of alcohol consumption in England, with data stratified by gender, age, socioeconomic status, ethnicity, and regional variations. The reports (NWPHO & Association of Public Observatories, 2007; NHS, The Information Centre, 2008) collated data from major national surveys (General Household Survey; Health Survey for England; Office for National Statistics Omnibus Survey; Department of Health Smoking, Drinking and Drugs in Adults / Young People), presenting figures relating to those groups that could be considered most 'at-risk' and least 'at-risk' of alcohol misuse. In addition, temporal trends are presented that compare such figures from the 1990s to 2006.

Whilst useful, information from surveys needs to be interpreted with caution. Self-reported drinking is known to be under-estimated; total consumption from surveys accounts for approximately 50% of known alcohol sales in the UK. However, sales figures cannot provide

details of who drinks alcohol, how often, or in what quantity. Reports cited in this section were scrutinised to identify these data in order to inform those engaging in alcohol misuse prevention of the groups likely to be most or least 'at-risk.' However, it should be borne in mind that individuals from any group in society may present with signs of alcohol misuse or require advice to prevent harm.

Data shows that among adults, 11% of men and 17% of women report abstaining from alcohol consumption. Among drinkers, men drink around double the volume of alcohol than that consumed by women. The highest mean consumption is among 45-64 year old men and 16-24 year old women of White ethnicity. Lowest average consumption is among older adults and in Pakistani and Bangladeshi communities. A trend was observed whereby more children are abstaining from alcohol over time but those that drink are consuming greater quantities of alcohol. Overall, average alcohol consumption has remained relatively stable over recent years.

Figures from 2006 were recalculated to take into account the rising alcohol strength of some wines and beers, as well as larger measures used for wine. This particularly affected the figures associated with women's drinking, as wine is the most commonly consumed alcoholic beverage, particularly in women aged 25 and over. Comparisons over time therefore need to consider both methods of calculation.

There has been a slight decrease over time in reported consumption in the last week for both men and women, particularly in younger adult age groups. Among children, drinking in the last week was reported by similar numbers of boys and girls.

Frequent drinking (at least 5 times in one week) was reported by almost double the number of men to women, and increases with age for both genders. Frequent drinkers were more likely to be high earners and live in the South East of England, and least likely to live in London or the North East. Children in school year 8 reporting consumption of 7 units of alcohol over 7 days were most likely to live in the East Midlands, and those in school year 10 in the North East. London was the least likely place of residence of any frequent child drinkers.

Drinking at levels above recommended limits was more commonly reported in men, particularly in the 25-44 year age group. Women reported drinking hazardously at a younger age, from 16 years. White and mixed ethnicity groups were most likely to drink above recommended limits than other ethnic groups.

Heavy or 'binge' drinking was reported by more than twice the number of men than women. Men who binge were more likely to be aged 25-44 years, whilst a larger proportion of women reported bingeing from age 16 upwards. Bingeing was most likely in the North East or Yorkshire and Humberside and least likely in London. Indulging in heavy drinking was associated more with higher paid employees in full-time jobs, and least in less well paid and unemployed respondents.

Alcoholic beverages most consumed by men and boys were beer, lager and cider. Wine was consumed by more women and middle-aged men, whilst in young people, and particularly girls, alcopops were the beverage of choice, and consumption of spirits is increasing in this group.

Just over half of expenditure on alcohol takes place outside the home, though there has been a slight decline in bar and off-sales in recent years and a corresponding increase in restaurant and supermarket sales. The bulk of sales were made by those earning the most, whilst those earning least spend much less. Children were most likely to obtain alcohol through friends or their parents, and Saturday was the most common day for consuming alcohol for all younger age groups, with Sunday becoming the day of choice for drinking in people of 65 years and over.

Evidence suggests that alcohol consumption in England has increased in the past, though is now stabilising, with men consuming larger volumes of alcohol more frequently than women. Boys also consume more alcohol than girls but with a smaller gender differential than for adults, and children that report drinking are consuming more over time. Consumption varied across socioeconomic, cultural and regional groups as well as by age and gender. By providing detailed information on drinking behaviour in these groups, this review has highlighted those most and least at risk of alcohol-related harm. This information is intended not to encourage systematic screening, but to assist practitioners in identifying those groups potentially at risk that might be missed during routine practice.

Review 5: The effectiveness of alcohol screening questionnaires, biochemical indicators and clinical indicators of alcohol misuse in identifying adults and young people who currently misuse or are at risk of misusing alcohol

Fifty one studies were identified relating to the effectiveness of screening measures for the identification of alcohol misuse in adults and young people. AUDIT was shown to be

effective in the identification of hazardous and harmful drinking in adults in primary care. The use of lower thresholds in conjunction with alcohol screening questionnaires was recommended for women. The evidence for the effectiveness of shorter versions of AUDIT in adults in primary care was variable. FAST was described as having good screening properties for the detection of alcohol problems in primary care. CAGE was found to be an effective tool for the detection of alcohol abuse and dependence in adults in primary care. Limited evidence was identified relating to the performance of alcohol screening questionnaires in hospital settings. Evidence was also identified for the use of alcohol screening questionnaires among adults in emergency care settings, including FAST and the Paddington Alcohol Test. AUDIT was shown to perform more effectively in the identification of alcohol abuse or dependence than CAGE, CRAFFT or RAPS-QF in male and female young people. AUDIT was also demonstrated to have better screening properties than CAGE, CRAFFT or POSIT in the detection of problem use (ie. hazardous/harmful consumption not reaching the diagnostic threshold for an alcohol-related disorder, abuse and dependence) in a teenage sample. The identified evidence for the effectiveness of SASSI in screening for alcohol misuse among young people was limited and inconclusive. The screening questionnaires TWEAK, T-ACE and AUDIT were appropriate for the identification of alcohol misuse during pregnancy. Laboratory markers were found to be of limited value in the detection of alcohol misuse when compared with alcohol screening questionnaires. However, the use of blood alcohol concentration testing may complement the use of later questionnaire screening in the identification of alcohol misuse among patients treated in the emergency department resuscitation room. The use of clinical signs may be most appropriate as a guide for clinicians in identifying the physical consequences of alcohol misuse.

Review 6: The effectiveness of brief interventions in preventing hazardous and harmful drinking among adults and young people

Twenty seven systematic reviews and meta-analyses have been included in the review of reviews of the effectiveness of brief interventions for alcohol misuse. The quality of reviews was generally of a high standard in terms of study design characteristics and clarity of reporting. Evidence has been identified for the positive impact of brief interventions for alcohol misuse on alcohol consumption, mortality, morbidity, alcohol-related injuries, alcohol-related social consequences, and healthcare resource use. Whilst the majority of studies were conducted in primary care, limited evidence was also identified for other healthcare settings. One systematic review presenting information on the effectiveness of brief interventions for alcohol misuse in non-healthcare settings was identified. Brief interventions were shown to be effective in both men and women. Study populations were

made up primarily of adult populations. However, the limited evidence identified for the effectiveness of brief interventions in young people was inconclusive. Study participants were predominantly Caucasian in origin. Socioeconomic status was not shown to influence the effectiveness of brief interventions. The relationship between the level of alcohol dependence and the effectiveness of brief interventions was unclear. One review put forward limited evidence of the effectiveness of brief interventions in patients with a dual diagnosis of a psychiatric condition and alcohol misuse. Limited evidence suggests that even very brief interventions may be effective in reducing negative alcohol-related outcomes. The benefit arising from increased exposure or the incorporation of motivational interviewing principles was unclear.

Review 7: Key barriers and facilitators to the implementation of screening and brief intervention for alcohol misuse in adults and young people

Forty five studies were included in the review of barriers and facilitators to implementation of screening and brief interventions. Included studies varied in quality and in study design. The majority of these studies were surveys, reported as part of a larger trial, or as stand-alone research projects. One Delphi survey was included that utilises the views of experts, with discussion of factors that might influence the implementation of screening and brief intervention. A further body of studies used qualitative methods such as interviews and focus groups to explore the views of providers or service users on implementation of screening and brief intervention for drinking problems. Whilst evidence has been identified to support the use of screening and brief interventions for alcohol misuse, evidence was found that despite a general positive attitude to screening by users and providers, it is under-utilised and that certain barriers and facilitators influence implementation. Facilitators include organisational factors such as positive support from policy makers, which might include financial incentives. Positive support from management and involvement of non-clinical staff where such staff feel involved in decision making were factors that improved team working. Training of clinical staff to undertake effective screening and brief intervention influences implementation in several ways. Staff felt more knowledgeable, skilled and therefore confident to carry out prevention work. Though the intention of training was to increase the appropriateness of screening and intervention behaviours in terms of selecting users at risk, this was not always found to be the case in practice. It is therefore crucial that health professionals are aware of groups likely to be more or less ‘at-risk’, and to be able to identify signs of potential misuse among their user populations. It is also important however, that clinical staff do not focus on groups considered to be ‘at-risk’ whist neglecting individuals from other groups who nevertheless require assistance with their drinking behaviours. There is evidence that certain groups such as men, the unemployed and ethnic minorities are approached to discuss alcohol

use more than the rest of the population. Practitioner workload was found to be a potential barrier to implementation since screening and brief intervention take up time that needs to be factored into the clinician's schedule. Popular opinion was found to give preference to carrying out screening and brief intervention in non-threatening contexts such as registration sessions and as part of general lifestyle advice given at well-person clinics. Evidence of support and implementation of interventions varied across settings, with primary care accounting for most activity as well as research evidence. There is much less research activity and therefore evidence available from settings such as emergency care, secondary care and probationary settings. Characteristics of user populations and work practices with regard to feasibility and acceptability have to be taken into account when developing alcohol-related health promotion interventions in these other settings.

Evidence statements:

Review 4:

Evidence has been sourced from two UK reports that collated data from major national surveys on alcohol consumption volumes, patterns and behaviours in adults and children over the age of 10 years. Around 11% of men and 17% of women surveyed abstained from drinking. Overall, self-reported alcohol consumption in the UK increased in the 1990s and has since remained relatively stable.

Evidence statement 4.1: Evidence demonstrates that of adults reporting that they consume alcohol, men are reporting average weekly consumption of around double the volumes of women, despite new methods of calculation that have increased the figures for women. The highest mean consumption is in men aged 45-64 years old. Men also report drinking more frequently, and indulging in hazardous drinking. Twice as many men than women, particularly those in the age group 25-44 years, report heavy drinking or 'bingeing'. Men tend to drink beer, lager or cider at all age groups, though wine is consumed by more older males.

Evidence statement 4.2: There is evidence to suggest that alcohol consumption levels are increasing in women, particularly in the 16-44 yrs age range. Among women, this age group is most at risk of heavy drinking, or 'bingeing'. The most commonly consumed alcoholic beverage for women is wine, whilst more young females consume alcopops and increasingly, spirits.

Recent revised methods of calculating unit measures of alcohol have had at least a partial effect on figures pertaining to alcohol consumption in women, suggesting that in years prior

to the new method (i.e. before 2006), consumption figures for women may have been under-estimated.

Evidence Statement 4.3: Evidence suggests that frequent drinking (on more than 5 occasions per week) is more prevalent in older age groups and males in the South East of England, and is least prevalent in London. In children and young people, the most frequent drinking (7 units over 7 days) is reported to take place in the East Midlands.

Evidence statement 4.4: Among children aged 11-15 yrs, 46% reported never having consumed alcohol. There is evidence that the differential in alcohol consumption between males and females is decreasing in those under the age of 16, and particularly those aged 11-13. Average alcohol consumption appeared to increase with increasing age. Consumption has increased over time among 11-15 yr olds.

Evidence statement 4.5: Evidence suggests that alcohol is consumed more frequently in those commanding high salaries and in full-time employment. Less frequent alcohol consumption is associated with people on lower salaries and without employment.

Evidence Statement 4.6: Surveys provide some evidence that alcohol consumption is greater in the White population, with Pakistani and Bangladeshi communities reporting least consumption.

Review 5:

Evidence statement 5.1: AUDIT is effective in the identification of hazardous and harmful drinking in adults in primary care (systematic review, ++)[1]; (systematic review, ++)[2]; (literature review)[3]; (cross-sectional diagnostic evaluation, ++)[4]; (cross-sectional diagnostic evaluation, ++)[5], (systematic review, ++)[6] . The use of lower thresholds in conjunction with alcohol screening questionnaires was recommended for women (cross-sectional diagnostic evaluation, ++)[4], (cross-sectional diagnostic evaluation, ++)[7], (systematic review, ++)[8], (literature review)[9]. Optimal screening thresholds for the detection of hazardous or harmful drinking using AUDIT appeared to be ≥7 or ≥8 among men (systematic review, ++)[1,] (systematic review, ++)[2,] and ≥6 to ≥8 among women (systematic review, ++)[2], (cross-sectional diagnostic evaluation, ++)[4], (literature review)[9]. Optimal screening thresholds for identifying binge drinking using AUDIT were≥7 or ≥8 for adult males (no data available for females) (cross-sectional diagnostic evaluation, ++).[10] Primary studies included in a

systematic review (++) recommended higher AUDIT thresholds for males (5 to 8) than females (2 to 6).[11]

[1] Berks & McCormick, 2008 (Systematic review, ++)

[2] Fiellin *et al.,* 2000 (Systematic review, ++)

[3] Reinert & Allen, 2007 (Literature review)

[4] Aalto *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) Finland

[5] Coulton *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) UK

[6] Berner *et al.,* 2007 (Systematic review, ++)

[7] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation ++) Belgium

[8] Bradley *et al.,* 1998 (Systematic review, ++)

[9] Reinert & Allen, 2007 (Literature review)

[10] Tuunanen *et al.,* (Cross-sectional diagnostic evaluation, ++) Finland

[11] Kriston *et al.,* 2008 (Systematic review, ++)

Applicability: The evidence included in the reviews was international in origin. One of the 4 primary studies described above was conducted in the UK.

Evidence statement 5.2: The evidence for the effectiveness of shorter versions of AUDIT in adults in primary care was variable, with some authors of cross-sectional diagnostic evaluations observing comparable performance between the full AUDIT and shorter versions (++)[1]; (++)[2]; (++)[3]; (++)[4], whilst other findings drawn from primary care were more cautious of the utility of the shorter forms of this questionnaire (systematic review, ++).[5] The optimal screening threshold for the detection of hazardous drinking using AUDIT-C was ≥3 among men (++)[6] and women (++)[6], (++)[7]. However, thresholds of≥5 for the detection of heavy drinking among females[1] and ≥6 for identifying bingeing moderate and heavy drinking men were also recommended (++).[4] Primary studies included in a systematic review (++) recommended higher AUDIT-C thresholds for males (3 to 6) than females (2 to 5).[5] FAST was described as being effective in the detection of alcohol problems at a cut-off point of ≥1 in males and females in a primary care setting in the UK (literature review)[8].

[1] Aalto *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) Finland

[2] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[3] Bradley *et al.,* 2007 (Cross-sectional diagnostic evaluation, ++) USA

[4] Tuunanen *et al.* (Cross-sectional diagnostic evaluation, ++) Finland

[5] Kriston *et al.,* 2008 (Systematic review, ++)

[6] Berks & McCormick, 2008 (Systematic review, ++)

[7] Frank *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) USA

[8] Reinert & Allen, 2007 (Literature review) UK-specific primary study

Applicability: The systematic reviews included evidence that was international in origin. One of the primary studies referred to in the literature review by Reinert & Allen was performed in the UK.

Evidence statement 5.3: CAGE was found by authors of a number of systematic reviews to be effective in the detection of alcohol abuse and dependence in adults in primary care (++)[1]; (++)[2]; (+)[3]. Optimal thresholds for screening for alcohol abuse or dependence using CAGE in primary care appeared to be ≥1 or ≥2 for adult men [1,2,3] and women.[1,2,3,4] CAGE was described as performing poorly in an elderly psychiatric population (systematic review, +)[5].

[1] Berks & McCormick, 2008 (Systematic review, ++)

[2] Fiellin *et al.,* 2000 (Systematic review, ++)

[3]Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[4] Frank *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) USA

[5] O'Connell *et al.,* 2004 (Systematic review, +)

Applicability: The systematic reviews included evidence that was international in origin. None of the above primary studies were performed in the UK.

Evidence statement 5.4: Limited evidence was identified that demonstrated that the ASSIST screening questionnaire (evaluation and qualitative study, ++)[1]; cross-sectional diagnostic evaluation, +)[2]; cross-sectional diagnostic evaluation, ++)[3]) shows promise and is appropriate for use for the detection of alcohol abuse and dependence among adults in primary care.

[1] WHO ASSIST Working Group, 2002 (Evaluation and qualitative study, ++) International sites

[2] Newcombe *et al.,* 2005 (Cross-sectional diagnostic evaluation, +) Australia

[3]Humeniuk *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) International sites

Applicability: The above studies were conducted across a range of international collaborative sites (Australia, Brazil, India, Ireland, Israel, UK, Zimbabwe, the Palestinian Territories and Puerto Rico). The study by Newcombe *et al.* specifically relates to an adult Australian primary care sample.

Evidence statement 5.5: Only a limited amount of evidence could be identified relating to the performance of alcohol screening questionnaires in hospital settings. The Five-shot questionnaire was shown to detect alcohol misuse in adult male inpatients at a cut-off of ≥2.5

(cross-sectional diagnostic evaluation, ++).[1] AUDIT was effective in screening UK male and female adult general medical admissions for hazardous and harmful alcohol consumption (cross-sectional diagnostic evaluation, +).[2] AUDIT was also described as performing well among general hospital inpatients (systematic review, ++)[3].

[1] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[2] McCusker *et al.,* 2002 (Cross-sectional diagnostic evaluation, +) UK

[3] Berner *et al.,* 2007 (Systematic review, ++)

Applicability: One primary study was conducted in the UK.

Evidence statement 5.6: Evidence was identified for the use of alcohol screening questionnaires among adults in emergency care settings. One study (++)[1] found that CAGE was effective in screening for a lifetime diagnosis of alcohol dependence in trauma centre patients. AUDIT-C was shown to effectively identify hazardous drinking among male and female adult traffic casualties in an emergency department (cross-sectional diagnostic evaluation, +)[2]. FAST displayed good screening properties in the identification of alcohol problems among males and females presenting to an A&E setting in the UK (literature review)[3]. The Paddington Alcohol Test has been shown to be rapid, feasible to use, be UK-specific and to have reasonably good screening properties for the detection of alcohol misuse when implemented in response to clinical 'trigger' conditions in A&E care (listed as follows: fall; collapse; head injury; assault; accident; unwell; non-specific GI; psychiatric; cardiac; repeat attender) (before and after study, ++)[4]; (before and after study, ++)[5]; (short communication)[6]; (before and after study, ++)[7]; (short communication)[8.]

[1] Soderstrom *et al.,* 1997 (Cross-sectional diagnostic evaluation, ++) USA

[2]Rodriguez-Martos & Santamarina, 2007 (Cross-sectional diagnostic evaluation, +) Spain

[3] Reinert & Allen, 2007 (Literature review) UK-specific primary study

[4] Smith *et al.,* 1996 (Before and after study, ++) UK

[5] Huntley *et al.,* 2001 (Before and after study, ++) UK

[6] Patton *et al.,* 2002 (Short communication) UK

[7] Patton *et al.,* 2003 (Before and after study, ++) UK

[8] Patton *et al.,* 2004 (Short communication) UK

Applicability: The evidence relating to the use of the Paddington Alcohol Test is specific to UK A&E populations.

Evidence statement 5.7: AUDIT was shown to perform more effectively in the identification of alcohol abuse or dependence (when used at a cut-off of≥10) than CAGE, CRAFFT or

RAPS-QF in male and female young people (median age of 19 yrs) (++).[1] AUDIT was also demonstrated to have higher sensitivity (when used at an optimal cut-off of ≥3) than CAGE, CRAFFT or POSIT in the detection of problem use (ie. hazardous/harmful consumption not reaching the diagnostic threshold for an alcohol-related disorder, abuse and dependence) in a sample aged between 14 and 18 yrs (++).[2] The identified evidence for the effectiveness of SASSI in screening for alcohol misuse was limited and inconclusive (literature review)[3]; (cross-sectional diagnostic evaluation, ++)[4]; (cross-sectional diagnostic evaluation, +)[5]; (cross-sectional diagnostic evaluation, ++)[6]). AUDIT was found to perform reasonably well in elderly populations (systematic review, ++),[7] whilst AUDIT-5 was described as showing potential as an appropriate tool for use among older people (systematic review, +).[8]

[1]Kelly *et al.,* 2004 (Cross-sectional diagnostic evaluation, ++) USA

[2]Knight *et al.,* 2003 (Cross-sectional diagnostic evaluation, ++) USA

[3] Fieldstein *et al.,* 2006 (Literature review)

[4] Lazowski *et al.,* 1998 (Cross-sectional diagnostic evaluation, ++) USA

[5] Rogers *et al.,*(1997) (Cross-sectional diagnostic evaluation, +) USA

[6] Stein *et al.,* (2005) (Cross-sectional diagnostic evaluation, ++) USA

[7] Berner *et al.,* 2007 (Systematic review, ++)

[8] O'Connell *et al.,* 2004 (Systematic review, +)

Applicability: All of the above evidence is specific to the USA.

Evidence statement 5.8: The screening questionnaires TWEAK and T-ACE are both appropriate for the identification of alcohol misuse during pregnancy (+)[1]; (++)[2]; (+)[3]; (++)[4]. However, AUDIT performed significantly better than T-ACE as a predictor of lifetime alcohol diagnoses, and current drinking (++)[2]. TWEAK was more effective than T-ACE or CAGE in detecting risky drinking in pregnancy (+)[4]. TWEAK and T-ACE displayed optimal combinations of sensitivity and specificity at a cut-off point of ≥2 (+)[4].

[1] Burd *et al.,* 2003 (Cross-sectional diagnostic evaluation, +) USA

[2] Chang *et al.,* 1998 (Cross-sectional diagnostic evaluation, ++) USA

[3] Dawson *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) USA

[4] Russell *et al.,* 1996 (Cross-sectional diagnostic evaluation, +) USA

Applicability: All the above studies were conducted in the USA.

Evidence statement 5.9: The screening properties of questionnaires were influenced by the ethnicity of recipients and authors suggested that the use of appropriate cut-off scores should

be considered (systematic review, ++)[1]; (cross-sectional diagnostic evaluation, ++)[2]; (literature review)[3]).

[1] Bradley *et al.,* 1998 (Systematic review, ++)

[2] Frank *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) USA

[3] Reinert & Allen, 2007 (Literature review)

Applicability: The primary evaluation above was conducted in the USA.

Evidence statement 5.10: Laboratory markers are of limited value in the detection of alcohol misuse when compared with alcohol screening questionnaires.[1,2,3,4] However, the use of blood alcohol concentration testing may complement the use of later questionnaire screening in the identification of alcohol misuse among patients treated in the emergency department resuscitation room (++)[5].

[1] Coulton *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) UK

[2] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[3] Bisson & Milford-Ward, 1994 (Cross-sectional diagnostic evaluation, ++) UK

[4] Wetterling *et al.,* 1998 (Cross-sectional diagnostic evaluation, +) Germany

[5] Csipke *et al.,* 2007 (Cross-sectional study, ++) UK

Applicability: 3 of the listed studies[1,3,5] are specific to the UK.

Evidence statement 5.11: A number of clinical indicators were described as being associated with excessive alcohol consumption.[1,2,3] Awareness of such indicators may serve useful in alerting health professionals to alcohol-related physical problems.

[1] Santolaria *et al.,* 1997 (Cross-sectional study, ++) Canary Islands, Spain

[2] Saunders & Conigrave, (1990) (Literature review)

[3] Wahie & Lawrence, (2006) (Case study) UK

Applicability: The case study above related to a small number of patients in the UK.

Review 6:

Evidence statement 6.1: The 27 included systematic reviews provided a considerable body of evidence supportive of the effectiveness of brief interventions for alcohol misuse in reducing alcohol consumption, mortality, morbidity, alcohol-related injuries, alcohol-related social consequences, healthcare resource use and laboratory indicators of alcohol misuse.

Applicability: The primary studies included in the systematic reviews included in this assessment were largely drawn from the USA. However, a smaller proportion of the included

studies were undertaken in the UK and therefore, the evidence base can be considered to have some applicability to a UK-based setting. The majority of included studies were also conducted in primary care.

Evidence statement 6.2: Six systematic reviews (++)[1-6] demonstrated that interventions delivered in primary care are effective in reducing alcohol-related negative outcomes. Three systematic reviews specifically focusing on the use of brief interventions in emergency care (+)[7], (++)[8], (++)[9] found limited evidence for the effectiveness of brief interventions for alcohol misuse in emergency care settings. A further review (++)[10] presented inconclusive evidence of the effectiveness of brief interventions in inpatient and outpatient settings. A systematic review of brief interventions for alcohol misuse in the workplace presented limited and inconclusive findings for the effectiveness of interventions in this setting.[11]

[1]Ashenden *et al.*, 1997 (Systematic review, ++)

[2]Ballesteros *et al.*, 2004a (Systematic review, ++)

[3]Bertholet *et al.*, 2005 (Systematic review, ++)

[4]Kaner *et al.*, 2007 (Systematic review, ++)

[5]Poikolainen, 1999 (Systematic review, ++)

[6]Whitlock *et al.*, 2004 (Systematic review, ++)

[7]D'Onofrio & Degutis, 2002 (Systematic review, +)

[8]Havard *et al.*, 2008 (Systematic review, ++)

[9] Nilsen *et al.*, (2008) (Systematic review, ++)

[10]Emmen *et al.*, 2004 (Systematic review, ++)

[11] Webb *et al.*, 2009 (Systematic review, ++)

Applicability: Four of the six primary studies included in the review by Ashenden *et al.* (1997) were conducted in primary care within the UK. The review by Kaner *et al.* also included studies from the UK. Approximately a third of the studies reviewed by Ballesteros *et al.* (2004a) were drawn from the UK; whilst one sixth of the trials reviewed by Whitlock *et al.* (2004) were from the UK. However, none of the studies included in the review by Bertholet *et al.* (2005) were from the UK. The origin of the studies included by Poikolainen was unclear. D'Onofrio & Degutis discussed evidence drawn from the UK in emergency care. It was unclear where the studies reviewed by Havard *et al.* (2008) and Emmen e*t al.* (2004) were conducted. The majority of the studies in the Nilsen review were conducted in the USA.

Evidence statement 6.3: Brief interventions are effective in reducing alcohol consumption in both men and women (++),[1] (++),[2] (++),[3] (++)[4] (++),[5] (++)[6] (++)[7]).

[1]Ballesteros *et al.*, 2004a (Systematic review, ++)

[2]Bertholet *et al.*, 2005 (Systematic review, ++)

[3]Whitlock *et al.*, 2004 (Systematic review, ++)

[4]Kahan *et al.*, 1995 (Systematic review, +)

[5]Kaner *et al.*, 2007 (Systematic review, ++)

[6]Poikolainen,1999 (Systematic review, ++)

[7] Ballesteros *et al.*, 2004b (Systematic review, ++)

Evidence statement 6.4: The majority of included primary evidence was drawn from adult populations with an age range of 12 to 70 years. Therefore, brief interventions for adults have been shown to be effective amongst adult populations.

Applicability: The primary studies included in the systematic reviews included in this assessment were largely drawn from the USA. However, a smaller proportion of the included studies were undertaken in the UK and therefore, the evidence base can be considered to have some applicability to a UK-based setting.

Evidence statement 6.5:

Three systematic reviews were identified (+),[1] (++),[2] (++),[3] that presented limited evidence for the effectiveness of brief interventions in young people (aged up to 25 years). Of eight identified RCTs of the effectiveness of alcohol brief interventions in young people (delivered in non-educational settings), four studies showed some statistically significant beneficial outcomes.[4,5,6,7] However, a further study reported increased alcohol consumption among adolescents as a consequence of brief intervention.[8] The remaining RCTs did not present any statistically significant differences between treatment groups. The evidence base for the effectiveness of alcohol brief interventions among young people was therefore inconclusive.

[1]D'Onofrio & Degutis, 2002 (Systematic review, +)

[2]Hunter Fager *et al.*, 2004 (Systematic review, +)

[3]Tait & Hulse, 2003 (Systematic review, ++)

[4] Bailey *et al.*, 2004 (RCT, +) Australia

[5] Spirito *et al.*, 2004 (RCT, ++) USA

[6] Monti *et al.*, 1999 (RCT, ++) USA

[7] Monti *et al.*, 2007 (RCT, ++) USA

[8] Boekeloo *et al.*, 2004 (RCT, ++) USA

Applicability: 14 of the 15 studies included by Hunter Fager *et al.* (2004) were from the USA and were based on undergraduate campuses. All of the studies included by Tait & Hulse were conducted in the USA in educational and healthcare settings. Therefore, the limited applicability of this evidence in relation to the effectiveness of brief interventions in UK-based young people must be taken into consideration. Seven of the eight identified RCTs relating to brief interventions for alcohol use among young people originated in the USA, whilst the remaining study was conducted in Australia.

Evidence statement 6.6: Whilst the ethnicity of study populations was poorly reported, where this information was provided, populations were primarily Caucasian. No review evidence could identified focusing specifically on effectiveness among ethnic minority groups in the UK.

Evidence statement 6.7: The evidence regarding the effect of socioeconomic status on effectiveness of brief interventions was very limited. One identified systematic review reported that socioeconomic status does not have an impact on the effectiveness of brief interventions (+).[1]

[1]Littlejohn, 2006 (Systematic review, +)

Applicability: The setting of included studies by country was not reported.

Evidence statement 6.8: No conclusive relationship could be observed in relation to the impact of levels of alcohol dependence on the effectiveness of brief interventions. However, it should be noted that, for the purposes of this guidance, brief interventions were defined in the scope as any brief intervention aimed at people who are not seeking help from specialist alcohol services. Therefore, review findings which include evidence from specialist care settings are of limited relevance and should be interpreted with caution. Furthermore, it should be noted that individuals with alcohol dependence were excluded from participation in

primary studies included within the identified systematic reviews. Therefore, it is unlikely that this evidence would be capable of elucidating any such effect.

Evidence statement 6.9: No conclusive evidence was available for the effectiveness of brief interventions in patients with significant physical or mental co-morbidities (as the majority of primary studies included in reviews excluded these subjects). One review (+)[1] presented limited evidence for the effectiveness of brief interventions in patients with a mental health condition who misuse alcohol.

[1]Laker, 2007 (Systematic review, +)

Applicability: The setting of included studies by country was not reported.

Evidence statement 6.10: Extensive heterogeneity was evident in the characteristics of evaluated brief interventions. However, limited evidence would suggest that even very brief interventions may be effective in reducing alcohol-related negative outcomes, (++)[1] with inconclusive evidence for an additional positive impact resulting from increased dose ((++),[2] (++),[3] (++)[4]). Evidence from an additional review (++)[5] suggests that brief interventions are effective, with impact of the inclusion of motivational interviewing principles unclear.

[1]Whitlock *et al.*, 2004 (Systematic review, ++)

[2]Ballesteros *et al*., 2004a (Systematic review, ++)

[3]Bertholet *et al*., 2005 (Systematic review, ++)

[4]Kaner *et al*., 2007 (Systematic review, ++)

[5] Tait & Hulse, 2003 (Systematic review, ++)

Applicability: The above systematic reviews included primary studies conducted in primary care (with the exception of the work by Tait & Hulse, which was undertaken in educational and healthcare settings in the USA). The evidence can be considered to have reasonable applicability to the UK.

Evidence statement 6.11: Extended brief interventions were demonstrated to be effective in the reduction of alcohol consumption (whereby evaluated interventions consisted of 2 to 7 sessions with a duration of initial and booster sessions of 15 to 50 min[1] or 10 to 15 min in 1 session with number of specific booster sessions of 10 to 15 min duration[2]).

[1]Kaner *et al*., 2007 (Systematic review, ++)

[2]Ballesteros *et al*., 2004a (Systematic review, ++)

Review 7:

Organisational factors

Evidence statement 7.1 Evidence was identified that organisational factors such as adequate support and resources can influence the acceptability and implementation of screening and brief intervention for alcohol misuse.

Implementation of screening and brief intervention is influenced by factors other than effectiveness. Positive support from the Government, management and involvement of non-clinical members of staff are more likely to result in successful implementation.

There is also evidence from a range of studies in primary care settings that adequate practitioner training and support in alcohol misuse screening and use of brief intervention materials facilitates or would facilitate effective implementation as well as rates and appropriate detection of 'at risk' drinkers. Evidence suggests that the extent of training and support available to practitioners is variable.

One RCT (++)[1] showed more successful implementation of screening and brief intervention where there was prior experience of this type of work, management stability and positive support in terms of co-ordination of programmes. Financial incentives and successful management of staff changes as well as assistance from receptionists were also important. However, barriers to success included competing priorities and lack of time. The importance of financial and other incentives for GPs, readily available materials and availability of training was also found in one survey (+)[2].

Evidence from RCTs (++)[1], (+)[3], (+)[4] suggests that the extent to which brief intervention is implemented, though not necessarily the appropriateness of implementation, is increased with use of a training and support intervention for GPs and nurses. One cross-sectional study (++)[6] provides evidence that GPs holding a qualification in addiction medicine are more likely to detect problem drinkers, although a cross-national survey (++)[7] found that training did not improve baseline role insecurity for GPs.

One cross-sectional study (+)[8] and one qualitative study (++)[9] found that practitioner training rates and ratings of their own familiarity with screening tools and knowledge of brief intervention content was low. The importance of training to practitioners in this survey was

evident, as were practitioner views that they lacked training to carry out counselling (++)[10]. The latter point was also evidenced in one cross-sectional study (++).[11] A Delphi survey (++)[12] provides evidence in the form of expert opinion that practitioner training should help raise awareness of risk factors and typical presentations of individuals with potential drinking problems. Evidence from qualitative studies show that some nurses in the UK (++)[13] see training as an incentive to carrying out alcohol-related work; a sample of GPs in Finland perceive that they lack training in identifying early stages of alcohol misuse; and GPs in a Danish focus group study (+)[14] felt they lacked training in counselling skills.

In a probationary setting, Forensic Medical Examiners in a UK qualitative study set in custody suites (-)[15] felt they lacked the required training to carry out assessments of drinking behaviour.

[1] Babor *et al.,* 2005 (RCT++) US

[2] Adams *et al.,* 1997 (Cross-sectional +) NZ

[3]Adams *et al.,* 1998 (RCT +) US

[4] Kaner *et al.,* 1999 (RCT +) UK

[5] Kaner *et al.,* 2003 (RCT++) UK

[6] Berner *et al.,* 2007 (Cross-sectional ++) Germany

[7]Anderson *et al.,* 2004 (Cross-sectional ++) Cross-national

[8]Aalto et al., 2000 (Cross-sectional +) Finland

[9]Aira *et al.,* 2003 (Qualitative ++) Finland

[10] Kaner *et al.,* 1999 (Cross-sectional ++) UK

[11] Deehan *et al.,*1998 (Cross-sectional ++) UK

[12] Heather *et al.,* 2004 (Cross-sectional ++) UK

[13] Hutchings *et al.,* 2006 (Qualitative ++) UK

[14] Beich *et al.,* 2002 (Qualitative +) Denmark

[15] Best *et al.,* 2002 (Qualitative -) UK

Applicability: The majority of these studies were carried out in the UK, therefore evidence regarding training and support is applicable to the UK. The remaining studies were carried out in US (2), New Zealand (1), Finland (2), Denmark (1) and Germany (1), where access to training may differ, and these studies are therefore less applicable.

Evidence Statement 7.2 Evidence has been found that extending current practitioner workload is a potential barrier to implementing screening and brief intervention on a large scale, particularly if all young people and adults are screened as routine practice.

The extra time that implementation demands can be a barrier to acceptability and therefore willingness to deliver such a programme. Implementation of routine screening and brief intervention programmes requires team-working between physicians, nurses and non-clinical personnel, with consideration required regarding the extent of involvement and specific roles of team members.

Evidence from one systematic review (++)[1] challenges the model of universal screening. The study concludes that implementation of universal screening does not benefit sufficient numbers of individuals to warrant the extra workload required. Nurses in one qualitative study (++)[2] felt 'overloaded' with preventative work generally, with resources such as space, staff and sufficient time in short supply. In another qualitative study (+)[3], the additional workload of screening and brief intervention was found to be creating stress among practitioners in primary care. In terms of time available, a Canadian qualitative study (++)[4] found that time was constrained in terms of assessing each patient. A qualitative study of Finnish GPs (++)[5] showed they felt they lacked time to carry out drinking assessment in the context of other consultation demands, and weak evidence (-)[6] was found that nurses in Sweden regarded time constraints as a barrier to their willingness to engage in alcohol prevention. There is mixed evidence from one RCT (++)[7] for the utilisation of non-clinical staff in implementation in order to delegate work and thus decrease the workload of clinicians. Another RCT (++)[8] found that receptionists did not have a particularly positive attitude to being involved in this type of work without adequate re-imbursement, or to changing their perceived role (++)[7].

In an emergency care setting, one cross-sectional study (-)[9] provides weak evidence in terms of reporting from a survey of physicians that, despite support for brief interventions in theory, lack of time is a barrier to implementation. A further UK-based study set in an emergency department also reported that lack of time was viewed as a limiting factor in delivering screening (++)[10].

In a briefly reported UK qualitative study set in custody suites (-)[11], Forensic Medical Examiners felt they lacked the required time to carry out assessments of drinking behaviour.

[1]Beich *et al.,* 2003 (Review +) Denmark

[2]Hutchings *et al.,* 2006 (Qualitative ++) UK

[3]Beich *et al.,* 2002 (Qualitative +) Denmark

[4]Rush *et al.,* 1995 (Qualitative ++) Canada

[5]Aira *et al.,* 2003 (Qualitative ++) Finland

[6]Johansson *et al.,* 2005 (Qualitative -) Sweden

[7]Babor et al., 2005 (Cluster RCT++) US

[8]Lock et al., 2000 (RCT++) UK

[9]Graham *et al.,* 2000 (Cross-sectional -) US

[10] Huntley *et al.,* 2004 (Cross-sectional study, ++) UK

[11]Best *et al.,* 2002 (Qualitative -) UK

Applicability: Four of these studies were carried out in the UK, one in a forensic setting. Quality of the study reporting was poor and therefore findings may not be applicable beyond the specific setting. The remaining studies were conducted in Denmark (2), Canada (1), Sweden (1), Finland (1) and US (1), and so findings here might be less applicable in the UK. However, issues of time and workload may be transferable if similar systems are in place.

Evidence Statement 7.3 There is evidence that implementation of screening and brief intervention would be facilitated by use of environments where alcohol can discussed in a non-threatening way. Integrating screening and advice into general lifestyle discussions might increase the acceptability of screening and brief intervention for users.

In a range of studies, providers and experts emphasise the importance of appropriate contexts for discussion of alcohol use with users in order to increase acceptability.

There is evidence that clinical consultations for non-alcohol-related medical problems can be inappropriate for discussing alcohol use, given that users are focussed on the condition for which they are seeking advice. Instead, sessions such as new patient registrations and well-person clinics, where health promotion is often discussed, are seen to be less threatening arenas in which to discuss drinking, embedded in general discussion around lifestyle issues such as diet, exercise and smoking.

Evidence was found from a cross-sectional study (+)[1] that primary care users attending for scheduled appointments are more likely to be asked about their drinking behaviour, which suggests that practitioners deem certain contexts as more appropriate or more convenient in some way for carrying out screening and intervention. A Delphi survey (++)[2] also provides expert view evidence that clinics and new registration sessions are an appropriate context for assessing drinking behaviour in terms of sensitivity to user acceptability. This study also suggests that interventions might be more acceptable to users if they are tailor-made to the individual rather than global in design. There is further evidence from five UK qualitative studies (++)[3]; (++)[4]; (++)[5]; (++)[6]; (+)[7] that practitioners and users regard clinics, registration sessions and routine consultations as opportunities for discussions in a less-threatening

environment and context. This provides an opportunity to discuss drinking in a context that is related to the purpose of the visit (i.e. lifestyle assessment or chronic condition monitoring).

Emergency care and probation settings are regarded as a potential opportunity to carry out alcohol screening and advice; however there is scarce evidence available. One survey of Scottish emergency care units (++)[8] and one qualitative study (-)[9] set in custody suites found that staff thought the location unsuitable for alcohol screening and intervention. However, two surveys from the US (+)[10], (+)[11] reported that both patients and surgeons found the emergency care setting acceptable and appropriate. One US evaluation (+)[12] provided evidence that emergency care staff may not feel adequately supported either by management or financially, with training and workload particular concerns. One UK survey (+)[13] provided mixed views with some nurses preferring a holistic approach, and others prioritising care of injuries over health promotion. A further UK-based study found that the majority of consulted professionals judged the emergency department to be an appropriate place to perform alcohol screening but that implementation rates were low, potentially due to clinical inertia (++)[14]. The importance of having resources in place to facilitate rapid referral of positively screening patients from the emergency department to brief intervention was emphasised, with a 'half-life of attendance' described at 2 days following referral, whereby the rate of attendance for brief intervention dropped off markedly (++)[15]. Implementation of alcohol screening and brief intervention in emergency care settings is not as consistent as in primary care. The setting differs from primary care in terms of patient population and types of presenting cases and, as such, account needs to be taken of barriers and facilitators to implementation specific to emergency care organisation, where attendance is brief and often traumatic, with patients who are more likely to be injured, traumatised, or intoxicated, and staff who may feel less prepared to give advice.

[1]Johansson *et al.*, 2005 (Cross-sectional +) Sweden

[2]Heather *et al.*, 2004 (Cross-sectional ++) UK

[3]Hutchings *et al.*, 2006 (Qualitative ++) UK

[4]Lock *et al.*, 2004 (Qualitative ++) UK

[5]Lock *et al.*, 2002 (Qualitative ++) UK

[6]Rapley *et al.*, 2006 (Qualitative ++) UK

[7]McManus *et al.*, 2003 (Evaluation +) UK

[8] Anderson *et al.*, 2001 (Cross-section ++) UK

[9]Best *et al.*, 2002 (Qualitative -) UK

[10]Schermer *et al.*, 2002 (Cross-section +) US

[11]Schermer *et al.*, 2002 (Cross-section +) US

[12]Desy *et al.*, 2008 (Evaluation +) US

[13]Brooker *et al.*, 1998 (Qualitative +) UK

[14] Huntley *et al.*, 2004 (Cross-sectional study, ++) UK

[15] Williams *et al.*, 2005 (Evaluation, ++) UK

Applicability: Eleven of these studies were conducted in the UK, therefore there is relatively high applicability.

Evidence Statement 7.4 There is evidence that service users have preferences regarding the status of the person dealing with their alcohol issues.

Although experts consider alcohol and counselling specialists to be better qualified to carry out interventions, service users might feel stigmatised or rejected should their needs be referred on to such practitioners.

Evidence from one RCT (+)[1] carried out in a general medicine setting showed that service users are no more likely to attend for counselling with an alcohol specialist than with a physician or nurse. In addition, qualitative evidence from the UK (++)[2] focusing on user views shows that counselling with alcohol specialists can sometimes be perceived as stigmatising. These views contrast with expert views (++)[3] that alcohol workers and counsellors might be best placed to deliver brief intervention. There is evidence of some mixed views from three studies (++)[4]; (++)[5]; (++)[6] in that professionals and some users perceive the nurse as having more time for discussing drinking with users, whereas other users report that they are more likely to discuss alcohol-related issues with their GP.

[1] Goldberg *et al.*, 1991 (RCT +) US

[2]Lock *et al.*, 2004 (Qualitative ++) UK

[3]Heather *et al.*, 2004 (Cross-sectional ++) UK

[4]Hutchings *et al.*, 2006 (Qualitative ++) UK

[5]Lock *et al.*, 2004 (Qualitative ++) UK

[6]Lock *et al.*, 2002 (Qualitative ++) UK

Applicability: Five of these studies were conducted in the UK. The RCT however was carried out in the USA, therefore the findings may be less applicable to the UK.

Provider Factors

Evidence Statement 7.5 There is some evidence that service users are generally positive about screening and intervention. There is also evidence for general under-activity in discussing drinking with service users.

However, practitioners' experiences of negative service user behaviour, such as aggression at being asked about their drinking, whilst rare, may serve as deterrents to approaching the topic of drinking with users. Actual drunkenness at consultations limits the likelihood that users will appreciate or remember the advice given. Practitioners may benefit from training in dealing with such situations, and in approaching the topic with individuals that they perceive as 'low risk' in appropriate contexts.

Two studies (+)[1]; (++)[2] provide evidence that the majority of service users are positive toward screening, and another (+)[3]toward discussing drinking. However, two qualitative studies [4] (++)[4]; (+)[5] found that some professionals had encountered negative reactions from users in terms of embarrassment and unease, and changing their GP practice.

Evidence from two UK cross-sectional studies (++)[6], (++)[7] shows under-activity in terms of practitioner management of hazardous drinking, with a majority of GPs in the first study only intervening in between one and six cases per year. Even in cases of heavy drinking, service users are not being asked about their consumption (+)[8]. Another cross-sectional study (+)[9] found that advice on drinking behaviour is provided less often than for other lifestyle behaviours, such as exercise, diet, and smoking, and less often than service users expect. One cross-sectional study (++)[10] found that the time being spent on asking users about their drinking was typically less than four minutes, and another recent cross-sectional study (+)[11] found that detection rates of problem drinkers are low, at one in three. Possible reasons are found in a Finnish qualitative study (++)[12] of GPs, who reported their reluctance to ask users about their drinking unless they saw clear signs of risky drinking behaviour.

[1] Miller *et al.*, 2006 (Cross-sectional +) US

[2]Hutchings *et al.*, 2006 (Qualitative ++) UK

[3] Aalto *et al.,* 2002 (Cross-sectional +) Finland

[4] Lock *et al.*, 2002 (Qualitative ++) UK

[5] Beich *et al.*, 2002 (Qualitative +) Denmark

[6] Kaner *et al.*,1999 (Cross-sectional ++) UK

[7]Anderson *et al.,* 2001 (Cross-sectional ++) UK

[8]Aalto *et al.,* 2002 (Cross-sectional +) Finland

[9]Johansson *et al.*, 2005 (Cross-sectional +) Sweden

[10]Aalto *et al.*, 2004 (Cross-sectional +) Finland

[11]Berner *et al.,* 2007 (Cross-sectional ++) Germany

[12]Aira *et al.,* 2003 (Qualitative ++) Finland

Applicability: Four studies of good quality were conducted in the UK, providing applicable evidence. Four studies were conducted in Finland, and one each in US, Denmark, Sweden and Germany.

Evidence Statement 7.6 Evidence was found that provider attitudes, knowledge, skills and behaviour can influence the implementation of screening and brief intervention for alcohol misuse.

There is evidence from primary care practitioner views of a short-fall in perceived knowledge in terms of detecting 'at-risk' individuals. There is also evidence of confusion regarding current guidelines around drinking behaviour, and the known benefits of drinking in moderation. This can affect practitioner confidence in and motivation towards implementing screening and brief intervention programmes effectively. In addition, the practitioner's own drinking behaviour and the user-practitioner relationship may affect the way that alcohol-related interventions are implemented.

One UK qualitative study (++)[1] provides evidence that GPs found difficulty in identifying early stage heavy drinkers. The study also reports difficulty working with multiple definitions of problematic drinking. One qualitative study (+)[2] found that GPs and nurses saw lack of clear guidance as a barrier to carrying out brief intervention. Utilising the skills of receptionists can be useful but there is evidence from one RCT (++)[3] that receptionist attitudes toward the work may be less positive than that of clinicians, and that this might have an impact upon implementation.

There is weak evidence (-)[4] that Forensic Medical Examiners perceive that they lack the knowledge to carry out assessment in custody suites in the UK.

Two UK qualitative studies (++)[5], (+)[6] found that nurses saw alcohol as a difficult and emotive topic to broach with users. In addition, nurses reported confusion for themselves and service users around the issue of standard drink units, and the potential benefits of alcohol that create ambiguity in discussing drinking from a health promotion perspective. Other studies (+)[7], (+)[8] found that GPs relationship with alcohol could affect their behaviour in terms of addressing service user drinking, with feelings of guilt and hypocrisy potential barriers to open discussion, or facilitators to empathy. There is qualitative evidence from three studies focussing on user views (++)[9]; (++)[10]; (+)[11] that discussing drinking is facilitated by a good relationship with the health professional. In addition, there is evidence (+)[12] that

practitioners are concerned not to offend users in relation to discussing alcohol for fear of disturbing the therapeutic relationship.

[1]Rapley *et al.,* 2006 (Qualitative ++) UK

[2]Aalto *et al.,* 2003 (Qualitative +) Finland

[3] Lock *et al.,* 2000 (RCT++) UK

[4]Best *et al.,* 2002 (Qualitative -) UK

[5]Lock *et al.,* 2002 (Qualitative ++) UK

[6]McManus *et al.,* 2003 (Evaluation +) UK

[7]Kaner *et al.,* 2006 Qualitative +) UK

[8]Aalto *et al.,* 2006 (Cross-sectional +) Finland

[9]Lock *et al.,* 2004 (Qualitative ++) UK

[10]Hutchings *et al.,* 2006 (Qualitative ++) UK

[11]de Guzman, 2006 (Qualitative +) US

[12] Beich *et al.,* 2002 (Qualitative +) Denmark

Applicability: Eight of these studies were conducted in the UK, therefore are transferable. Two of the remaining studies were carried out Finland, and one each in Denmark and US, making these studies less applicable, particularly as attitudes to discussing alcohol in Scandinavian countries may differ from those in the UK.

Service User Factors

Evidence Statement 7.7 There is evidence that the consistency of provider implementation of screening and brief intervention for alcohol misuse can be influenced by particular aspects of the service user population.

Evidence was identified that shows disparities in implementing screening and brief intervention for alcohol misuse in terms of certain groups within the population. Whilst certain groups such as males and high earners are more 'at-risk' than others from alcohol misuse, individuals from groups that are 'low-risk' such as females, younger and older people may be missed. Conversely, over-targeting can also occur due to misperceptions of the populations most at-risk of alcohol misuse.

One systematic review (+)[1] provides inconclusive evidence that socioeconomic status affects the uptake of brief interventions. However, one cross-sectional study (++)[2] found that unemployed individuals were more likely to receive brief intervention than those in employment. In terms of ethnicity, there is evidence from one cross-sectional study (+)[3] that individuals of ethnic background, in this instance Black and particularly Hispanic people,

were more likely to be approached by practitioners regarding their alcohol consumption. Four cross-sectional studies, one from the UK, (++)[4]; (+)[5]; (++)[6];(+)[7] provide evidence that primary care users most likely to be given advice on drinking are males, and another cross-sectional study (+)[7] suggests that males, as well as heavy drinkers, are also more likely to adhere to the advice provided in brief intervention. One qualitative study (+)[9] found that GPs were reluctant to address drinking with young people as they felt that they would be likely to grow out of the habit of hazardous drinking.

[1]Littlejohn *et al.,* 2006 (Review +) UK (includes studies from outside the UK)

[2]Kaner *et al.,* 2001 (Cross-sectional ++) UK

[3]Mukamal *et al.,* 2007 (Cross-sectional +) US

[4]Lock *et al.,* 2004 (Cross-sectional ++) UK

[5]Johansson *et al.,* 2005 (Cross-sectional +) Sweden

[6]Berner *et al.,* 2007 (Cross-sectional ++) Germany

[7]Aalto *et al.,* 2002 (Cross-sectional +) Finland

[8]Aalto *et al.,* 2000 (Cross-sectional +) Finland

[9]Beich *et al.,* 2002 (Qualitative +) Denmark

Applicability: Two of these studies were carried out in the UK; the systematic review included studies from outside the UK. The remainder were conducted in Finland (3), US (1), Germany (1), Sweden (1) and Denmark (1). It is possible that these findings are transferable but given the differences between populations, this cannot be assumed.

Discussion

A considerable body of evidence of a relatively high standard of quality has been identified to support the effectiveness of screening and brief interventions for alcohol misuse, most notably in primary care. There is evidence of mixed quality from a range of studies of organisational, contextual, and individual barriers and facilitators to screening and brief intervention for alcohol misuse.

3. BACKGROUND

The National Institute for Health and Clinical Excellence (NICE) has received a referral from the Department of Health to develop public health guidance aimed at the prevention and early identification of alcohol-use disorders in adults and adolescents.

3.1 Description of health problem

The NICE guidance scope document highlights that a significant proportion of the population are drinkers, with 73% of men and 57% of women report having had a drink on at least 1 day during the preceding week (Goddard 2006). The scope also acknowledges that approximately 1.55 million people in England are classed as harmful drinkers, with an additional 6.3 million drinking at hazardous quantities (North West Public Health Observatory, 2007). Alcohol consumption is attributed as being a significant risk factor in a wide range of clinical conditions (Jones *et al.*, 2008) and linked with negative social consequences.

3.2 Remit of the assessment

3.2.1 Groups that will be covered

Adults and young people aged 10 years and over. The populations of interest include both individuals who consume alcohol and those who do not consume alcohol. No population groups of particular interest or concern were identified *a priori* in the scope. Where research identifies interventions that are applied to – or have differential impact in – specific population groups that can be defined, these are clearly identified and described within the assessment report.

3.2.2 Groups that will not be covered

Children under 10 years of age.

3.2.3. Activities/interventions that will be covered

i) Measures to detect alcohol misuse amongst adults and young people both within and outside primary care. These may be used by a wide range of professionals and non-professionals within the health service, social services and the criminal justice system.

ii) Brief interventions to manage alcohol misuse among adults and young people both within and outside primary care settings. These may be delivered by a wide range of professionals

and non-professionals within the health service, social services and the criminal justice system. For the purposes of this guidance, they are defined as any brief intervention aimed at people who are not seeking help from specialist alcohol services.

iii) Interventions to improve management of England's alcohol market (including interventions to influence price, advertising, and availability of alcohol).

3.2.4. Activities/interventions that will not be covered

i) drink-driving schemes.
ii) self-help interventions (eg. Alcoholics Anonymous)
iii) treatment administered by alcohol specialists
iv) interventions in schools and pregnancy (already covered by recent NICE guidance)
v) educational interventions to raise awareness around sensible alcohol consumption

3.3 Aims and objectives of the assessment

The reviews undertaken as part of the remit of this assessment are based on a conceptual framework for evidence synthesis that ensures the PDG can review the relevant research evidence for each section in the context of the evidence base as a whole. The reviews cover both 'upstream' and 'downstream' interventions.

The review team have addressed a series of review topics as part of the assessment.

Two linked reports have been produced:

Report 1 (Reviews 1, 2 and 3):

Review 1: *The effectiveness of price controls in reducing alcohol consumption, alcohol misuse, alcohol-related harm or alcohol-related social problems among adults and young people*

Review 2*: The effectiveness of interventions in managing alcohol availability to reduce levels of consumption, alcohol misuse, alcohol-related harm or alcohol-related social problems among adults and young people*

Review 3: *The effectiveness of the control of alcohol promotion (e.g. advertising) in reducing levels of consumption, alcohol misuse, alcohol-related harm or alcohol-related social problems among adults and young people*

Report 2 (Reviews 4, 5, 6 and 7)

Due to the overlap between the scope of Reviews 4, 5, 6 and 7 and the likelihood of overlap in identified evidence, these review topics were considered in parallel and presented in a single report.

Review 4: *Patterns of alcohol consumption*

Review 5: *The effectiveness of alcohol screening questionnaires, biochemical indicators and clinical indicators of alcohol misuse in identifying adults and young people who currently misuse or are at risk of misusing alcohol*

Review 6: *The effectiveness of brief interventions in preventing hazardous and harmful drinking among adults and young people*

Review 7: *Key barriers and facilitators to the implementation of screening and brief intervention for alcohol misuse in adults and young people*

This is Report 2 and details the findings of the systematic reviews conducted to identify evidence in relation to patterns of alcohol consumption, screening, brief interventions and barriers and facilitators to implementation of screening and brief interventions (Reviews 4, 5, 6 and 7).

4. REVIEW METHODS

4.1. Key principles of methods for identification of evidence

The challenges in searching for evidence to inform public health guidance are widely recognised (Spring *et al.,* 2008; Pawson, 2005). These challenges include the volume of literature in the subject area, the variation in the language used within public health disciplines (and therefore indexing within databases), and gaps within the evidence base. It is therefore not feasible to develop a single, definitive search strategy from the study protocol, encapsulating all the relevant complexity and inconsistency in language without retrieving an unmanageable number of redundant records. Search strategies based solely on the study protocol have been shown to yield a limited number of useful references (Spring *et al.,* 2008; Greenhalgh & Peacock, 2005; Ogilvie *et al.,* 2005). This may be because within public health, defining the topic to be addressed and the information that will be relevant is often complex and uses non-standardised terminology (Alpi, 2005; Curran *et al.,* 2007).

Therefore, in order to address these challenges, the review team have built upon the existing NICE search methods (National Institute for Health and Clinical Excellence, 2006) to allow for a process in which the scope of relevance is explored and informed by the search process. Where a problem is well defined and where indexing allows a self-contained literature to be defined, then the methods would default to the standard NICE approach. A targeted approach to the identification of evidence has been taken. Instead of aiming to identify the relevant literature for a specific review using one search, we have adopted an emergent approach, which attempts to identify evidence that will inform understanding of the problem area. This evidence is then explored in order to inform further retrieval by the identification of useful search terms and keywords/index terms. The process is cyclical and emergent, with searching continuing until no new useful ideas/evidence are identified.

In addition to free text and keyword/index term searching of databases, the following approaches were utilised (for example, where insufficient evidence was retrieved):

- Searching for key authors
- Citation searching
- Searching using index terms of key papers
- Searching for specific programmes or interventions (e.g. searching by questionnaire)
- Liaison with experts including the Programme Development Group
- Identification of evidence through liaison with the topic expert
- Searching reference lists of included papers and relevant systematic reviews
- Utilising existing searches (e.g. search records held by key stakeholders)

- Handsearching of key journals identified by the systematic reviewer

Once references were retrieved, they were imported into Reference Manager and keyworded appropriately. A thorough audit trail of the search process has been maintained, with all searches, number of hits and number of relevant references identified recorded, in order that searches are transparent, systematic and replicable. A version of this audit trail is available in Appendix 4.

Database search results were sifted by a systematic reviewer, who suggested to the information specialist the results and strategies which were considered 'fruitful' (having resulted in the identification of potentially relevant evidence), and should be run in other databases, those strategies which were not fruitful and listed keywords or key issues which should be incorporated into new searches. Following the first iteration of searching, further searches were undertaken by the information specialist as required, based on the scope of relevance developed through the first iteration of searching. Additional iterations of searching were undertaken until no further key pieces of evidence were identified.

4.2. Review 4: Patterns of alcohol consumption

Surveys of the national population are of great utility in identifying differences in lifestyle activities between groups within the population (General Household Survey) and associations between these activities and health status (Health Survey for England). In addition, smoking, drinking and drug taking behaviour in young people aged 11-15 and adults 16 years and over has been the focus of two NHS surveys (Smoking, Drinking and Drugs among Young People, 2007; Smoking, Drinking and Drugs among Adults, 2007).

Each of these surveys includes questions that explore alcohol consumption within a stated population. In recent years, questions have been added that measure the extent to which individuals are heeding the advice of Government guidelines, i.e., consuming no more than 2-3 units for women and 3-4 units for men per day (or 14 units and 21 units per week respectively).

This review summarises patterns of alcohol consumption in England using data from reports of the most recent major national surveys. Such information is presented here to contextualise the evidence reviews presented in this report, and provide additional evidence in terms of sub-groups and geographical areas that are most affected by alcohol-related problems.

4.2.1. Methods for reviewing effectiveness

A search strategy was devised and utilised to source the most recent reports available on-line to address Review 4 (see Appendix 1 for search strategy and the web-sites searched).

The following reports were selected on the basis of relevance to the review topic, and availability of the most recent data:

- NHS Information Centre Statistics on Alcohol (2008)
- North West Public Health Observatory (NWPHO) Indications 8: Alcohol (2007).
- ONS Smoking, Drinking and Drugs in Adults (2007)
- ONS Smoking, Drinking and Drugs in Young People (2007)

Data from these reports were collated (MJ) to produce a narrative of alcohol consumption patterns in adults and young people over the age of 10 years. The main report providing relevant information is the NHS Information Centre Statistics on Alcohol (2008) with supplementary information drawn from the North West Public Health Observatory (NWPHO) Indications 8: Alcohol (2007). Surveys included in these reports are the General Household Survey (GHS 2007), the Health for England Survey, and the Smoking, Drinking, and Drugs in Young People Survey (SDD, 2007). A summary of information by survey and report is included in the appendices.

In 2006, changes were made to the way that alcohol units were measured in the national surveys. Thus, two methods of calculation were given in the 2006 data; the 'original' method and the 'revised' method that accounted for varying strengths of alcoholic beverages and the measures used to define one unit.

The following data items relating to alcohol consumption were extracted (where available) (MJ):

- Weekly alcohol consumption
- Drinking patterns (hazardous, harmful, bingeing)
- Types of alcoholic beverages consumed
- When most drinking takes place
- Where most drinking takes place
- Trends in drinking behaviour

A sampling frame was developed using the population sub-groups for whom alcohol consumption may be relevant in the context of identifying higher risk groups and potentially targeting interventions with higher risk groups. See the appendices for coverage of the data on each group and the available information that could be derived from this data. Briefly, the sampling frame includes the following subgroups:

- Sex
- Age
- Ethnicity
- Socioeconomic status
- Geographic Region

Definitions of assessed drinking levels and patterns used in the included surveys and population groups included in the survey analyses are listed at the end of this chapter.

4.2.2 Evidence selection

Inclusion criteria

Evidence from the above surveys that related to patterns of alcohol consumption among adults and young people aged 10 years and above was included.

4.2.3 Data abstraction strategy and data synthesis

Data were abstracted by a single reviewer (MJ) and presented in a narrative synthesis. Data were double-checked by a second reviewer (JM).

4.3. Review 5: The effectiveness of alcohol screening questionnaires, biochemical indicators and clinical indicators of alcohol misuse in identifying adults and young people who currently misuse or are at risk of misusing alcohol

4.3.1. Methods for reviewing effectiveness

A systematic review of the clinical and cost-effectiveness of alcohol screening questionnaires, biochemical markers and clinical indicators in the identification of adults and young people who currently misuse or are at risk of misusing alcohol has been performed. The review was conducted according to the general principles recommended in the methods guide for

development of NICE public health guidance (National Institute for Health and Clinical Excellence, 2006). Methods for the review are detailed below.

4.3.2. Identification of studies

A targeted and emergent approach to the identification of evidence was taken for both the clinical review and the cost effectiveness review. Findings from the cost effectiveness review are presented in a separate report. Rather than developing a traditional search strategy, which may not cover the scope of relevance, a modified approach was undertaken in which key documents were used as a starting point from which to retrieve evidence to assist in defining the topic and developing iterations in the search process. The review protocol and screening tools recommended by PDG members were used to inform a number of targeted searches, at title and abstract level, to be run in a number of databases. The sources and search terms used are available in the search audit table in Appendix 4. Searches were not restricted by the date of publication, study type or by restriction to publication in the English language.

4.3.3. Study selection

4.3.3.1 Inclusion criteria

The following inclusion criteria were applied as follows:

Population

Adults and young people aged 10 years and above

Interventions

Use of i) alcohol screening questionnaires, ii) biochemical indicators of alcohol misuse, iii) clinical indicators of alcohol misuse to identify individuals who currently misuse or are at risk of misusing alcohol. The scope of the interventions under study was determined in an emergent process by consultation with the PDG.

Outcomes

Key characteristics of screening tools, including sensitivity and specificity in identifying individuals who currently misuse or are at risk of misusing alcohol, feasibility of use, acceptability of screening methods to recipients, costs and economic outcomes.

Study types

No restriction on study type was applied.

4.3.3.2. Exclusion criteria

Studies which are only published in languages other than English were excluded. Studies in which the study population is solely below 10 years of age were also ineligible. Evidence not originating in economically developed countries (as categorised by membership of the Organisation for Economic Co-operation and Development) would be excluded on grounds of having limited relevance to the application of screening within a UK-specific context.

Studies relating to the use of the following interventions are outside the remit of this guidance and are also excluded:

- Drink-driving schemes
- Self-help interventions
- Interventions administered by alcohol specialists
- Interventions in schools and pregnancy (already covered by recent NICE guidance)
- Educational interventions to raise awareness around sensible alcohol consumption

The scope of the interventions for inclusion was determined in an emergent process by consultation with the PDG. Article selection was undertaken by one reviewer (RJ), with involvement of a second reviewer (MJ/FC) where discussion was necessary to provide consensus on inclusion or exclusion of individual studies.

4.3.4. Data abstraction strategy

Data were extracted (with no blinding to authors or journal) by one reviewer (RJ) using a standardised form (presented in Appendix 5). As highlighted in the Cochrane Collaboration guidelines for systematic reviews of health promotion and public health interventions, extraction forms should be developed for each review in order to make them relevant to the information that is required. The form was based on the forms presented within the methods guide for development of NICE public health guidance (National Institute for Health and Clinical Excellence, 2006). The form was piloted on two randomly selected articles in order to confirm appropriateness for use. The data extracted included information relating to the screening tool under study, use of any reference standards for comparison, setting, population and key outcomes, including screening characteristics. Data extraction was confirmed by a second reviewer (MJ) to ensure reliability.

4.3.5. Critical appraisal strategy

The quality of included articles was assessed by one reviewer (RJ). The purpose of such quality assessment is to provide a narrative account of trial quality for the reader, in order to

inform judgements on the strength of the evidence presented. A quality checklist for systematic reviews was developed, using established quality criteria based on those developed by Oxman & Guyatt (1991) (as published by Kelly *et al.,* 2001, the Health Development Agency process and quality standards manual for evidence briefings (Swann *et al.,* 2005), the NHS Public Health Resource Unit Critical Appraisal Skills Programme (NHS Public Health Resource Unit, 2006) and Shea *et al.* (2007). The form was piloted on two randomly selected systematic reviews before use. The quality assessment form used is presented as Appendix 8. The quality of diagnostic evaluations was appraised based on criteria recommended by Reid *et al.* (1995); Jaeschke *et al.* (1994) and Whiting *et al.* (2004). Criteria assessed included whether studies adequately described the characteristics of the study sample (including such variables as age, gender and co-morbidity) (in order to allow assessment of the generalisability of the study); whether all patients received both the screening and criterion standard test (classed as avoidance of work-up bias); whether blinding was performed as part of the screening and criterion standard testing (in order to avoid review bias); and whether analysis of pertinent clinical subgroups was undertaken.

Included evidence was categorised according to study type and methodological rigour and quality (categories ++, + or -) in order to provide a clear representation of type of evidence. Study quality is annotated as outlined within the NICE methods guide for the development of public health guidance (National Institute for Health and Clinical Excellence, 2006) and described according to the following broad categorisation:

Study quality

++ All or most of the criteria have been fulfilled

\+ Some of the criteria have been fulfilled

\- Few or no criteria have been fulfilled

Whilst it is noted that criteria may not be judged as having equal value in quality assessment, in the interests of consistency, during quality assessment of systematic reviews, a subjective cut-off score of 9 criteria fulfilled (out of a total of 14) was applied for systematic reviews rated as ++. For cross-sectional diagnostic studies, a subjective cut-off score of 4 criteria satisfied (out of a total of 6) was used for rating studies as ++ (with studies meeting 2 to 3 criteria classed as +, and scores below as -). Quality assessment ratings are presented. Quality assessment of included articles was confirmed by a second reviewer (MJ) to ensure reliability.

4.3.6. Data synthesis

Data synthesis was informed by the methods advocated by NICE (National Institute for Health and Clinical Excellence, 2006) and the recognised standards established by the NHS Centre for Reviews and Dissemination (2001). Pre-specified outcomes are tabulated in evidence tables and presented within a narrative synthesis. Screening properties of tools, including sensitivity and specificity data, are presented where available. Evidence tables were based on recommendations within the NICE public health guidance (National Institute for Health and Clinical Excellence, 2006).

4.4. Review 6: The effectiveness of brief interventions in preventing hazardous and harmful drinking among adults and young people

4.4.1. Methods for reviewing effectiveness

A systematic review of the effectiveness of brief interventions for alcohol misuse was undertaken according to the general principles recommended in the methods guide for development of NICE public health guidance (National Institute for Health and Clinical Excellence, 2006). The findings from the cost effectiveness review are presented in a separate report. Methods for the review are detailed below.

4.4.2. Identification of studies

A targeted and emergent approach to the identification of evidence was undertaken. Key documents were used as a starting point from which to retrieve evidence to assist in defining the topic and developing iterations in the search process. The recently published Cochrane review of brief interventions (Kaner *et al.,* 2007), recommended references supplied by key stakeholders, and terms listed in the protocol were used to inform a number of targeted searches, at title and abstract level, to be run in a number of databases (see Appendix 4). Searches were not restricted by the date of publication, study type or by restriction to publication in the English language. In addition to the methods outlined above, the online electronic archives of key journals in the field were searched for any new systematic review evidence published within the preceding 12 months (and which may not yet have been indexed in electronic search databases). The key journals searched included:

Alcoholism: clinical and experimental research

British Medical Journal

Addiction

Archives of Internal Medicine

Academic Emergency Medicine

Worldviews on Evidence Based Nursing
Journal of Clinical Nursing
Alcohol
Drug and Alcohol Dependence
Preventative Medicine
Annals of Internal Medicine
Journal of General Internal Medicine

4.4.3. Study selection

4.4.3.1. Inclusion criteria

The following inclusion criteria were applied:

Population

Adults and young people aged 10 years and above

Interventions

Brief interventions to prevent alcohol misuse amongst adults and young people delivered both within and outside primary care settings by a range of professionals and non-professionals (excluding alcohol specialists). For the purposes of this review, we defined brief intervention in accordance with the definition used in the recently published Cochrane review (Kaner *et al.*, 2007), by which a brief intervention consists of a single session, and up to a maximum of 4 to 5 sessions of professional engagement with a patient, in which the patient received information and advice to reduce alcohol consumption and/or alcohol-related problems. However, whilst the majority of included primary studies were in agreement with this definition, reviews were not excluded if the authors had evaluated brief interventions of longer exposure. Characteristics of evaluated brief intervention are reported for each included review. As defined previously (Raistrick *et al.*, 2006), brief interventions are delivered by non-specialist personnel to recipients who may have been identified 'opportunistically' (ie. identified as having a potential alcohol problem when attending for other, non-alcohol-related reasons). The focus of this review included brief interventions for alcohol misuse delivered by both health and non-health professionals in any setting.

Comparators

Usual practice, related intervention, or no intervention

Outcomes

Reduction in alcohol consumption or in the numbers of adults and young people who misuse alcohol, costs and economic outcomes. Other clinically relevant outcomes reported in included studies were also considered and are presented.

Study types

Systematic reviews only were included. Decisions on the type of evidence to be included within the review were informed by the initial searching process. Due to the considerable number of systematic reviews previously published in the field, a decision was made to undertake a review of systematic reviews (or evidence briefing).

4.4.3.2 Exclusion criteria

Exclusion criteria were applied as described above.

The scope of this review was defined at the outset as a review of systematic reviews. Article selection was undertaken by one reviewer (RJ). A second reviewer (MJ) independently sifted a randomly selected sample of abstracts (representing approximately 10% of the total number of citations) to determine the degree of consensus. A Cohen's Kappa statistic of 0.880 was obtained, indicating very good agreement between reviewers. Involvement of a second reviewer (MJ/FC) was used where discussion was necessary to provide consensus on inclusion or exclusion of individual studies at full text stage.

4.4.4. Data abstraction strategy

Data were extracted (with no blinding to authors or journal) by one reviewer (RJ) using a standardised form (presented in Appendix 7). As highlighted in the Cochrane Collaboration guidelines for systematic reviews of health promotion and public health interventions, extraction forms should be developed for each review in order to make them relevant to the information that is required. The form was based on the example form presented within the methods guide for development of NICE public health guidance (National Institute for Health and Clinical Excellence, 2006) and on data fields collected for the Database of Abstracts of Reviews of Effectiveness (DARE) (NHS Centre for Reviews and Dissemination, 2008). The form was piloted on two randomly selected systematic review articles in order to confirm appropriateness for use. The data extracted included information relating to the intervention under study, namely objectives, content, intervener, duration, adherence, mode of delivery and population. Information relating to the review addressed, study design, outcomes and conclusions were collated. Any studies giving rise to uncertainty were reviewed

independently by a second reviewer, and discrepancies, for example where studies were not clearly reported, were resolved by discussion. Data were checked by a second reviewer (MJ/FC) to ensure reliability.

4.4.5. Critical appraisal strategy

The quality of included systematic reviews and meta-analyses was assessed by one reviewer (RJ). A quality checklist for systematic reviews was developed, using established quality criteria based on those developed by Oxman & Guyatt (1991) (as published by Kelly *et al.* (2001) , the Health Development Agency process and quality standards manual for evidence briefings (Swann *et al.*, 2005), the NHS Public Health Resource Unit Critical Appraisal Skills Programme (NHS Public Health Resource Unit, 2006) and Shea *et al.* (2007). The form was piloted on 2 randomly selected systematic reviews before use. The quality assessment form used is presented as Appendix 8. The purpose of such quality assessment is to provide a narrative account of trial quality for the reader, in order to inform judgements on the strength of the evidence presented.

Studies have been categorised according to study type and methodological rigour and quality (categories ++, + or -) in order to provide a clear representation of type of evidence. Study quality is annotated as outlined within the NICE methods guide for the development of public health guidance (National Institute for Health and Clinical Excellence, 2006) and described according to the following broad categorisation:

Study quality

++	All or most of the criteria have been fulfilled
+	Some of the criteria have been fulfilled
-	Few or no criteria have been fulfilled

The quality of randomised controlled trials was assessed using the checklist recommended in the NICE public health methods guide (2006) and confirmed by a second reviewer (MJ/FC).

Whilst it is noted that criteria may not be judged as having equal value in quality assessment, in the interests of consistency, a subjective cut-off score of 9 criteria fulfilled (out of a total of 14) during quality assessment for systematic reviews was applied for studies rated as ++. Quality assessment ratings are presented. Quality assessment was confirmed by a second reviewer (MJ/FC) in order to ensure reliability.

4.4.6. Data synthesis

Data synthesis was informed by the methods advocated by NICE (National Institute for Health and Clinical Excellence, 2006) and the recognised standards established by the NHS Centre for Reviews and Dissemination (2001). Pre-specified outcomes are tabulated in evidence tables and presented within a narrative synthesis. Evidence tables were based on recommendations within the NICE public health guidance (National Institute for Health and Clinical Excellence, 2006).

4.5. Review 7: Key barriers and facilitators to the implementation of screening and brief intervention for alcohol misuse in adults and young people

4.5.1 Methods for reviewing effectiveness

A systematic review of the barriers and facilitators in the implementation of screening and brief interventions was undertaken according to the general principles recommended in the methods guide for development of NICE public health guidance (National Institute for Health and Clinical Excellence, 2006).

4.5.2. Identification of studies

As would be anticipated, the searches undertaken in the systematic review of the effectiveness of brief interventions for alcohol misuse (Review 6) resulted in the identification of evidence of direct relevance to Review 7. Further appropriate searches identified evidence to address the review topic. These include organisational issues such as training and workload, contextual factors such as appropriate environments for intervention, recruitment of service users to interventions, and delivery of interventions in terms of certain groups within the patient population. Further detail on these searches is available in the search audit table in Appendix 4.

4.5.3. Study selection

4.5.3.1. Inclusion criteria

Population

Adults and young people aged 10 years and above who misuse or are at risk of misusing alcohol and practitioners involved in helping adults and young people manage their drinking behaviour

Exposure

Presence of barrier and/or facilitator

Outcomes

Information on key barriers and facilitators to implementing interventions to identify and intervene with young people and adults who misuse or are at risk of misusing alcohol

Study types

Decisions on the type of evidence to be included were not made *a priori*, but were informed by the emergent searching process.

4.5.3.2. Exclusion criteria

Exclusion criteria were applied as above.

Study selection was undertaken by one reviewer (MJ). Involvement of a second reviewer (RJ) was used where discussion was necessary to provide consensus on inclusion or exclusion of individual studies.

4.5.4 Data abstraction strategy

Data were extracted with no blinding to authors or journal. Data were extracted by one reviewer (MJ) using standardised forms for each type of study (presented in appendices). As highlighted in the Cochrane Collaboration guidelines for systematic reviews of health promotion and public health interventions, extraction forms should be developed for each review in order to make them relevant to the information that is required. A form was developed for extraction of data from qualitative studies, to include what was considered to be the most useful items for the review (see Appendix 12). The form was based on the example presented within the methods guide for development of NICE public health guidance (National Institute for Health and Clinical Excellence, 2006) and was piloted using two randomly selected qualitative studies that had been sourced for the review before a revised version was finally agreed upon. The data extracted included the population under study, setting of the study, study design and methods, details of the intervention(s), and mode of delivery, and results, focusing upon the barriers and/or facilitators to implementing screening and brief intervention for adults at risk of alcohol misuse.

Details of the qualitative results from systematic reviews, RCTs and cross-sectional studies that were pertinent to Review 7 were extracted and recorded on extraction forms developed for that purpose (see appendices). Each form was piloted to correspond with the requirements of the review for Review 7. Data extraction was checked for accuracy by a second reviewer (RJ).

4.5.5 Critical appraisal strategy

A quality checklist for systematic reviews was developed, using established quality criteria based on those developed by Oxman & Guyatt (1991) (as published by Kelly *et al.* (2001), the Health Development Agency process and quality standards manual for evidence briefings (Swann *et al.*, 2005), the NHS Public Health Resource Unit Critical Appraisal Skills Programme (NHS Public Health Resource Unit, 2006) and Shea *et al.* (2007). The quality of included qualitative studies was assessed using quality criteria based on tools recommended within the NICE public health methods guidance (National Institute for Health and Clinical Excellence, 2006), Dixon-Woods *et al.* (2006) and the NHS Public Health Resource Unit Critical Appraisal Skills Programme (NHS Public Health Resource Unit, 2006). Additional study types were appraised using tools as recommended within the NICE public health methods guidance (National Institute for Health and Clinical Excellence, 2006).

Studies were categorised according to study type and methodological rigour and quality (categories ++, + or -) in order to provide a clear representation of type of evidence. This type of categorisation can be problematic in the appraisal of qualitative evidence (Popay *et al.*, 1998) and therefore quality will also be described in a narrative form where necessary in terms of, for example, clarity of reporting of the methods used. A randomly selected sample of papers (representing 10% of the total number of included papers) was independently confirmed by a second reviewer (RJ).

4.5.6. Data synthesis

Data synthesis was informed by the methods advocated by NICE (National Institute for Health and Clinical Excellence, 2006) and the NHS Centre for Reviews and Dissemination (2001). Pre-specified outcomes were tabulated in evidence tables and presented alongside a narrative synthesis. Evidence tables were based on recommendations within the NICE public health methods guidance (National Institute for Health and Clinical Excellence, 2006).

5. REVIEW FINDINGS

5.1. Review 4: Patterns of alcohol consumption

This review summarises patterns of alcohol consumption in England using data from reports of the most recent major national surveys. Such information is presented here to contextualise the evidence reviews presented in this report, and provide additional information in terms of subgroups and geographical areas that are most affected by alcohol-related problems. Evidence is presented on average volume and frequency of alcohol consumption as well as drinking patterns above the recommended limits by age, gender, regional area, socio-economic status, and temporal trends from 1990-2006.

5.1.1 Consideration of methods used in national surveys

Surveys that are designed to identify drinking behaviour rely on self-report and as such may be prone to under-reporting when compared to sales figure data. In addition, sampling and data collection methods as well as items used in survey instruments can differ between surveys and across time, therefore care is required when making comparisons. For example, questions around drinking over the past year were discontinued in both the GHS and the HSE in 1993, but were re-instated in the GHS in 2005.

Changes were made in 2006 to the way that alcohol units are described in acknowledgement of changing strengths of drinks and the ways that they are served. In recent years it has been recognised that alcohol unit measures have been increasingly under-estimated in relation to the volume and strength of alcohol consumed (a standard unit of alcohol = equivalent to 10ml ethyl alcohol). Under-estimates have largely involved the consumption of wine, though there has also been a re-calculation of the alcohol content of beer, lager and cider. Until 2005 a glass of wine was considered to be equivalent to one unit measure of alcohol. As most measures of on-sale wine exceed 85ml (a ‘standard’ glass = 175ml and a ‘large’ = 250 ml), an accurate estimate of units per glass of wine would be greater. Consideration of this under-estimation led to a change in the way that survey data was interpreted from 2006, resulting in higher drinking levels being recorded, particularly for wine-drinkers. The overall change in average alcohol consumption estimates is an increase of approximately a third; for men this is less (twenty-five percent), whilst for women, who are more likely to consume wine, the increase is almost fifty-percent (Goddard, 2007). It is therefore necessary to cite pre-change as well as post-change figures in order to reflect the influence that the changes have made to consumption data.

Surveys described in the reports identified for this chapter use face-to-face questionnaire methods to obtain data. This method is the optimum choice for generating a reasonable response rate assuming that respondents are reassured of confidentiality. Repeated attempts are made to access respondents who are unavailable on initial calls in order to further maximise responses (World Health Organisation, 2000). However, it needs to be recognised that the timing of survey visits and respondent recall of drinking behaviour over time may not result in an accurate reflection of alcohol consumption at certain times of the year, such as holidays, Christmas, and other special occasions (Goddard, 2007). In addition, surveys will not capture data from individuals without a permanent address or children outside the traditional school system.

Sample size can also influence the reliability of findings; sample sizes in the GHS are approximately 13,000 with a 72% response rate. Samples in the HSE have varied over time, with only 3,000 individuals interviewed in 1991. This was boosted in 1993 to 16,000 to enable estimates to be made for population sub-groups. A sample of approximately 4,000 children was introduced in 1995. As an added protection from potential bias, analysis of the data also includes weightings to compensate for possible differences in representation of sub-groups, given that survey samples do not extend to the entire population of England (World Health Organisation, 2000). A smaller sample (1,800 adults per survey month) is used in the (Office of National Statistics, 2007) that mainly explores items such as alcohol awareness and the locations at which alcohol is purchased.

The GHS and HSE both measure alcohol consumption by asking respondents to recall their drinking behaviour during the past week. The ‘heaviest day’ was the day during the past seven days in which most alcohol was consumed, reported in the GHS as the ‘maximum daily amount drank last week’. The GHS also measures average weekly consumption using the ‘quantity-frequency method’, a factorisation of drinking frequency (for example ‘every day’ has a factor of 7; whilst ‘once or twice a year’ is factored at 0.029) multiplied by the units drunk on a usual drinking day (Goddard, 2007). Figures for binge drinking are higher in the HSE than in the GHS, though figures for hazardous and harmful drinking are in agreement (NWPHO, 2008). Surveys could not provide detailed information regarding the duration of heavy drinking in individuals, therefore continued risk of harm is difficult to assess.

Whilst such information is useful, and indeed is the best available as an adjunct to alcohol sales figures, there are limitations that need to be taken into account on interpretation. Recall, or self-report, is notoriously biased toward under-reporting of drinking when compared to

sales figures (NWPHO, 2008). Therefore, we must assume that average alcohol consumption is higher than these figures suggest. In addition, the general public may be uncertain regarding accurate unit measures of alcohol, particularly when consumed outside of on-sales facilities, where drinks may be 'topped up'. Glass sizes and measures on-sale differ according to 'standard' and 'large', or multiples of half-pint definitions rather than being described by unit. Alcohol strength varies according to the specific type and brand of each beverage. However assistance is given to respondents using lists from which to choose the relevant beverages and strengths (Goddard, 2007).

5.1.2. Findings

Weekly alcohol consumption

In the 2006 General Household Survey, 11% of men and 17% of women were self-reported abstainers. Of those that reported drinking alcohol at all, the mean weekly consumption for males over the previous 12 months was 18.9 units, for females 9.2 units. These figures take into account changes in unit calculations for the 2006 survey to accommodate changing strengths of wine and some beers as well as larger measures used for serving wine in pubs, bars and restaurants. Whilst women's consumption figures have risen proportionately due to these changes, they remain half the amount consumed by men. In adults, weekly consumption in 2006 was highest in the 45-64 age group (mean 21.1 units) and lowest in the 65 years and over group for males (mean 13.9 units), though for females it was highest in 16-24 year olds (mean 11.3 units), and again, lowest in the over 65 year group (mean 5.3 units) (NHS, 2008).

Average weekly consumption therefore varies by gender and across age groups, being more than double for men than women and lower in older people than those in young and middle-aged groups. Of children that had consumed alcohol in the previous week in the 2006 survey, mean consumption was 11.4 units for all pupils. Reported average consumption ranged from 10.1 units at 11-13 years to 12.3 units at age 15, which is a level comparable to that of adults. Younger girls consumed least on average (mean 8.4 units), whereas boys generally consumed more (mean 12.3 units) than girls (mean 10.5 units), with older boys consuming an average of 13.9 units (NHS, 2008). Consumption in children and young people was therefore shown to be highest among boys and older age groups.

Whilst the number of children abstaining has risen from 39% in 2001 to 45% in 2006, there has been a trend towards heavier consumption in those children who do drink (Fig. 1), and the trend is most pronounced in younger age groups. Average consumption in the last week rose from a mean 6.0 units in 1992 to 10.4 in 2000 and 11.4 units in 2006 (NHS, 2008).

Available evidence that compares drinking across ethnic groups was taken from the NHS Statistics on Alcohol Report (2007). Figures showed that drinking was less prevalent in Bangladeshi and Pakistani respondents (4-5% reported drinking in the last week compared to 67-68% of White respondents). Pupils from minority ethnic groups that responded to the question and gave their ethnic grouping were less likely to drink than white pupils. Black pupils had an odds ratio of 0.54 (P=0.017; 95%CI 0.33 – 0.90) and those of mixed ethnicity had an odds ratio of 0.50 (P=0.002; 95%CI 0.33 – 0.77) of drinking alcohol in the previous week compared to white pupils (1.0), whilst the odds ratio for Asian pupils was 0.15 (P<0.001; 95CI 0.07 – 0.34) (NHS, 2008).

Frequency

Of those that consume alcohol, most adults (30% of males and 28.4% of females) surveyed in 2006 reported drinking alcohol on average once or twice a week. Overall, there is evidence of a slight decrease in males and females reporting to have consumed alcohol in the week previous to interview (males 75% in 1998, 72% in 2006; females: 59% in 1998, 57% in 2006), particularly in the younger age groups. Drinking in the last week has remained relatively constant over time for the 45-64 year group for both men and women (NHS, 2008).

In children aged 11-15, 46% reported never having consumed alcohol. Drinking frequency increased generally with age. At age 11, 1% of girls and 2% of boys were drinking at least once a week. By age 15, this figure has increased to 31% for girls and 32% for boys.

In 2006, more men (21%) reported drinking on 5 days or more than women (12%). In men, drinking on at least 5 days was more prevalent with rising age (9% at 16-24, 18% at 25-44, 26% at 45-64 and 28% in over 65 year olds). The same pattern is evident in women (3% at 16-24 years, 10% at 25-44 years, 15% at 45-64 and 6% for over 65 year olds). Over time, reported frequent drinking has decreased slightly for men (24% in 1998, 22% in 2006) and remained relatively stable for women (13% in 1998, rising to 14% between 2001 and 2003, 13% in 2006) (NHS, 2008).

Figures from 2006 showed that individuals drinking on 5 or more days in the week previous to interview were more likely to work for large employers or work in higher managerial employment (males 29%; females 18%). Drinking frequency was lower for intermediate job classifications, and even less in routine and manual employment (17% men, 7% women) (NHS, 2008).

Frequent drinkers (consuming alcohol almost daily) are most likely to live in the South East of England (29% of men, 19% of women) and least likely to live in the North East or London (less than 9% for men and women). In children, the highest rate of drinking reported in school year 8 pupils (7 units over 7 days) was in the East Midlands (12.7%); whilst for school year 10, it was the North East (26.8%). The lowest rate for this level of drinking was in London for both age groups (2.9% and 8.4% respectively) (NWPHO, 2007).

Drinking above recommended limits

Definitions of hazardous and heavy drinking patterns described in the reports used for this chapter are described in the appendices.

Hazardous drinking

In 2005, 24.5% of males and 14.5% of females surveyed reported drinking over the Government recommended limit (NWPHO, 2007). In men, 25-44 year olds were more likely to report hazardous drinking (42% original method / 48% revised method), with those over the age of 65 least likely (14% original method / 21% revised method). Women between 16-44 years were most likely to report drinking above recommended levels (26 -36% original method / 39% revised method) (NHS, 2008).

White and mixed ethnicity adults were most likely to drink above the daily recommended levels at least one day in the week prior to interview. Care needs to be taken in interpretation of these findings, which were calculated using the old style unit measures (i.e. pre-2006). However, it is likely that similar patterns might have arisen using the modified method.

Heavy or 'binge' drinking

Heavy or 'binge' drinking is defined here as consuming 8 units or more of alcohol for men, or 6 units or more for women on the heaviest drinking day of the week. Because of recollection and social desirability bias, general household surveys are known to substantially underestimate actual levels of drinking, and especially levels of binge drinking (Stockwell *et al.*, 2004), thus it needs to be recognised that the following figures are likely to be lower than the actual proportion of heavy and binge drinkers in the population.

In 2005, men were more likely (19.3%) to report having indulged in heavy drinking during the last week than women (8.1%), with younger men, particularly 25-44 year olds, most likely to have binged. Bingeing was most commonly reported in 16-24 year old women (NWPHO, 2007).

The GHS and HSE differ slightly in their data on regional differences for heavy drinking. The HSE reports that in 2005, binge drinking in adults was most prevalent in the North East of England (28.8%) for males, and the North West for females (11.4%). London figures are lowest (11.4% males and 4.6% females). The GHS figures are higher for Yorkshire and Humber in males (22.6%) and females (11.6%), and lowest in London (12.5 and 4.8%). (NWPHO, 2007).

Bingeing during the week before interview was more commonly reported in higher earners, classed as 'higher professionals' (27% of males and 19% of females), full-time workers (28% of men and 22% of women), and those earning £800 to £1000 per week. Excessive drinking in a single session was reported least in women earning less than £200 per week and men earning £200 to £400, those in more routine employment, (21% of men and 12% of women), or unemployed (19% unemployed males and 16% unemployed females) (NHS, 2008).

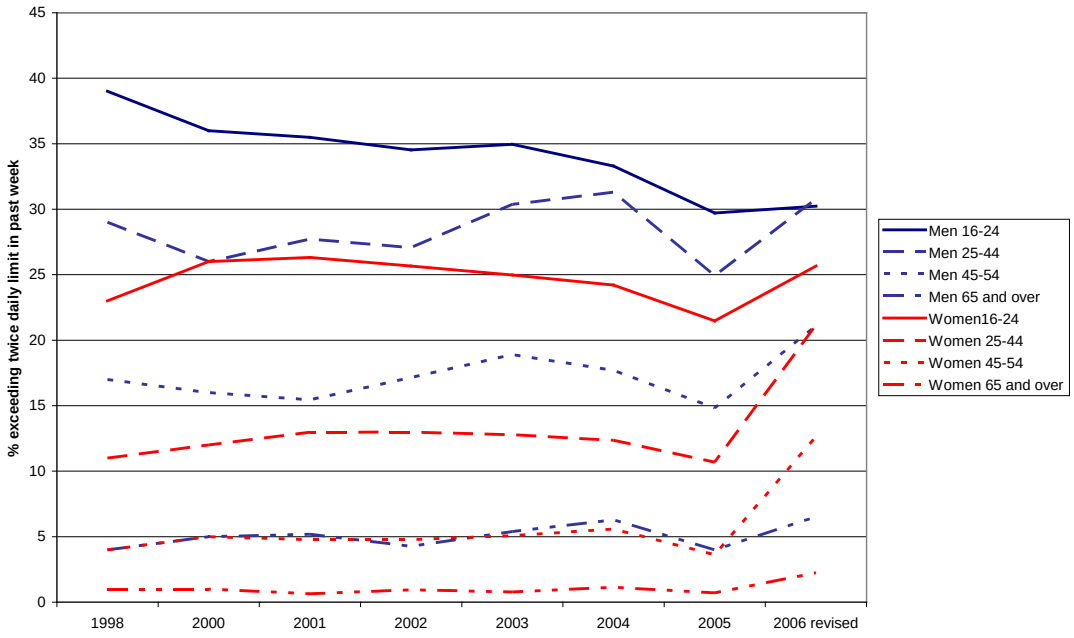


Fig 1. Excessive drinking: Trend over time, by age and gender. Source: GHS.

All alcohol consumption in children and young people under the age of 18 is regarded as a risk. Therefore no comparative data are available for drinking above adult recommended limits in the surveys cited in this report. However, there may be local data available on alcohol intoxication in young emergency department users.

Types of alcoholic beverage consumed

In 2007, average weekly consumption of alcohol in men consisted mainly of normal strength beer, lager and cider (mean 7.6 units per week), whilst wine was the most likely beverage for women (mean 5.6 units per week) across all age groups. For men between the ages of 45-65, wine was reported as the most consumed beverage (mean 8.2 units per week), reducing to a mean of 4.1 units per week in those over 65 years (NHS, 2008).

In 11-15 year olds, the most likely drinks consumed in the week previous to interview were beer, lager and cider (8.4 units for boys, 4.4 for girls), with alcopops second most common, though with a higher consumption in girls (3.2 units, compared to 1.8 units for boys) (SDD, 2007). These patterns have remained fairly constant over time since alcopop consumption was first included in surveys in 1998; however, the percentage of pupils drinking spirits has increased (boys: 33% in 1990; 55% in 2000; 59% in 2006; girls: 38% in 1990; 63% in 2000; 67% in 2006), with overall higher spirit consumption in girls (NHS, 2008).

Where and when most drinking takes place

Drinks consumed outside the home account for 56% of the total expenditure on alcohol. There was a strong linear relationship between income and expenditure for alcohol. Whilst households in the lowest 10% income bracket spend, on average, under £5 per week on alcohol, those in the top 10% income bracket spend over £28 per week (Expenditure and Food Survey). This trend was reflected in figures from the national surveys that showed hazardous or harmful consumption of alcohol reported more frequently in 2006 by those classed as 'higher professional' (48% of males, 46% of females) (NHS, 2008).

Purchasing from licensed bars was reported by fewer respondents in 2007 (28%) than in 1998 (32%). For women, the rate of purchasing alcohol in bars fluctuated slightly but remained relatively constant over time (21%), whilst men are reporting a decreasing rate of purchasing in bars over time (45% in 1998; 37% in 2007). Reported purchasing at off-license premises decreased from 8% in 1998 to 6% in 2007. Conversely, there was an increase in reported purchasing of alcohol in supermarkets (22% in 1998; 26% in 2007) and restaurants (12% in 1998; 16% in 2007) (NHS, 2008).

Among pupils aged 11-15 years, alcohol was most commonly obtained via other people; relatively few (11% overall) attempted to purchase from a bar or shop, though this behaviour increased with age. The most common reported access to alcohol was through friends (26% overall, 52% at age 15), with parental access being second most common (23% overall, 35% at age 15) (NHS, 2008).

Most adult drinking in 2006 was reported to take place on Saturdays (27%). However, patterns differ across age groups; for over 65s, the heaviest day is Sunday (31%) and the lightest Friday (7%). Sunday becomes the most common drinking day as age increases. (NHS, 2008).

In pupils aged 11 -15, the most commonly reported day for alcohol consumption is Saturday (62%), with Friday second most common (51%). This pattern is consistent across age groups and for males and females, though with a general increase in reported drinking as age increases, and a higher percentage of girls drinking on Saturdays than boys (e.g. at 15, 67% of girls and 62% of boys report drinking on Saturday).

There is growing awareness that some young people and adults are indulging in 'pre-drinking', a behaviour that involves consumption in the home before going out to bars and clubs. The surveys have no specific data on pre-drinking, though we can compare reported drinking and figures or trends in off-sales alcohol expenditure. Data collected in the annual Expenditure and Food Survey (EFS) and its predecessor, the Family Expenditure Survey, show that expenditure on alcohol rose sharply up to 2003 and has increased less sharply since then. Overall, each year individuals spent an extra 10p per week on alcohol than in the previous year, which represents a 4-6% annual rise and is above the average levels of inflation for these years.

Trends in drinking behaviour

GHS data suggest that there has been little change over recent years in reported alcohol consumption, with rates of men regularly exceeding the government's recommended daily limits having remained relatively stable (NHS, 2008). Men consumed an average of 17.2 units of alcohol per week in 1998 compared to 14.9 (original method) / 18.9 (revised method) in 2006, with drinking above recommended limits appearing to decline from 39% in 1998 to 33% in 2006; however, the revised method of calculation raises the figure for 2006 to 40%. Average weekly consumption in women also appeared to remain stable (6.5 units in 1998; 6.3 units in 2006), though with the revised method the latter is 9.2 units. The percentage of women drinking above recommended limits of 3 units per week has also increased with the revised method, from a stable 20-22% since 1998 to 33% in 2006.

Survey results from 1998 to 2006 show a fluctuation in the numbers of pupils across all age groups who reported that they had consumed alcohol in the last week. Girls reporting to have consumed alcohol in the last week increased from 17% in 1998 to 26% in 1996, decreasing to

20% in 2006. Whilst figures for boys were higher than for girls in 1998 (24%), by 2006 similar numbers of girls and boys were claiming to have had a drink the previous week (21% of boys; 20% of girls). This suggests that fewer boys but more girls have been consuming alcohol in recent years.

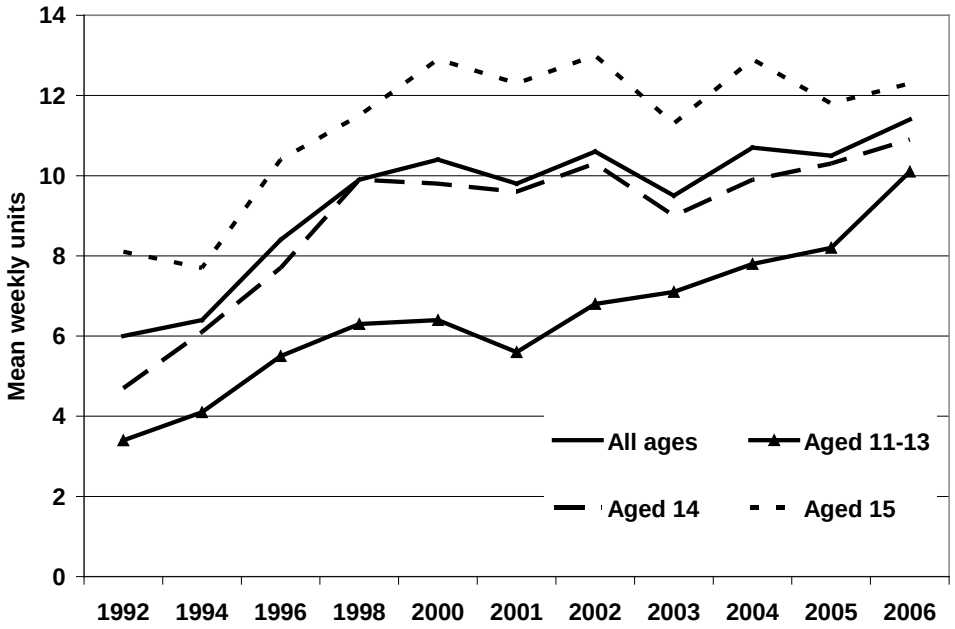


Fig 2. Mean weekly units consumed by 11-15 year olds who have ever had a drink. Source: ONS Statistics on Alcohol 2008.

Reported hazardous drinking has remained relatively constant over time according to original calculating methods, but revised methods increased the figures significantly for women (21% in 1998; 20% original method / 33% revised method in 2006). Heavy or binge drinking in women has also remained constant though with an increase due to revised methods (8% in 1998; 8% original method / 15% revised method in 2006) across all age groups. Comparisons will be more meaningful as the revised method of calculating units consumed is utilised over the coming years.

For men, the percentage of younger men (16-24) who reported consuming more than 4 units on at least one day decreased from 52% in 1998 to 42% in 2006, and drinking more than 8 units on one day ('bingeing') from 39% in 1998 to 27% (original method of calculation) / 30% (revised method) in 2006. Consistently few men of 65 years and over (4%) reported bingeing or consuming more than 8 units in at least one session in 1998 and 2006 (NHS, 2008). As with other consumption trends, there is a recent downward turn of heavy drinking in young men, even when taking into account the unit adjustment (42% in 1998 compared to

30% in 2006). Otherwise, the proportion of excessive male drinkers appears stable, whereas the unit estimation change again suggests that more women than previously recognized might have been binge drinking in recent years.

Harmful drinking (consuming 35 units or more per week for women/ 50 units per week for men) was reported more frequently in 2006 by men generally (8%) than women (5%), though the percentage for men has decreased since a peak in 2001. Among women, harmful drinking is most reported in 16-24 year olds (7%) (ONS SDD 2008); this figure has fluctuated since 1998, peaking between 2001 and 2005 (10%). Men living in Yorkshire and Humberside (8.0%) are most likely to engage in harmful drinking and women from the East of England are least likely (1.3%) to drink at harmful levels (NWPHO, 2007).

Drinking above recommended limits and drinking heavily is therefore reported more in men than women, but is decreasing in men, particularly in younger age groups. However, these figures may not accurately represent the increased tendency for drinking at home, where units of alcohol consumed are less accurately measured, remembered and reported.

5.1.3. Evidence statements:

Review 4:

Evidence has been sourced from two UK reports that collated data from major national surveys on alcohol consumption volumes, patterns and behaviours in adults and children over the age of 10 years. Around 11% of men and 17% of women surveyed abstained from drinking. Overall, self-reported alcohol consumption in the UK increased in the 1990s and has since remained relatively stable.

Evidence statement 4.1: Evidence demonstrates that of adults reporting that they consume alcohol, men are reporting average weekly consumption of around double the volumes of women, despite new methods of calculation that have increased the figures for women. The highest mean consumption is in men aged 45-64 years old. Men also report drinking more frequently, and indulging in hazardous drinking. Twice as many men than women, particularly those in the age group 25-44 years, report heavy drinking or ‘bingeing’. Men tend to drink beer, lager or cider at all age groups, though wine is consumed by more older males.

Evidence statement 4.2: There is evidence to suggest that alcohol consumption levels are increasing in women, particularly in the 16-44 yrs age range. Among women, this age group is most at risk of heavy drinking, or ‘bingeing’. The most commonly consumed alcoholic

beverage for women is wine, whilst more young females consume alcopops and increasingly, spirits.

Recent revised methods of calculating unit measures of alcohol have had at least a partial effect on figures pertaining to alcohol consumption in women, suggesting that in years prior to the new method (i.e. before 2006), consumption figures for women may have been under-estimated.

Evidence Statement 4.3: Evidence suggests that frequent drinking (on more than 5 occasions per week) is more prevalent in older age groups and males in the South East of England, and is least prevalent in London. In children and young people, the most frequent drinking (7 units over 7 days) is reported to take place in the East Midlands.

Evidence statement 4.4: Among children aged 11-15 yrs, 46% reported never having consumed alcohol. There is evidence that the differential in alcohol consumption between males and females is decreasing in those under the age of 16, and particularly those aged 11-13. Average alcohol consumption appeared to increase with increasing age. Consumption has increased over time among 11-15 yr olds.

Evidence statement 4.5: Evidence suggests that alcohol is consumed more frequently in those commanding high salaries and in full-time employment. Less frequent alcohol consumption is associated with people on lower salaries and without employment.

Evidence Statement 4.6: Surveys provide some evidence that alcohol consumption is greater in the White population, with Pakistani and Bangladeshi communities reporting least consumption.

5.1.4. Discussion

General trends

Information from recent national surveys showed that reported adult alcohol consumption remained fairly stable, and for some groups and in some regional areas decreased between 1998 and 2006. Caution needs to be taken interpreting data from the surveys, which rely on self-report methods, and therefore ability to accurately recall and record perceived behaviour. In addition, there is a tendency towards drinking more at home (Plant & Plant, 2006; Wells *et al.,* 2009) This behaviour may be in response to policy and economic changes such as longer licensing hours, cheaper off-sales access to alcohol, and initiatives to limit drink-driving. In

general, though reported rates of consumption appeared from the data to have stabilised, figures remained high, with implications for future health care.

Findings showed that consuming alcohol at rates above recommended levels was reported more in those with large incomes and higher status employment. This may be a function of higher disposable income with which to purchase alcohol, as well as expectations of drinking as part of a work culture, or possibly associated with increased stress in high-level jobs.

The new method of calculating unit measures has affected survey figures from 2006 onwards to reflect the increasing strength of alcoholic beverages, especially wine, the most popular reported beverage for women. Nevertheless findings still show men to be consuming more units of alcohol (mainly beer, lager and cider, though wine was more commonly consumed in older men) than women. Although males were found to consume at least double the amount of alcohol to females overall, women reported increasing consumption over time, and some male groups reported drinking less than has been the case in previous years. In addition, more women report hazardous and heavy drinking in younger age groups compared to men, possibly reflecting changes in cultural norms between the sexes.

Generally, there is a North-South divide in terms of alcohol consumption, with higher overall rates of consumption and bingeing in some Northern areas, although most frequent drinking is reported in the South East of England. Reported consumption in London is decreasing.

Limited data on differences in alcohol consumption between ethnic groups show that all ethnic groups report less alcohol consumption than Whites. There are culturally specific issues with regard to drinking that are reflected in the figures. Religious beliefs are likely one explanation for the low reported alcohol consumption in Asian groups. Black and mixed ethnicity groups are about half as likely to report drinking as those in the White population.

For children aged 11-15, almost half of those surveyed reported never having consumed alcohol. For the rest, consumption increased with age, with a third of 15 year olds reporting consumption at least once a week. The drinks most commonly reported to have been consumed were beer, lager and cider among boys and alcopops for girls. Consumption of spirits has increased steadily in young people over time.

Identifying ‘at-risk’ groups and geographical areas is useful for designing and targeting interventions more specifically and tailored to the needs of users. However, caution needs to be taken that groups identified as ‘low-risk’ are not overlooked when promoting healthy

lifestyles or that ‘at-risk’ groups are not over-targeted. Some groups will be affected more than others by policies that alter pricing and / or availability, with potential implications for unexpected changes in behaviour (for example, ‘pre-drinking’ to avoid the high cost of purchasing in bars). Interventions therefore need to be sensitive to current trends in social behaviours as well as inclusive to all potentially at risk groups and individuals, yet remain realistically within resource limits.

5.1.5. Further analysis/research gaps

Areas useful for future exploration include research linking specific alcohol consumption behaviours to known alcohol-related harms. In addition, there is no evidence available in the two reports used on hazardous and heavy drinking in more narrowly defined age ranges, or in young people.

5.1.6. Conclusions and Implications

UK alcohol consumption appears to have stabilised following an increase that began in the 1990s. Particular increases over time were shown in younger people and females. However, males continue to consume alcohol in larger quantities and more frequently than females, and are more likely to binge. Drinking alcohol frequently is more often reported in those with higher incomes.

National surveys can be useful resources from which to identify alcohol–related behaviours and trends across groups, regions, and time. However, accuracy of data is modified by inherent issues in survey and self-report methods, as well as changes in unit measurements of alcoholic content. Therefore, this chapter provides evidence from the most recent and relevant information currently available.

5.2. Review 5: The effectiveness of alcohol screening questionnaires, biochemical indicators and clinical indicators of alcohol misuse in identifying adults and young people who currently misuse or are at risk of misusing alcohol

5.2.1. Quantity and key characteristics of included research

As a result of the searches described above, a total of 2054 citations were identified, following removal of duplicates, and were screened for inclusion in the review of clinical effectiveness (see Figure 3). 1375 citations were rejected at the title stage, leaving 679 abstracts to be screened. 451 abstracts were rejected upon examination. 228 papers remained for screening. Following consultation with the PDG, interventions for focus were defined as follows:

a) A comparison of AUDIT and shorter versions (and key evidence relating to the performance of the AUDIT family across different settings)

b) A comparison of the AUDIT family with CAGE and/or MAST

c) Paddington Alcohol Test

d) SASSI for use in children and adolescents

e) ASSIST

f) SASQ

g) TWEAK and T-ACE in prenatal screening

h) A comparison of the performance of laboratory markers (including γ-glutamyltransferase (GGT), carbohydrate-deficient transferring (CDT) and mean corpuscular volume (MCV) vs. alcohol screening questionnaires

i) A comparison of the performance of clinical indicators of alcohol misuse vs. alcohol screening questionnaires and laboratory markers.

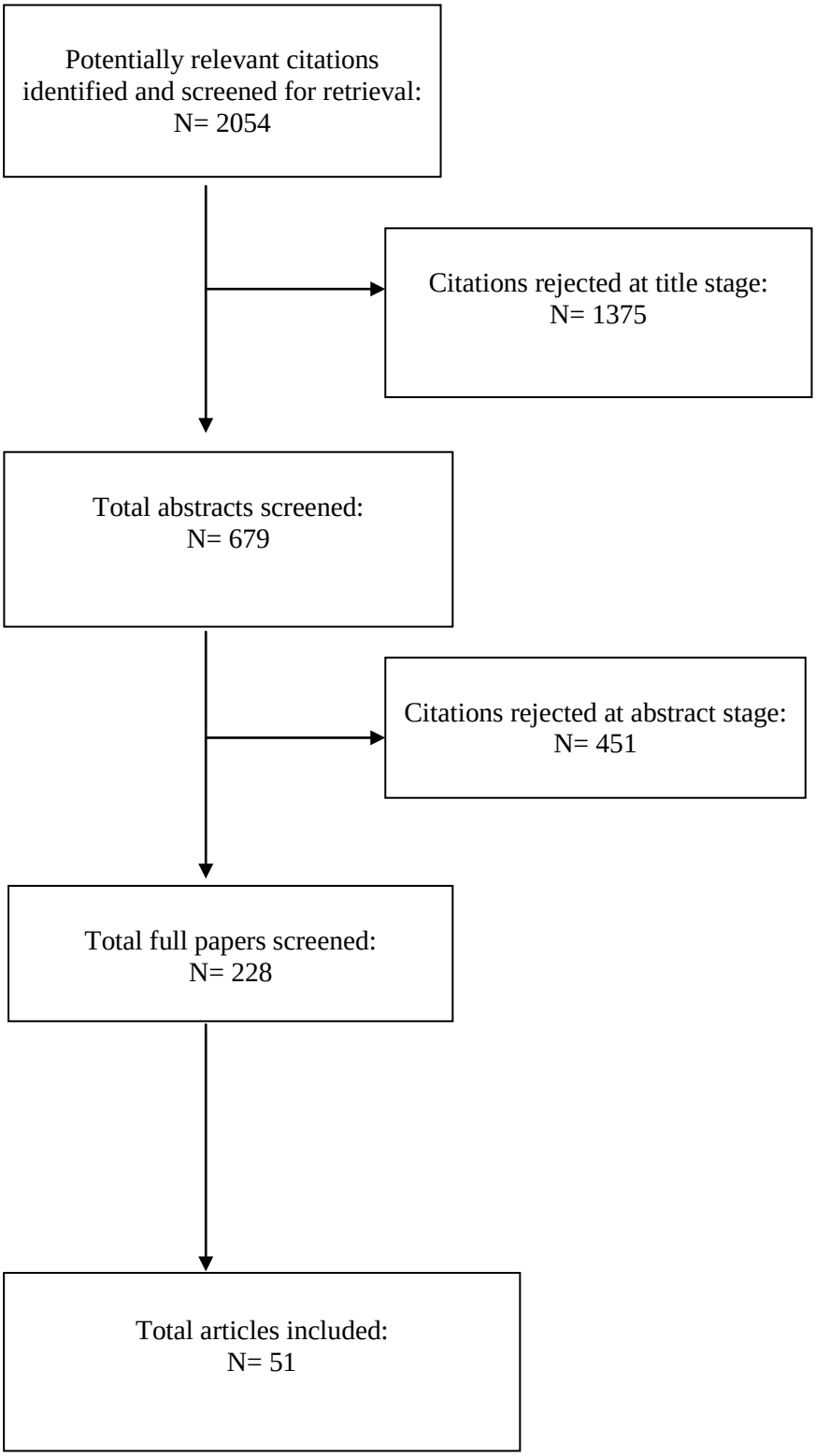
Where other data were presented within identified papers relating to questionnaires outside the remit of this assessment (eg. CRAFFT), details were included in the review for further information.

Using this scope, key evidence was identified. A total of 51 articles were included in the review of effectiveness. The evidence base consisted largely of cross-sectional diagnostic evaluations of screening tools and systematic reviews. Literature reviews were used where it was considered that the primary studies included would significantly reinforce the evidence base.

Evidence relating to screening questionnaires, comparisons of laboratory markers with screening questionnaires and clinical indicators are presented within a narrative review. Key characteristics of included studies and main findings are presented in Appendix 13. Factors

that may influence the identification of adults and young people who currently misuse or are at risk of misusing alcohol are addressed in Section 7.

Figure 3: Flow chart of study inclusion and exclusion in review of effectiveness of screening for alcohol misuse (Review 5)



5.2.2 Overall narrative synthesis of review findings

ASSIST

WHO ASSIST Working Group (2002) (Evaluation and qualitative study, ++)

The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) was developed by the World Health Organisation (WHO) for the detection of psychoactive substance use and related problems in primary care settings. This study (WHO ASSIST Working Group, 2002) was undertaken in order to evaluate the performance of ASSIST in primary care patients.

The international study was based in primary care, general medical, community settings and specialised alcohol and drug treatment services, primarily residential settings in Australia, Brazil, India, Ireland, Israel, UK, Zimbabwe, the Palestinian Territories and Puerto Rico. At least 2 interviewers at each of these collaborating sites were selected to become trained and administer ASSIST. Interviewers were selected on the basis of their familiarity with drug abuse (2 to 4 per site). 71% were female and the average age was 32 yrs. Interviewers had approximately 15 years of education; 14% with Masters degrees, 29% with PhDs and 5% with MDs. One quarter were employed as researchers, a third in the alcohol and drug treatment field, and the rest in medical, psychiatric or other facilities. Twelve items were selected for initial evaluation. Test-retest reliability was explored, with interviews with respondents used to identify discrepancies between screenings and possible reasons. Focus groups (at least one per country) were conducted to scope issues surrounding the use of screening tests in primary care in the particular country. Interviewers, investigators and research assistants participated. Reactions of different types of patients were described, as well as their own subjective reactions to the procedures, and problems with the administration of the items.

Of the patient sample (n=236), the mean age was 34 yrs, 54% were male, 61% were unemployed, with a mean education duration of 10 yrs. 60% were recruited from alcohol and drug abuse treatment facilities. The remaining 40% were recruited from general medical settings and psychiatric facilities.

The mean time for administering ASSIST was found to be 16 min. The average re-test time was 17.5 min. Participants recruited from alcohol and drug treatment facilities took significantly longer to complete the interview (17.88 minutes $p < 0.001$; retest time 19.70 minutes $p<0.001$). The test-retest procedure was used to assess the consistency of responses from subjects to the same items on two separate occasions. The average time between test and

retest was 2.16 days (range 1.32 in Sao Paulo to 3.28 in Harare). The average test-re-test reliability coefficients (kappa) ranged from between a high of 0.90 (consistency of reporting 'ever' use of substance) to a low of 0.58 (regretted what was done under substance influence). A high average kappa value was reported for alcoholic beverages (0.97). A high alpha statistic was also observed for alcohol (0.92), demonstrating the high internal consistency of items.

The debriefing interviews indicated that 96% of participants enjoyed being interviewed; 81% thought that the length was 'just right'; 78% indicated that none of the questions were difficult to understand, and 98% thought that the questions were not offensive. However, this implies that 22% found some or all of the questions difficult to understand and that a small minority (2%) were offended by some or all of questions, both being issues requiring further exploration. Participants believed that 'most people' would be more comfortable answering questions about tobacco and alcohol (4 and 3.27 respectively on a scale of 1-5; 1=very uncomfortable, 5= very comfortable) than about cocaine and opioids. There were no gender differences observed, but participants from alcohol and drug treatment facilities had significantly higher honesty ratings than those recruited from primary care ($p<0.05$). Participants rated that it is important for health providers to know about all substance use (alcohol 4.62 out of 5). Interviewers thought that participants were interested in the interview (97%), were not offended by the questions (100%), and were not responding in the negative to shorten the interview (95%). None of the interviewers perceived that interviewees were withholding information. Two items 'preoccupied with thoughts about using' and 'using more than intended' were identified as confusing. 77% of interviewers indicated that the interview was 'easy' or 'very easy' to administer. Only 3% reported difficulties.

Three sites (Adelaide, Sao Paulo, Beer Sheva) submitted focus group reports. Some items were felt to be too general or unfocused, and a suggestion was made to clarify frequency categories for the ASSIST items.

Data were used to revise and shorten the ASSIST. The following criteria were applied: simplicity, applicability, coverage of key domains, appropriateness for use with a range of people and problems, compatibility with empirical data. Based on these criteria, the test was shortened to 8 items (with 4 items having been dropped); comprehension and coverage were improved by changing the wording on 3 items and revising the wording of response options.

Humeniuk *et al.*, (2008) (Cross-sectional diagnostic evaluation, ++)

Humeniuk *et al*. (2008) evaluated the validity of the ASSIST questionnaire across a number of international sites. The evidence suggests that ASSIST is a valid screening test for psychoactive substances.

Participants were aged between 18 and 45 yrs (mean age of 30.4 yrs, SD=82) (total n=1047; 697 from primary care and 350 from specialised settings). ASSIST includes the following domains: specific substance abuse involvement score for each substance; total substance involvement score; current frequency of substance use; dependence; abuse. A hair sample was taken from participants to confirm self-reported consumption of certain substances. Two to 5 interviewers with experience of substance abuse were involved at each site. An independent clinical examination from a specialist addiction clinician determined a diagnosis of current or lifetime substance dependence, based on DSM-IV criteria.

ASSIST took an average of 8.7 (SD=4.6) min to complete. Significant positive correlations were observed between current frequency of use for alcohol, cannabis, cocaine, amphetamines, sedatives, and uploads ($p<0.001$ n=1047).

The area under the receiver operating characteristic curve is an indicator of the performance of a screening test, with an area of 1.00 representing a test with perfect discriminatory properties. Significant differences were observed between 'use' and 'abuse' groups ($p<0.001$) and ASSIST scores for alcohol ($p<0.001$) (AuROC =0.87, sensitivity 83%, specificity 79% at cut-off of 5.5), as well as 'abuse' and 'dependence' for alcohol ($p<0.001$) (AuROC = 0.70, sensitivity 67%, specificity 60%, at a cut-off of 10.5), indicating the discriminatory capacity of this instrument.

Newcombe *et al.* (2005) (Cross-sectional diagnostic evaluation, +) Australia

The performance of the WHO Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) was assessed by Newcombe *et al.* (2005) in an Australian sample.

The study sample (n=150) was recruited from drug treatment and primary health care settings. ROC analysis was used to define appropriate cut-off scores for use, with acceptable sensitivities and specificities obtained for most substances. Participants undertook an independent clinical examination with an addiction psychologist to determine diagnoses of lifetime and current dependence. The mean age of the sample was 31.3 yrs (SD=8.4), with equal numbers of male and female subjects in the sample. 61% of subjects were unemployed. Data were presented for the ability of ASSIST to discriminate between use and abuse, abuse

and dependence on a number of domains, including substance involvement score for alcohol. For use/abuse, the AuROC value was reasonable, at 0.76, with 71% sensitivity and 63% specificity at an ASSIST cut-off score of 4.5 ($p \leq 0.001$). For abuse/dependence, the AuROC was higher at 0.83, with 86% sensitivity and 77% specificity at a cut-off score of 10.5 ($p \leq 0.001$).

AUDIT

The Alcohol Use Disorders Identification Test (AUDIT) was developed by the WHO for use in primary health care settings, although use extends to other settings (Raistrick *et al.*, 2006).

Aalto *et al.* (2006) (Cross-sectional diagnostic evaluation, ++) Finland

The purpose of this cross-sectional study (Aalto *et al.*, 2006) (++) was to evaluate the performance of abbreviated versions of AUDIT compared with the full version of AUDIT when screening for heavy drinking (as defined below) among middle-aged women and to determine the optimal cut-off scores for use in this population. The authors demonstrated the broadly equivalent effectiveness of the 10-item AUDIT, AUDIT-C, Five-shot, AUDIT-PC , AUDIT-3 (AUDIT Question 3 relating to binge drinking) and AUDIT-QF in screening for heavy alcohol consumption in this group and emphasised the importance of tailoring appropriate cut-off scores for use according to gender.

The study was based in primary care in the city of Tampere, Finland. All 40 year old females are invited for health screening each year. The mailed health questionnaire included AUDIT and CAGE questions for completion before an interview conducted by a nurse, in which the Timeline Follow Back method was used to determine alcohol consumption in the sample. Consumption of at least 140 g/wk of alcohol on average during the last month was classed as heavy drinking. A total set of AUDIT and CAGE data and information from the Timeline Follow Back interview were available for 894 women (response rate of 68.2%) invited for screening.

According to the findings from the Timeline Follow Back, mean (SD) weekly reported alcohol consumption was 45g (SD=67, range 0 to 936 g/wk) absolute ethanol. A relatively small proportion (6.2%) of the sample (55/894) were categorised as heavy drinkers. The mean (SD) score obtained by participants on AUDIT was 3.6 (SD=3.2, range 0 to 28). Corresponding values (with SD and range reported) for the additional questionnaires under assessment were as follows: AUDIT-C = 3.0 (1.8, 0 to 10), Five-shot = 1.4 (0.9, 0 to 6.5), AUDIT-PC = 2.5 (1.7, 0 to 15), AUDIT-3 = 0.6 (0.8, 0 to 3), AUDIT-QF = 2.3 (1.2, 0 to 7) and CAGE = 0.4 (0.8, 0 to 4).

Optimal combinations of sensitivity and specificity were reached for AUDIT using a cut-off score of ≥6, for AUDIT-C with a cut-off of ≥5, for Five-shot using a cut-off of ≥2, for AUDIT-PC with a cut-off of ≥4 and for AUDIT-QF using a cut-off of ≥4. When using the optimal cut-off points, AUDIT-C, Five-shot, AUDIT-PC and AUDIT-QF were found to perform as effectively as the full 10-item AUDIT. Using these cut-offs, sensitivities of the tools ranged from 84% to 93%, whilst specificities were in the range of 83% to 90%. AUDIT-3 and CAGE were found to be not as effective as the other tested questionnaires. The measured area under the receiving operating curve (AuROC) represents the accuracy of each test in correctly identifying heavy drinking. AuROC values were similarly high for AUDIT, AUDIT-C, Five-shot, AUDIT-PC and AUDIT-QF, demonstrating the ability of these tools to accurately detect heavy drinking in the population. Values were lower for AUDIT-3 and for CAGE, reflecting their poorer performance as screening tools.

Aertgeerts *et al.* (2001) (Cross-sectional diagnostic evaluation, ++) Belgium

Aertgeerts *et al.* (2001) undertook a cross-sectional diagnostic evaluation to assess the performance of CAGE and AUDIT questionnaires, their derivatives and laboratory tests in the identification of alcohol abuse or dependence in a primary care population in Belgium. The evidence demonstrated that AUDIT is appropriate for use in both males and females, but that screening properties among male patients were more favourable. Laboratory tests, in particular CDT, were found to be of limited use in the identification of alcohol abuse or dependence in this population.

A large sample of patients (n=1992) aged over 18 years attending general practice participated in the study. The mean ages of male and female patients were 54 yrs and 48 yrs respectively. Patients self-completed alcohol questionnaires (including CAGE, AUDIT, AUDIT-C, Five-shot and AUDIT-PC) and gave blood samples for laboratory testing (including MCV, GGT and CDT). The Composite International Diagnostic Interview was completed as a reference standard, in order to categorise patients as 'alcohol dependent', 'alcohol abusing' or as 'normal', according to criteria of the DSM-III-R. The past year prevalence of alcohol abuse or dependence in the sample was 8.9% (178/1992) (comprising 138 male and 45 female patients). Seventy four (7.6%) male patients met the criteria of alcohol abuse and 59 men (6.1%) fit the criteria for alcohol dependence. Twenty (2%) female patients were alcohol abusers and 26 (2.6%) were classed as alcohol dependent during the past year. The mean age of subjects did not differ according to diagnosis of abuse or dependence. Lifetime alcohol abuse or dependence was most frequent among male patients

aged 18 to 60 yrs (n=122/623, 18%). Binge drinking was reported weekly or daily in 114 male patients (12.1%) and in 12 female patients (1.2%).

The screening properties of measures in male patients (n=971) for alcohol abuse or dependence were reported. At cut-off scores of ≥5 for AUDIT and AUDIT-C sensitivities were 82% and 78% and specificities 73% and 75% respectively. At the recommended AUDIT cut-off of ≥8, screening properties were found to be poor among men. At the recommended cutoff score of ≥2.5, Five-shot was reported to have a sensitivity of 74% and a specificity of 81%. AUDIT-PC had a lower sensitivity (68%) but higher specificity (84%) in this group. At a cut-off of ≥5 and over, positive predictive values (PPV) were low for AUDIT (32%) and AUDIT-C (32.8%) but higher for AUDIT-PC (40%, cut off ≥5) and for Five-shot (38%, cut-off ≥2.5 and over). Negative predictive values (NPV) of these tests were found to be above 90%. The screening properties of all investigated laboratory tests were found to be poor. Among males, AuROC values for AUDIT and derived versions of the AUDIT were similar (AUDIT = 0.85, AUDIT-C = 0.83), Five-shot = 0.84 and AUDIT-P = 0.83), demonstrating similar effectiveness as screening tools. Laboratory tests resulted in AuROC values from 0.57 (GGT) to 0.66 (CDT), such lower values indicating weaker performance.

The screening properties of instruments in female patients (n=1021) were also described. CAGE performed more poorly in females than males, with a sensitivity of only 54% at a cut-off of ≥1. A sensitivity of 65% and a specificity of 92% were reported for AUDIT (at a cut-off of ≥5). AUDIT-C performed less effectively in women than men (at a cut-off of ≥5), with a sensitivity of only 50% and a specificity of 93%. The sensitivity of Five-shot (at a cut-off score of≥2.5) was slightly higher at 63%, with a similarly higher specificity of 95%. All questionnaires yielded very low PPV values but very high NPV values (over 96%). For all questionnaires and cut-offs examined, odds ratios were above 10 and higher at higher cutoffs. No laboratory test was judged to be appropriate for screening for alcohol abuse or dependence in this group. Only CDT confirmed the diagnosis at a recommended cut-off of ≥6.

The Five-shot questionnaire performed most effectively in women, with an AuROC value of 0.88 (95%CI 0.86 to 0.90). The AuROC for CAGE in women was lower at 0.76, 95%CI 0.73 to 0.79) but better for AUDIT (0.87, 95%CI 0.85 to 0.89). Optimal cut-off scores were lower for female than males. AUDIT-C performed less well than AUDIT and Five-shot in females, with an AuROC value of 0.82 (95%CI 0.80 to 0.85). No significant differences between the performances of either GGT and MCV compared with CDT were found among women.

Aertgeerts *et al.* (2002) (Cross-sectional diagnostic evaluation, ++) Belgium

Aertgeerts *et al.* (2002) compared the performance of CAGE, AUDIT and derivatives and laboratory tests in screening for alcohol abuse or dependence in a male hospital population. AUDIT and Five-shot were found to have good diagnostic properties in this group.

All male patients older than 18 yrs admitted to three general hospitals and one university hospital during a period of 6 weeks were consecutively entered into the study (n=233) (mean age = 62 yrs). Screening tools were compared with a reference standard of alcohol abuse or dependence diagnosed according to DSM-III-R criteria.

A current diagnosis of alcohol abuse or dependence was made in 29 inpatients (12.4%) (95%CI 8.6 to 17.5). Ten of these (4.2%) satisfied criteria for alcohol abuse and 19 (8.2%) met criteria for alcohol dependence (as reported). The reported AuROC values were 0.86 (95%CI 0.81 to 0.90) for AUDIT, 0.84 (95%CI 0.78 to 0.88) for AUDIT-C, 0.86 (95%CI 0.81 to 0.90) for AUDIT-PC, 0.80 (95%CI 0.74 to 0.85) for CAGE, and 0.86 (95%CI 0.81 to 0.90) for Five-shot. Laboratory tests were shown to be of little value as screening tools, with AuROCs between 0.68 (95%CI 0.54 to 0.80) for %CDT and 0.57 (95%CI 0.51 to 0.64) for MCV.

Berks & McCormick (2008) (Systematic review, ++)

This systematic review (++) by Berks & McCormick (2008) was performed in order to investigate screening for alcohol misuse in elderly primary care patients. The authors found AUDIT to be useful in screening for hazardous and harmful drinking in older people, whilst CAGE was effective in screening for alcohol dependence.

Studies testing screening in primary care patients aged over 60 yrs were included. Studies were excluded if they did not include an appropriate reference standard for evaluation. AUDIT, AUDIT-C, CAGE, Michigan Alcohol Screening Test (MAST), SMAST, MAST-G, the Alcohol-Related Problems Screen (ARPS) and a shortened version of ARPS (shARPS) were covered. For the detection of hazardous and harmful drinking, careful questioning about alcohol consumption was used as the reference standard. For the identification of dependence or abuse, the reference standard was interviewing and use of clinical diagnostic criteria (eg. DSM-IV).

Alcohol screening questionnaires adapted for use in older people were found to perform similarly to those in the younger primary care population. Two studies were evaluations of

AUDIT (Gomez *et al.,* 2006; Morton *et al.,* 1996). Morton *et al.* tested performance in the identification of abuse and dependence at a cut-off of 8 and observed a low sensitivity of 33.3% and high specificity of 90.7%. Gomez *et al.* assessed AUDIT and AUDIT-C in the detection of hazardous drinking. AUDIT used at a cut-off of 8 showed a sensitivity of 66.7% and a specificity of 95.3%; whilst AUDIT-C at a cut-off of ≥3 and over had good screening properties, with a sensitivity of 100% and specificity of 80.7%.

Three of the 8 included studies investigated the effectiveness of CAGE in detecting alcohol abuse and dependence (Buchsbaum *et al.,* 1992; Jones *et al.,* 1993 and Morton *et al.,* 1996). Analysis of ROC curves indicated the use of a cut-off of ≥1 as most appropriate in screening, at which threshold sensitivity ranged from 79.1% to 88% and specificity from 55.8% to 88% (Buchsbaum *et al.,* 1992; Jones *et al.,* 1993). Three studies evaluated the utility of CAGE in the detection of hazardous or excessive drinking in the elderly (Adams *et al.,* 1996; Bersci *et al.,* 1993; Gomez *et al.,* 1996). The Adams and Bersci teams used a used cut-off of ≥1 and over. At this cut-off, sensitivity was rather low, ranging from 31% to 60% and specificity from 92% to 100%. At a cut-off of 2 (Adams *et al.*; Gomez *et al.*), sensitivity was lower at 14% to 38.9% and specificity approximately 97%.

Four of the 8 studies tested the ability of MAST or a variation of MAST to identify alcohol abuse and dependence (Hirata *et al.,* 2001; Jones *et al.,* 1993; MacNeil *et al.,* 1994; Morton *et al.,* 1996). Analysis of ROC curves (Hirata *et al.*; Jones *et al.*) suggested the use of ≥4 as a threshold, and was shown by Hirata *et al.* to give strong sensitivity of 91.4% and specificity of 83.9%. At a cut-off of ≥3, sensitivity ranged from 64% to 97.1% and specificity from 66.7% to 79% (Hirata *et al.,* 2001; Jones *et al.,* 1993). Using a cut-off of ≥5 (Morton *et al.,* 1996), sensitivity ranged from 69.8% to 91% and specificity from 80.5% to 84%. Two papers tested MAST and CAGE concurrently in the identification of dependence and abuse (Jones *et al.,* 1993; Morton *et al.,* 1996). Morton *et al.* found the two questionnaires to perform very similarly, with MAST being slightly more effective; whilst Jones *et al.* found CAGE to be more effective. Bersci *et al.* (1993) evaluated the effectiveness of SMAST in detecting heavy drinking (defined in this study as 3 or more drinks per day or twice a day drinking). SMAST performed relatively poorly at a cut-off of 2, with a low sensitivity of 48% despite a specificity of 100%.

Moore *et al.* studied the use of the Alcohol-Related Problems Screen (ARPS) and shortened-ARPS in the detection of hazardous and harmful drinking, compared to AUDIT and SMAST-G. The evidence showed good sensitivity (93% and 92% vs 28% for AUDIT at a cut-off of 8 and 52% for SMAST-G at a cut-off of 2). Specificity was poorer at 63% and 51% for ARPS

and shARPS vs 100% and 96% for AUDIT and SMAST-G. The authors stated that it was not clear what the ARPS and shARPS cut-offs used were.

In the identification of hazardous and harmful drinking, AUDIT and AUDIT-C were seen to be superior to CAGE and various forms of MAST. The authors stated that lower cut-offs than 8 for AUDIT and 3 for AUDIT-C may be more efficient in the over 60s. CAGE was found to be effective in screening for lifetime and current abuse and dependence at a cutoff of ≥1.

Berner *et al.* (2007) (Systematic review, ++)

Berner *et al.* (2007) conducted a systematic review of the performance of the full AUDIT in the detection of at-risk drinking across a range of settings.

Twenty three studies were included in the review, with 19 used in the meta-analysis. Quantity/frequency of alcohol consumption and/or heavy episodic drinking were used as the reference standard in the evaluation of AUDIT. The majority of studies were conducted in the USA, with others originating from Europe, Australia and Japan. The majority of patients were adults, however one study included patients as young as 15 yrs.

Using a threshold of 8 points, sensitivity ranged from 31% to 89% and specificity from 83% to 96% across the 8 primary care-based studies (and therefore pooling was not considered appropriate). The largest study was described as having a sensitivity of 76% and a specificity of 92% at a cut-off of 8 (Gordon *et al.,* 2001, n=13,438 USA patients, 69.7% aged under 61 yrs, 53% male). One trial in general hospital inpatients reported a sensitivity of 93% and specificity of 94% (MacKenzie *et al.,* 1996, n=240 UK patients, mean age 54 yrs, 53% male), a further trial in an emergency department gave a sensitivity of 75% and a specificity of 84% for men and 59% and 95% for women (Neumann *et al.,* 2004, n=1927 patients in Germany, median age 32 yrs for both genders), whilst a study based on University students presented a sensitivity of 82% and specificity of 78% (n=302 USA students, mean age 20.3 yrs, 39% male). Three studies in elderly patients reported sensitivities between 55% and 83% and gave a pooled specificity of 96%. One study in drug-dependent patients from an inpatient substance use rehabilitation programme in the USA (Skipsey *et al.,* 1997) (age range 18 to 52 yrs, 38% male) presented a sensitivity of 97% and specificity of 69% at a cut-off of 8.

Berner *et al.* concluded that the findings relating to the screening performance of AUDIT were largely heterogeneous and suggested that the use of AUDIT should be restricted to primary care patients, inpatients and the elderly.

Beullens & Aertgeerts (2004) (Systematic review, +)

Beullens & Aertgeerts (2004) systematically reviewed the use of screening tools for alcohol abuse and dependence in older people in clinical settings. CAGE and MAST-G were reported as being the most appropriate screening tools for use in this group.

A number of screening instruments were evaluated: two questions of Cyr and Wartman, MAST, Brief MAST (BMAST), Short MAST (SMAST), MAST-Geriatric version, CAGE and AUDIT. Included studies used DSM diagnostic criteria as reference standards. Six studies were based in a hospital setting (subjects aged 60 yrs and over) and one study was based in a nursing home (subjects aged 50 yrs and over). The setting of the studies by country was unclear.

Seven relevant research reports were identified in total. The authors found that MAST-G and particularly CAGE were appropriate for the detection of alcohol abuse and dependence in older patients. The two questions of Cyr and Wartman, AUDIT and MAST were not found to be effective in screening for alcohol abuse and dependence in older people in this context. During the interpretation of this evidence, it should be borne in mind that there is a degree of overlap among the primary studies included in both systematic reviews by Berks & McCormick and Beullens & Aertgeerts. Authors of primary studies are listed to indicate such overlap.

In male ambulatory hospital patients using a cut-off of ≥8, AUDIT had a low sensitivity of just 33%, a specificity of 91% and low AuROC of 56%. When this cut-off was lowered to ≥4, sensitivity was still only 59% and specificity lowered to 41% (Morton *et al.*, 1996).

CAGE was used in 4 studies among older people. If the typically recommended cut-off score of 2 was used, sensitivities varied between 48% and 70% in hospital patients (specificities between 82% and 99%) and was 82% in nursing home patients (with a specificity of 90%) (Buchsbaum *et al.*, 1992; Jones *et al.*, 1993; Joseph *et al.*, 1995; Morton *et al.*, 1996). Compared with young and middle-aged patients, older people were significantly less likely to answer positively to 'have people annoyed you by criticising your drinking' (Curtis *et al.*, 1989). By lowering the threshold to 1 positive answer, sensitivity increased to 79 to 88% in hospital patients and 98% in nursing home patients but specificity decreased to 56% to 88% and 75% (Buchsbaum *et al.*, 1992; Jones *et al.*, 1993; Joseph *et al.*, 1995; Morton *et al.*, 1996). Luttrell *et al.* (1997) found CAGE to have low sensitivity (13%) using a cut-off of 2 (and a specificity of 98%) but did not report the impacts of the use of lower thresholds. In

comparative studies, CAGE was more sensitive than Cyr and Wartman, AUDIT and MAST and similar in sensitivity to MAST-G (Jones *et al.*, 1993, Joseph *et al.*, 1995, Morton *et al.*, 1996).

The original version of MAST was evaluated in 3 studies among older people. With a score of 5 as the cut-off in male alcoholism and medical patients (Willenbring *et al.*, 1987), screening properties were good, with sensitivity at 100% and specificity at 83%. Using the recommended cut-offs of 5, 6 and 3 respectively, UMAST displayed a sensitivity of 93%, BMAST of 82% and SMAST of 89% with specificities above 95%. However, if cut-offs used were lowered (to 3, 4 and 2 respectively), sensitivity increased to 96% for UMAST, 91% for BMAST and 98% for SMAST and specificities were still above 70% (Willenbring *et al.*, 1987). The screening power of MAST was reported as still being retained when a shorter version was used. Using a score of ≥5 as a cut-off, MAST-G had sensitivity of 70% with hospital patients and sensitivity of 93% in nursing home patients (specificities of 81% and 65%). By lowering the cut-off to 3, sensitivity increased to 86% and 98% but specificity dropped to 61% and 50% (Joseph *et al.*, 1995, Morton *et al.*, 1996). Luttrell *et al.* (1997) found that in hospital patients using a cut-off of 5, sensitivity was only 50%, and specificity of 93% but sensitivity values using lower cut-offs were not reported by Luttrell. MAST-G is therefore appears to be relatively effective in the identification of abuse and dependence in older people in clinical settings.

The two questions of Cyr and Wartman were found to be poor in sensitivity. In nursing home patients, the observed sensitivity was only 65%, specificity was 92% and a positive predictive value of PPV (ie. the proportion of people with a positive test who have the target disorder) of 89% (Johnson *et al.*, 1995).

Bradley *et al.* (1998) (Systematic review, ++)

Bradley *et al.* (1998) systematically reviewed the evidence relating to the performance of alcohol screening questionnaires in female patients. AUDIT and TWEAK performed appropriately in Black and White women, using cut-offs lower than typically recommended. The authors found CAGE to be less sensitive in largely White female populations.

Studies were included that compared brief alcohol screening questionnaires with valid reference standards for heavy drinking (defined as ≥2 drinks per day) or alcohol abuse or dependence in US female clinical populations. Alcohol dependence was used to refer to a repetitive pattern of excessive alcohol use with serious adverse consequences. Alcohol abuse referred to continued drinking despite adverse consequences (in the absence of dependence).

Appropriate reference standards for alcohol abuse or dependence were based on DSM or ICD criteria. For heavy drinking, reference standards were based on in-depth interviews and included the Timeline Follow Back procedure, with heavy drinking being typically defined for women as having an average of ≥2 standard-size alcoholic drinks per day. The included studies focused on 8 brief screening questionnaires: AUDIT, CAGE, TWEAK, T-ACE, NET, Trauma Scale, a 6-item quantity-frequency screen and BMAST.

CAGE, AUDIT and TWEAK were all found to be appropriate screening tests for the identification of alcohol dependence in women. A study based in an emergency department suggested that sensitivities were higher for TWEAK and CAGE than for AUDIT, but the sensitivity of AUDIT using thresholds below 7 was not reported for women. However, the high specificity of AUDIT at a cut-off of 7 (95%), is supportive of the use of lower cut-offs, which may result in the optimal combination of sensitivity and specificity in this population. AUDIT and TWEAK questionnaires displayed high AuROC values (0.87 to 0.93) for past year alcohol abuse or dependence in Black or White women, showing good accuracy, but sensitivities were below 80% at typical cut-off scores. The CAGE questionnaire demonstrated AuROC values ranging from 0.84 to 0.92 for alcohol abuse and dependence in largely Black populations of women. Using the typical cut-off score of ≥2 generated low sensitivities (38% to 50%) in predominantly White female populations. The authors found that the sensitivity of screening questionnaires for alcohol dependence may be affected by the ethnicity of the population screened. CAGE performed appropriately in mainly Black populations of women, but only showed a sensitivity of 50% for past year alcohol abuse and dependence in White female emergency department patients using the typical cut-off. Similarly, the sensitivity of CAGE for a lifetime diagnosis of abuse or dependence was only 38% in a primary care study in a largely White population of women. In emergency department patients, evidence for AUDIT and TWEAK was suggestive of increased sensitivity for the detection of alcohol dependence among Black females.

In the identification of heavy drinking, AUDIT had an AuROC of at least 0.87 in female primary care patients. TWEAK and T-ACE had higher AuROC values (0.84 to 0.87) than CAGE (0.76 to 0.78) for detecting heavy drinking before pregnancy in black obstetric patients. One study assessing the screening for identification of heavy drinking in non-pregnant women found AUDIT to be effective.

AuROC values for alcohol screening questionnaires were not significantly different for males and females, showing similar accuracy as tools. However, most studies suggested lower sensitivities in women than men at equivalent thresholds. Furthermore, several studies

reported higher specificities of screening questionnaires in women than men, although this was not described as being a consistent finding. This evidence therefore demonstrates the importance of the use of appropriate thresholds according to gender and ethnicity when using questionnaires in screening for alcohol misuse.

Bradley *et al.* (2007) (Cross-sectional diagnostic evaluation, ++) USA

Bradley *et al.* (2007) assessed the effectiveness of AUDIT and related questionnaires in screening for alcohol misuse in primary care.

Outpatients aged over 18 yrs of White, African American or Hispanic origin attending a primary care academic practice in Texas, USA participated in the study (n=1319; 392 male and 927 female). Mean ages of the sample were 46 yrs for men and 42 yrs for women. Patients were approximately equally distributed between the 3 ethnic groups under study. The full version of AUDIT, AUDIT-C, AUDIT question 3 and an augmented version of the CAGE (augmented with questions to identify risky drinking, typical quantity and frequency questions and a question relating to binge drinking) were compared with a reference standard of alcohol misuse diagnosed according to DSM-IV and/or drinking above recommended limits in the past year. Patients completed written questionnaires before appointments and in-person interviews with non-clinician interviewers were conducted after appointments. Risky drinking was defined as drinking above recommended limits according to NIAAA criteria (>14 drinks/wk and/or 5 or more drinks on any single occasion for men; > 7 drinks/wk and/or 4 or more drinks on any single occasion for women) (NIAAA). A DSM-IV alcohol use disorder (alcohol abuse or dependence) was classed as a chronic maladaptive pattern of use that results in clinically significant impairment or distress; whilst the term alcohol misuse was used in relation to the presence of risky drinking or a DSM-IV alcohol use disorder in the past year. An additional reference standard was that of any symptom of an alcohol use disorder over the preceding year.

One hundred and twenty eight (33%) men and 177 (19%) women met criteria for risky drinking and/or DSM-IV alcohol use disorders in the past year (alcohol misuse), whilst 66 (17%) men and 83 (9%) women fulfilled criteria for DSM-IV alcohol abuse or dependence (alcohol use disorder) in the past year.

When compared with the interview reference standard of alcohol misuse in the past year, the area under the ROC curve for AUDIT-C was over 0.90 for both men and women, demonstrating its strength as a screening tool. AUDIT-C performed as effectively as the full AUDIT and significantly better than self-reported risky drinking, AUDIT Q3, or augmented

CAGE questionnaire (p values all <0.001), particularly in women. The AUDIT-C cut-off score yielding optimal sensitivity (86%) and specificity (89%) for identifying past year alcohol misuse in men was found to be ≥ 4 , and either ≥2 (sensitivity 89%, specificity 78%) or ≥ 3 (sensitivity 73%, specificity 91%) for women. The optimal cutoff for full AUDIT was described as being ≥4 and (sensitivity 91%, specificity 80%) or ≥5 (sensitivity 81%, specificity 90%) for men and ≥3 (sensitivity 79%, specificity 87%) for women. AUDIT Question 3 alone and augmented CAGE had reasonably high sensitivities and specificities for alcohol misuse in men but lower sensitivities in women.

The AuROC value for the detection of DSM-IV alcohol use disorders alone by AUDIT-C was 0.89 in men and 0.91 in women. Cut-off scores for optimal sensitivity and specificity were higher when screening for alcohol use disorders than when screening for both risky drinking and/or alcohol use disorders (past year alcohol misuse). AUDIT-C was found to have a greater AuROC than either augmented or standard CAGE questionnaires (P <0.005).

Coulton *et al.* (2006) (Cross-sectional diagnostic evaluation, ++) UK

Coulton *et al.* (2006) conducted this comparative study in order to evaluate the effectiveness of a range of screening methods for the identification of alcohol use disorders in an opportunistic screening programme in primary care within the UK. The authors found AUDIT to be effective as a tool for routine screening of alcohol use disorders in this study.

1794 male general practice patients aged 18 years and over attending 6 general practices in South Wales were consecutively approached and asked to complete AUDIT embedded within a general lifestyle questionnaire whilst awaiting their clinic appointment. Of these, 447 (24.9%) were positive for alcohol use disorders and 112 (25% of patients with a positive test result) agreed to participate in the study. Patients were interviewed by a researcher who determined the frequency and quantity of alcohol consumption in the previous 180 days using the Timeline Follow Back method. A total of 194 patients participated. The number of weeks in the previous 180 days that the patient had exceeded a safe level of alcohol consumption (greater than 21 units of alcohol in any one week) and the frequency with which the patient binged (greater than 8 units of alcohol in any one day) were obtained. This measure was used as a criterion standard for hazardous and binge alcohol consumption and was reported to be inclusive of both harmful alcohol consumption and dependence. Blood samples were also drawn from participants in order to determine GGT, aspartate aminotransferase, CDT and erythrocyte mean cell volume. The average age of subjects was 46.2 yrs (range 18.1 to 80.9 yrs). Fifty (26%) fulfilled the criteria for alcohol dependence according to DSM-IV, 121 (62%) fulfilled criteria for hazardous alcohol consumption, 117 (60%) engaged in binge

drinking at least monthly and 4 (2%) were abstinent. Using the study sample to estimate the prevalence of drinking behaviours in the general practice population, the prevalence of hazardous alcohol consumption was reported as being 34% (95%CI 28% to 40%), 35% for monthly binge consumption (95%CI 29% to 42%), 24% for weekly binge consumption (95%CI 19% to 29%) and 12% for alcohol dependence 12% (9% to 16%).

Significant correlations were observed between alcohol consumption (measured as number of standard drinks consumed per drinking day, where a standard drink equated to 8g of ethanol) over the previous 180 days and AUDIT score (Pearsons' correlation coefficient r=0.74, P<0.001), GGT (r=0.20, P=0.04) and CDT (r=0.36, P<0.001) but not aspartate aminotransferase (r=0.03, P=0.7) or MCV (r=0.02, P=0.9).

High sensitivity, specificity and positive predictive values were observed for AUDIT for the detection of hazardous consumption (sensitivity, specificity, PPV presented respectively) (69%, 98% and 95%), weekly binge consumption (75%, 90% and 71%), monthly binge consumption (66%, 97% and 91%) and alcohol dependence (84%, 83% and 41%). AUDIT performed more effectively than any of the biomarkers. AuROC values for AUDIT of 0.94 to 0.96 for all consumption classifications were obtained, showing considerable power as a screening tool, being close to the maximum value of 1.00 demonstrating a perfect test. Of the biomarkers, only CDT yielded an acceptable AuROC value of 0.70, whilst the observed value in the region of 0.50 observed for aspartate aminotransferase highlights the poor performance of this tool in screening for alcohol misuse in this population.

AUDIT (using the typically recommended cut-off score of ≥8) showed reasonable sensitivity (69%) in the identification of hazardous drinkers, with high specificity (98%) and PPV (95%) values. AUDIT also performed relatively well in detecting monthly bingers, although sensitivity, specificity and PPV and NPV values were slightly lower. In the identification of weekly bingers by AUDIT, the specificity fell to 90% and PPV also decreased, but sensitivity increased to 75%. For the identification of alcohol dependence, AUDIT sensitivity was highest at 84%, but specificity lowest at 83%, with a PPV of only 41% and a NPV of 97%.

Fiellin *et al.* (2000) (Systematic review, ++)

Fiellin *et al.* (2000) systematically reviewed the evidence for screening methods for alcohol problems in primary care.

A range of screening methods were evaluated as follows (number of studies presented in brackets for each instrument): AUDIT or variation (n=9), CAGE or variation (n=15), MAST

or variation (n=8), two question screen proposed by Cyr and Wartman (n=3), mental or general health screens (n=4), quantity-frequency questions (n=6) and clinical indicators (eg. clinicians recognition or laboratory tests) (n=7). The authors considered that a study compared a screening tool with a valid reference standard if an identified diagnostic instrument was used (eg. Structured Clinical Interview for the DSM-III) or an operational definition (eg. quantity and frequency of alcohol consumption) was used to diagnose an alcohol problem.

Categories of alcohol use were defined as follows:

> Moderate drinking (NIAAA): Men, ≤2 drinks/day, women ≤1 drink/day, >65 yrs ≤1 drink/day
>
> At-risk drinking (NIAAA): Men >14 drinks/wk or >4 drinks/occasion; women >7 drinks/wk or >3 drinks/occasion
>
> Hazardous drinking (WHO): At risk of adverse consequences from alcohol
>
> Harmful drinking (WHO): Alcohol is causing physical or psychological harm
>
> Alcohol abuse (APA): ≥1 of the following events in a year: recurrent use resulting in failure to fulfil major role obligations, recurrent use in hazardous situations, recurrent alcohol-related legal problems (eg DUI), continued use despite social or interpersonal problems caused or exacerbated by alcohol
>
> Alcohol dependence (APA): ≥3 of the following events in a yr: tolerance, increased amounts to achieve effect, diminished effect from same amount, withdrawal, a great deal of time spent obtaining alcohol, using it or recovering from its effect, important activities given up or reduced because of alcohol drinking more or longer than intended, persistent desire or unsuccessful attempts to cut down or control alcohol use, use despite knowledge of having a psychological problem caused or exacerbated by alcohol.

A total of 38 relevant studies were identified. Eleven studies covered screening for at-risk, hazardous or harmful drinking, whilst the focus of 27 was screening for alcohol abuse or dependence.

AUDIT was described as being most effective in the identification of subjects with at-risk, hazardous or harmful drinking (sensitivity 51% to 97%, specificity 78% to 96%). CAGE was more effective in identification of alcohol abuse and dependence (sensitivity 43% to 94%, specificity 70% to 97%). These two questionnaires were found to perform more effectively than other methods, including quantity-frequency questions.

At-risk, heavy and harmful drinking

Eleven studies on screening for the above categories were performed in a variety of primary care settings. Five of the studies were performed outside of the USA. The mean age of subjects when reported ranged from 35 to 47 yrs. One study only included subjects aged 60 yrs or older. Between 30% and 100% of subjects were male. The prevalence of alcohol problems ranged from 1% to 44% and varied by sex and disorder.

6 studies were found that focused on the use of AUDIT. AUDIT demonstrated a sensitivity of 97% and specificity of 78% for hazardous consumption and a sensitivity of 95% and specificity of 85% for harmful consumption when a threshold of ≥8 was used (Saunders *et al.*, 1993). Using the same cut-off but different reference standards, other studies presented AUDIT sensitivities between 51% and 59% and specificities of 91% to 96% for the identification of at-risk drinking or heavy drinking (Volk *et al.*, 1997; Bush *et al.*, 1998; Bradley *et al.*, 1998a, 1998b). When a cut-off of 5 was used, AUDIT showed a sensitivity of 84% and specificity of 90% for combined hazardous, harmful or dependent drinking (Piccinelli *et al.*, 1997). AUDIT-C had a sensitivity of 54% to 98% and specificity of 57% to 93% for various definitions of heavy drinking (Bush *et al.*, 1998; Bradley *et al.*, 1998a, 1998b).

Four studies covered the use of CAGE. King *et al.* (1986) evaluated the use of CAGE to identify at-risk drinkers (consuming 64g of alcohol or more per day) and found a sensitivity of 84% and specificity of 95% when using a cut-off of ≥2. However, using the same cut-off, Adams *et al*. (1996) reported a very low sensitivity of 14% and a specificity of 97% for the detection of at-risk drinkers among patients older than 60 yrs. Further work (Aithal *et al.*, 1998; Bradley *et al.*, 1998b) generated sensitivities for AUDIT between 49% and 69% and specificities between 75% and 95% for the detection of heavy drinking.

An augmented CAGE questionnaire (consisting of the 4 CAGE questions, the first 2 quantity and frequency questions of AUDIT and a question relating to history of drinking problems) had a sensitivity of 65% and specificity of 74% (Bradley *et al.*, 1998b).

A single item screen (‘on any occasion during the last 3 months have you had more than 5 drinks containing alcohol?’) had a sensitivity of 62% and 93% for the identification of problem drinkers (Taj *et al.*, 1998).

CDT had relatively poor sensitivities of 39% to 69% and specificities of 29% to 81% for heavy drinking (Aithal *et al.*, 1998; Sillanaukee *et al.*, 1998). MCV, aspartate

aminotransferase, alanine aminotransferase and GGT also were reported to have limited use as screening tests (Aithal *et al.,* 1998; Sillanaukee *et al.,* 1998). Only 1 study reported good screening properties for a laboratory test, with a sensitivity of 77% and specificity of 81% quoted for GGT (Aithal *et al.,* 1998).

Alcohol abuse and dependence

A total of 27 studies were conducted in a range of primary care settings that focused on the identification of alcohol abuse and dependence. Four studies were performed outside the USA. The mean age of subjects were reported ranged from 36 to 72 yrs. Males made up between 19% and 100% of the subjects. The prevalence of alcohol problems in study populations ranged from 2% to 41%, depending on diagnosis and whether lifetime or current criteria were used. In the majority of studies (66%), screening was performed by research staff, or was otherwise self-administered (15%) or clinician-administered (19%).

Five studies with a focus on AUDIT were discussed. Barry and Fleming (1993) reported a sensitivity of 61% and specificity of 90% for a current alcohol use disorder using a cut-off of 8. Increasing the cut-off score to ≥11 caused a decrease in sensitivity to 40% and an increase in specificity to 96%. Performance characteristics altered considerably when investigators considered lifetime alcohol use disorders. In this context, AUDIT had a sensitivity of 46% and 30% with a specificity of 90% and 97% with the use of cut-off scores of 8 and 11 respectively (Barry and Fleming, 1993). Other research found that AUDIT had sensitivities of 63% and 93% and specificities of 96% and 96% for lifetime or current diagnosis respectively of alcohol abuse or dependence (Isaacson *et al.,* 1994). However, AUDIT did not perform as effectively in the study by Schmidt *et al.* (1995), in which AUDIT had a sensitivity of 38% and a specificity of 95% for a lifetime diagnosis of alcohol abuse or dependence. These results were described as being similar to those obtained by Morton *et al.* (1996), with a threshold of 8 in a study population older than 65 yrs, whereby AUDIT had a sensitivity of 33% and a specificity of 91%. In one study, AUDIT (using a cut-off of 8) displayed sensitivities between 70% and 92% and specificities of 73% to 94%, with variation based on gender and ethnic background (Steinbauer *et al.,* 1998).

Ten studies were found that described the use of CAGE in the identification of alcohol abuse or dependence. Sensitivities were between 21% and 94% and specificities of 77% to 97% using a cut-off of ≥2 (Cleary *et al.,* 1998; Buchsbaum *et al.,* 1991; Chan, 1994; Brown and Rounds, 1995; Fleming and Barry, 1991; Cherpitel, 1998). Lowering this cut-off to 1 resulted in sensitivities of 60% to 71% and specificities of 84% to 88% (Brown and Rounds, 1995; Fleming and Barry, 1991). In older primary care populations, sensitivities were reported as

ranging from 63% to 70% and specificities from 82% to 91% with cut-off scores of 2 or more (Morton *et al.*, 1996; Buchsbaum *et al.*, 1992). CAGE had a relatively low sensitivity of 53% and a high specificity of 93% with a combined target of identification of alcohol abuse, dependence and harmful drinking (Rumpf *et al.*, 1997). In one study (Volk *et al.*, 1997), the proportion of subjects who gave a positive answer to CAGE questions varied by race, sex and item.

Seven studies described the use of MAST in detecting alcohol abuse or dependence. Unweighted scoring of Short-MAST with a cut-off of 2 or more yielded sensitivities of 82% and 100% and specificities of 96% and 85% for the detection of subjects with lifetime and current diagnoses respectively. A further study using the same threshold found that SMAST had a sensitivity of 48% and specificity of 95%, but no distinction between current or lifetime disorder. Weighted scoring of SMAST typically uses a cut-off of 5 or more, and generated sensitivities of 57% and 66%, with specificities of 80% and 80% for current and lifetime alcohol use disorders respectively. Other studies found sensitivities of 38% to 80% and specificities of 79% to 97% with the use of various SMAST cut-off scores. A geriatric version of MAST had a sensitivity of 70% and specificity of 80% with a cut-off of 5 or more in an older (>65 yrs) primary care population.

Cyr and Wartman found that a combination of positive response to question ‘have you ever had a drinking problem’ and/or ‘when was your last drink?’ had a sensitivity of 91% and specificity of 90% when MAST scores were used as the reference standard. Other studies found sensitivities between 48% and 53% and specificities between 76% and 93% (Schorling *et al.*, 1995; Moran *et al.*, 1990). TWEAK had a sensitivity of 75% and specificity of 90% (Cherpitel, 1998). One study on quantity-frequency questions found a sensitivity of 47% and specificity of 96% using MAST scores as a reference standard and quantity cut-off of 4 or more drinks per day (Cyr and Wartman, 1988).

Six studies investigated clinical judgement and/or laboratory values. The Alcohol Clinical Index was generated to formalise use of clinical indicators (Escobar *et al.*, 1995) and the use of a diagnostic grid combined the use of CAGE with features of history and physical examination (Gabrynowicz and Watts, 1981). The Alcohol Clinical Index had a sensitivity of 28% and specificity of 86% for the detection of alcohol dependence. The grid demonstrated a sensitivity of 99% and specificity of 96% for alcohol dependence. Laboratory screening methods tests were reported to perform poorly as screening tools (Escobar *et al.*, 1995, Cleary *et al.*, 1988). SMAST consistently outperformed laboratory tests (Cleary *et al.*, 1988). Escobar *et al.* (1995) found that the use of MCV, elevated GGT or an aspartate

aminotransferase-alanine aminotransferase ratio of ≥2 resulted in sensitivities that ranged from 13% to 63% and specificities from 48% to 94%.

Frank *et al.* (2008) (Cross-sectional diagnostic evaluation, ++) USA

Frank *et al.* (2008) evaluated the validity of the AUDIT-C questionnaire among White, African American and Hispanic adult primary care patients in the USA. AUDIT-C was observed to perform effectively in all 3 ethnic groups. At the recommended threshold scores, there were significant differences in sensitivity but not specificity across the 3 groups.

Outpatients aged 18 yrs and above (n=1292) attending a family practice clinic in Texas, USA participated in the study. The study sample had a mean age of 43 yrs and was 70% female. AUDIT-C and CAGE were evaluated. Patients completed comparison standard interviews and screening questionnaires administered by a non-clinician interviewer after appointments. The main comparison standard was for alcohol misuse (risky drinking, alcohol abuse) defined as meeting criteria for either DSM-IV alcohol use disorder or risky drinking defined as drinking above recommended limits according to the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Risky drinking was defined as drinking greater than 7 drinks a week or 4 or more drinks on any single occasion (women) and greater than 14 drinks a week or 5 or more drinks in any single occasion (men). The alcohol problems module of the Alcohol Use Disorder and Associated Disabilities Interview Schedule was used to identify DSM-IV alcohol use disorders. Interviews were administered to all participants, with the exception of those who reported drinking less than 12 drinks ever during their lives. AUDIT-C was compared with a reference standard of alcohol misuse (alcohol use disorders and risky drinking) as well as alcohol use disorders alone. CAGE was compared only with a reference standard of alcohol use disorders.

The prevalence of alcohol misuse in the study sample was 32% for men and 19% for women, whilst the prevalence of alcohol use disorders was 17% for men and 9% for women.

AuROCs were greater than 0.85 in all 3 groups, with no significant differences across racial/ethnic groups in men (P=0.43) or women (P=0.12). At previously recommended cutoff points there were statistically significant differences by race in AUDIT-C sensitivities but not specificities. In women, sensitivity was higher in Hispanic (85%) than in African American (67%, P=0.03) or White (70%, P=0.04). In men, sensitivity was higher in White (95%) than African-American men (76%, P=0.01), with no significant difference from Hispanic men (85%, P=0.11).

Screening for risky drinking and alcohol use disorders (alcohol misuse)

The sensitivity of AUDIT-C at recommended cutoffs (3 and over for women and 4 and over for men) for detecting alcohol misuse differed significantly in 3 groups. However, these differences were not consistent in women and men, except that AUDIT-C had lowest sensitivity and highest specificity in African Americans. In women, AUDIT-C sensitivity was significantly higher in Hispanic (85%) than African American (67%, P=0.03) or White (70%, P=0.04) women. In men, AUDIT-C sensitivity was significantly higher in White (95%) than African American (76%, P=0.01) men but not significantly higher in Hispanic males (85%, P=0.11). No significant differences in specificities were observed between the 3 groups in men or women. Negative likelihood ratios were lowest in Hispanic women and White men, reflecting higher sensitivities. Positive likelihood ratios were highest in African American women and men, reflecting highest specificity in African Americans. Despite differences in sensitivity across the 3 groups, the overall performance of AUDIT-C as screen for alcohol misuse did not differ across the 3 groups, based on AuROCs. In each of the 3 groups, AuROCs for alcohol misuse were greater than 0.90 in men and greater than 0.85 in women.

Screening for alcohol use disorders

AUDIT-C was also effective in screening for alcohol use disorders in all 3 groups, although sensitivity varied across groups. Sensitivity of AUDIT-C for alcohol use disorders was lower in African American men (65%) than in White (96%) (p=0.008) or Hispanic (100%) (P=0.003) men but did not differ significantly across groups of women (African American 88%, Hispanic 91%, White 87%) (P>0.70 for all comparisons). Specificity was higher in African American men (83%) than White men (70%) (P=0.02) but not compared to Hispanic men (72%) (P=0.07). Among women, AUDIT-C specificity was significantly higher in African American women (89%) compared to Hispanic women (77%) (P=0.001) but not compared to White women (86%) (P=0.27). No significant differences were observed in the AUDIT-C AuROCs for detecting alcohol use disorders across groups in men (P=0.43) or women (P=0.12) (range 0.87 to 0.94).

In each ethnic group, AUDIT-C had a higher AuROC than CAGE (range 0.67 to 0.88) for detecting alcohol use disorders (P<0.05 for each comparison, bar Hispanic women (P=0.07)). CAGE had a relatively low sensitivity for alcohol use disorders (23% to 72%), with lowest sensitivity in Hispanic women and highest among White men. CAGE specificity was observed to be higher than AUDIT-C in African American women, Hispanic women, White women, Hispanic men and White men.

Gordon *et al.* (2006) (Literature review)

Gordon e*t al*. (2006) reviewed the evidence for screening for alcohol misuse in primary care.

RCTs and systematic reviews were included as evidence. The quality of the research was considered to be good. Clinical signs and laboratory tests were described as having low sensitivity to the detection of alcohol misuse. Alcohol screening questionnaires were discussed. AUDIT was described as having positive attributes such as the capability of detecting less severe forms of alcohol misuse, being relatively short and having been validated internationally. AUDIT-C was found to perform comparably with the full AUDIT and be quicker to use. CAGE was stated as being useful in detecting more severe alcohol misuse. The full MAST was described as being burdensome to apply in clinical practice, with shortened versions being effective in detecting alcohol use disorders and being more practical to use.

Kelly *et al.* (2002) (Cross-sectional diagnostic evaluation, +) USA

The goal of this study by Kelly *et al.* (2002) was to examine the appropriateness of adult-validated alcohol screening tools among adolescents and young adults. The authors concluded that AUDIT performed more effectively than CAGE or TWEAK in this population.

103 (55 males, 48 females) patients presenting to emergency department settings in the USA were the focus of the study. The mean age of the sample was 17.5 yrs (SD=2.1, range 12.2 to 20.9 yrs). The sample was 79.5% Caucasian, 14.5% African American, 5% Asian American and 1% Hispanic. Participants completed the following 3 screening questionnaires: AUDIT, CAGE and a modified version of TWEAK.

The mean score for AUDIT was 7.74 (SD=7.14). This was noted as being high for this relatively young sample. The mean score on TWEAK was 2.74, reflecting a fairly high level of alcohol misuse on this 7 point scale. Only 2 respondents endorsed needing an ‘eye-opener’ in the morning. Performance of this scale compromised by the tolerance question, as 32% of adolescents did not know how to respond to this item. The mean score on CAGE was 0.71 (SD=1.03), reflecting a relative lack of alcohol problems as assessed by CAGE.

The construct validity of the tools was investigated by comparing younger and older participants, males and females, and ethnic groups on screening instruments. Epidemiological studies have shown that older participants are more likely to drink, Caucasian youths are more likely to problem drink than African Americans, and that males are more likely to drink than

females. The construct validity of these instruments for assessing problem alcohol use in adolescents would be supported to the degree that these same 'known group' differences are found for each. For expected differences by age, groups differed in the expected direction for TWEAK (younger group mean = 2.23 (SD=1.5) vs older group 3.10 (1.8), P<0.04) and on AUDIT (younger group mean=5.02 (4.9) vs older=10.39 (8.0), P<0.001). Groups did not differ significantly on CAGE (younger group mean=0.60 (0.85) vs older mean=0.84 (1.17), P=0.22). For expected gender differences, males and females did not differ on the AUDIT or CAGE, but differed significantly on TWEAK (male mean=3.9 (1.5), female mean=2.1 (1.8), P<0.009). Caucasian adolescents compared with African American adolescents on each measure. Findings for the two ethnic groups differed significantly only on AUDIT (Caucasian mean=8.56 (7.6) vs African American mean=5.07 (3.9), P<0.02).

Participants were categorised according to whether they drank 6 or more drinks on one occasion 'less than once a month' vs. more frequently. Based on the specified standard, there were 73 non-hazardous drinkers and 30 hazardous in AUDIT and CAGE analyses and 42 non-hazardous drinkers and 28 hazardous drinkers in the TWEAK analysis. All 3 screening instruments were able to significantly discriminate between potentially hazardous and non-hazardous drinkers (P<0.05 in all cases).

The authors stated that the evidence was indicative that AUDIT performed most effectively in screening for alcohol use disorders in young people treated in emergency departments.

Kelly *et al.* (2004) (Cross-sectional diagnostic evaluation, ++) USA

Kelly *et al.* (2004) evaluated the use of AUDIT, CAGE, CRAFFT and a modified RAPS-QF in screening for alcohol abuse or dependence among older adolescents in the emergency department setting.

Adolescents attending an emergency department setting in the USA participated in the study. 93 were included at follow-up analysis. The sample for analysis was limited to 18-20 year olds. The sample was 55% male, 81% White, with a median age of 19 yrs (SD=0.9).

AUDIT and CRAFFT performed significantly better than the CAGE ($p<0.01$ and $p<0.05$ respectively); whilst AUDIT performed significantly better than the RAPS-QF ($p<0.01$). Optimal cut-off scores were identified as follows: AUDIT (≥ 10), CAGE (≥1), CRAFFT (≥3) and RAPS-QF (≥3).

Screening properties were as follows: AUDIT (≥10) sensitivity 82%, specificity 78% (85% and 53% for alcohol-positive respondents); CAGE (≥1) sensitivity 66%, specificity 58% (70% and 35% for alcohol-positive respondents); CRAFFT (≥3) sensitivity 82%, specificity 67% (85% and 53% for alcohol-positive respondents); RAPS-QF (≥3) sensitivity 82%, specificity 54% (80% and 41% for alcohol-positive respondents).

Three of the AUDIT items were predictive of an alcohol use disorder, including binge drinking, cannot stop drinking, and family and friends concerned about drinking items. One CAGE item was predictive of an alcohol use disorder (need to cut down). Three CRAFFT items were predictive of an alcohol use disorder, including riding with a drinking or intoxicated driver, forgetting things while drinking, and getting into trouble as a result of drinking. One RAPS-QF item was predictive (amnesia as a result of drinking).

A new scale was constructed that used all 8 items predictive of an alcohol use disorder from the 4 questionnaires. Of the 8 items, those that did not improve the sensitivity or specificity of the scale for identifying an alcohol use disorder were eliminated. A 5-item, 11-point scale was derived (RUFT-Cut acronym for the Riding, Unable to stop, Family/friends, Trouble and need to CUT down items). The scale was most efficient at a cut-off point of 3, at which 31 participants were correctly classified as having an alcohol use disorder (82% sensitivity) and 43 without an alcohol use disorder (78% specificity). For females, a sensitivity of 85% and specificity of 79% were obtained; whilst these values for males were 80% and 77% respectively. RUFT-Cut performed significantly better than the CAGE ($p<0.05$), but there were no significant differences between the scale and the other instruments for discriminating between subjects with or without an alcohol use disorder.

Knight *et al.* (2003) (Cross-sectional diagnostic evaluation, ++) USA

The purpose of this study by Knight *et al. (*2003) was to compare the validity of AUDIT, CAGE, POSIT and CRAFFT in screening among adolescents. Strong supportive evidence was obtained for the validity of AUDIT, POSIT, CRAFFT in an adolescent general outpatient clinic sample. CAGE was not considered to have sufficient sensitivity for use with adolescents. AUDIT was the only screening tool recommended for the identification of alcohol misuse (although the authors suggested that screening for all substance misuse may be more practical, given the association between alcohol and illegal drug misuse). The typically

recommended used cut-off points for use in adults should be lowered for use with adolescents.

Participants aged 14 to 18 yrs were recruited at a hospital-based adolescent clinic in the USA, with 538 in the final study sample. CAGE and CRAFFT tools were administered verbally by a research assistant. Participants were monitored while they self-completed AUDIT and POSIT. The Adolescent Diagnostic Interview was then undertaken. The sample was 68% female, 51% Black non-Hispanic.

A fair proportion (>40%) of subjects reported drinking in the last 12 months, 28% with alcohol-associated problems and 8% with alcohol abuse or dependence. More females drank than males (45% vs. 34%, $p<0.0001$). Screening properties for the detection of 'any problem' were as follows: AUDIT 89% sensitivity, 94% specificity; POSIT 85% sensitivity, 92% specificity; CAGE 61% sensitivity, 72% specificity; CRAFFT 85% sensitivity, 92% specificity. For the identification of 'any disorder', tools performed as follows: AUDIT 87% sensitivity, 95% specificity; POSIT 89% sensitivity, 96% specificity; CAGE 67% sensitivity, 86% specificity; CRAFFT 83% sensitivity, 93% specificity. Finally, for the detection of 'dependence', results were as follows: AUDIT 91% sensitivity, 99% specificity; POSIT 91% sensitivity, 98% specificity, CAGE 74% sensitivity, 99% specificity; CRAFFT 83% sensitivity, 95% specificity. The authors also reflected that, since POSIT requires 20-30 min to complete, this may be unfeasible, whilst CRAFFT only takes 1-2 min to perform.

Optimal thresholds identified for the use of the tools where there was 'any problem' were 3 for AUDIT, 2 for POSIT, 1 for CAGE and 2 for CRAFFT.

Kriston *et al.* (2008) (Systematic Review, ++)

Kriston *et al.* (2008) performed a systematic review and meta-analysis to assess the use of AUDIT and AUDIT-C in the identification of alcohol misuse in adults. The identified evidence was inconclusive, but suggested that the full version of AUDIT may be more effective than AUDIT-C in the identification of alcohol misuse.

Studies that administered both the full AUDIT and AUDIT-C in conjunction with a valid reference standard were included. Risky drinking was defined as consumption of alcohol above a recommended level or heavy binge drinking in the past 12 months. An alcohol use disorder was classed as fulfilling criteria for harmful drinking (clinically significant

impairments or consequences of alcohol consumption in the past 12 months as classified in the ICD), alcohol abuse (clinically significant impairments or consequences of alcohol consumption in the past 12 months as defined in the DSM) or alcohol dependence (fulfilment of 3 or more criteria describing a chronic maladaptive pattern of alcohol consumption in the past 12 months as defined by the ICD and DSM). Unhealthy alcohol use referred to the fulfilling of criteria for risky drinking or any alcohol use disorder.

Fourteen studies were identified, which were conducted in Europe (8 studies), the USA (5 studies), and China (1 study), with sample sizes ranging from 112 to 13,438 patients (median 609 subjects). Sex and age distributions were described as showing variation. Research was performed in primary care (8 studies), inpatient populations (2 studies) and general population samples (4 studies). The standardised threshold for the definition of risky drinking varied between 196 to 280 g of ethanol per week for men and between 98 and 169 g for women; heavy binge drinking ranged from 4 to 6 drinks per occasion for men and from 3 to 4 drinks for women. In all cases with only one exception, trained interviewers were used to perform reference standard interview procedures to determine quantity and frequency of alcohol consumption to determine risky drinking. Seven of the nine studies examining alcohol use disorders used the criteria of the DSM (3^{rd} revised or 4^{th} edition). Two studies were based on ICD diagnoses.

Five studies including a total of 8679 patients examined the use of AUDIT and AUDIT-C in detecting risky drinking in primary care. Threshold scores ranged from 4 to 8 for AUDIT and 3 to 5 for AUDIT-C. Five studies with a total of 4572 patients investigated the use of AUDIT and AUDIT-C in the identification of any alcohol use disorder, with threshold scores between 2 and 8 for AUDIT and 2 and 5 for AUDIT-C. Four studies with a total of 2580 patients focused on unhealthy alcohol use (risky drinking or any alcohol use disorder).

Threshold scores recommended in the included primary studies were higher for men (AUDIT 5 to 8; AUDIT-C 3 to 6) than women (AUDIT 2 to 6; AUDIT-C 2 to 5), which increased as the severity of the target alcohol condition increased. Two studies presented data for older people (with one study having a sample with a mean age above 65 yrs, and another stratified for age), using thresholds of 5 to 8 for AUDIT and 2 for AUDIT-C. Kriston *et al.,* stated that age did not affect the comparison of AUDIT and AUDIT-C.

No statistically significant differences were observed between the accuracy of AUDIT and AUDIT-C in the detection of risky drinking, alcohol use disorders or unhealthy alcohol use in primary care patients. Four studies on general population samples (total n=5600) were included. Evidence for this population suggested that AUDIT may be more effective than AUDIT-C in the detection of dependence and unhealthy alcohol use. Two studies included inpatients (n=345) and also indicated slightly better screening properties for AUDIT than AUDIT-C for the screening of any alcohol use disorder.

McCambridge & Thomas (2009) (Cross-sectional diagnostic evaluation, ++) UK

The purpose of this work by McCambridge & Thomas (2009) was to examine the performance of short forms of AUDIT in a web-based study of young drinkers.

167 young people aged 16 to 24 yrs who had consumed any alcohol within the preceding 7 days participated in the study based on completion of an online questionnaire including AUDIT items and other indicators of hazardous drinking. The study population was 70% female, 86% White, with a mean age of 20.3 yrs (SD=2.2 yrs). Gender variation was evident, with mean AUDIT score for males being 11.7 (SD=7.7) vs 9.1 (SD=5.5) for females. 62% of the population (103/167) were identified as being hazardous drinkers at a threshold of ≥ 8. Items 3, 4, 5 and 8 were found to be predictive of the majority of variance in total AUDIT scores. The authors observed that existing short forms of the AUDIT were not better at predicting total scores than other potential alternative combinations of questions and concluded that further validation of brief versions of AUDIT among young people is required.

McCusker *et al.* (2002) (Cross-sectional diagnostic evaluation, +) UK

The authors of this study (McCusker *et al.*, 2002) compared the effectiveness of CAGE and AUDIT questionnaires in screening general medical admissions for hazardous and harmful alcohol consumption. McCusker *et al.* found that AUDIT identified not only harmful drinkers identified by CAGE, but also hazardous drinkers. AUDIT was recommended for use in this population for early identification of alcohol misuse.

Medical admissions aged 17 yrs and over were recruited from the Chelsea and Westminster Hospital, London, UK. 103 patients were included, with an equal proportion of male (n=52) and female (n=51) subjects and a median age of 56 yrs (SD=23.9). The study sample was mainly White (90%, 93/103). Of the remaining 10 participants, 4 (4%) were Afro-Caribbean,

1 (1%) was Black/UK, 1 (1%) was Chinese, 1 (1%) was Bangladeshi/UK and 1 (1%) was Pakistani. Hazardous alcohol consumption was defined as over 14 units/wk for women and over 21 units for men, with harmful drinking resulting in negative physical and psychological consequences. The performances of AUDIT and CAGE in detecting hazardous and harmful alcohol consumption in this population were compared.

Of the 103 included patients, 36% were identified by AUDIT as drinking hazardously or harmfully, and 22% were identified by CAGE. All CAGE cases were also AUDIT cases. AUDIT cases (hazardous or harmful drinkers) made up 36% (37/103) of participants. 48% of males were cases, vs 24% of females, yielding a male to female ratio of 2:1 (P=0.013). The mean age of cases was 57 yrs (SD=22.7). Cases were not younger than non-cases (mean age 56 yrs, SD=24.8). AUDIT cases were more likely to be White than other ethnic groups (n=35 vs n=1, P=0.052). Twenty two percent of participants were identified as CAGE cases. CAGE cases were younger than non-cases (mean age 48 (SD=20.0) vs 58 (SD=24.7 yrs) (P=0.046)). Significantly fewer cases were identified using CAGE than AUDIT (22% and 36% respectively, P<0.0001). As would be expected, all CAGE cases were also AUDIT cases. Twenty two (61%) AUDIT cases were also CAGE cases. The authors favoured the use of AUDIT over CAGE in this population.

Miles *et al.* (2001) (Cross-sectional diagnostic evaluation, ++) UK

The purpose of this study by Miles *et al.* (2001) was to assess the clinical effectiveness of the 5-item AUDIT in identifying hazardous drinking among young people.

The study population comprised 393 young people aged between 16 and 19 yrs at 2 colleges in London, UK. The group was 40% male and had a mean age of 17.0 yrs (range 16 to 19 yrs). The effectiveness of the 5-item AUDIT in detecting hazardous drinking was evaluated in this group. This version had been previously validated and contains items on the amount and frequency as well as problems caused by alcohol. Questions 1-2 measure hazardous use, questions 3-4 measure dependence and question 5 measures whether use is harmful. A cut-off of 5 or more was used to indicate hazardous consumption. Participants self-completed a questionnaire recording the 5-item AUDIT, patterns of alcohol consumption, alcohol-related consequences and perceptions of associated health risk. Measures of self-reported consumption included those in the Maudsley Addiction Profile, numbers of days used in the past month, and number of units consumed on a typical day, as well as frequency of use (eg.

monthly, weekly or daily), age first used alcohol and approximate number of occasions ever used alcohol.

Over 90% of the study sample reported drinking alcohol regularly, with common excessive weekend use and related physical, psychological and social consequences. A total of 357 (90.8%) had ever consumed alcohol (missing n=8). The average age of first alcohol use was 12.9 yrs (males 13.0 yrs, SD=2.7, range 3-17, females 12.9 yrs, SD=2.7, range 1-18). The average number of days on which alcohol was consumed in the past month was 5.5 days. Fifty seven subjects reported drinking in excess of UK recommended limits, with 29 males (18.4% of males) drinking more than 21 units a week and 28 females (12.0% of females) drinking more than 14 units a week. The average score obtained on the 5-item AUDIT was 3.7 (SD=2.9, range 0-16), with a significant gender difference observed ($p<0.05$), with males scoring 4.2 (SD=3.4, range 0-16) and females scoring 3.5 (SD=2.5, range 0-13). Nearly one third of subjects (125, 31.8%) reported scores than indicated hazardous levels of drinking (5 and above): 54 males (34.2% of males) and 71 females (30.2% of females). However, the majority did not perceive their consumption to carry associated health risks, viewing their use to be 'light' (44.8%) and unproblematic (79.1%). Only 1 in 10 of those individuals who were drinking at 'hazardous' levels recognised their use to be problematic. The 5-item AUDIT was found to have predictive validity, reflecting self-reported alcohol consumption, perception of associate health risk and hazardous consequences among young people.

O'Connell *et al.* (2004) (Systematic review, +)

O'Connell *et al.* (2004) performed a systematic review of the performance of self-report alcohol screening tools in the elderly.

The majority of identified studies were from the USA, with a considerable proportion being conducted in Veterans Administrations settings. The properties of CAGE, MAST, AUDIT, ARPS and shARPS were described.

Thirteen studies included the CAGE questionnaire, of which 7 were conducted in community dwelling and outpatient populations, 2 in inpatients, 3 in patients with psychiatric illness, and 1 in a nursing home sample. The ages of the populations ranged from 50 yrs and over to a mean of 80.63 yrs. Sensitivity and specificity values varied widely between studies. The sensitivity of CAGE was low in psychiatric populations (38.9% for problem drinking at a cut-off of 1, Philpot *et al.*, 2003) and emergency admissions to hospital (13% and 98% for alcohol dependence at a cut-off of 2 in emergency admissions to hospital, Luttrell *et al.*, 1997).

Good screening properties for MAST were described, with a sensitivity of 91.4% and specificity of 83.9% in a population with a high prevalence of alcohol abuse and dependence.

AUDIT was reported to be relatively insensitive in a number of studies (33% to 79%), but with good specificity (86% to 100%) for alcohol misuse. AUDIT-5 was shown to perform more effectively than AUDIT and CAGE in community dwelling older people referred to a psychiatry service (Philpot *et al.,* 2003).

ARPS and shARPS were found to have high sensitivity (93% and 91%) and only moderate specificity (66% for each tool) among internal medicine clinic patients (Moore *et al.*, 2002b).

The authors concluded by emphasising the necessity for the consideration of ease of use and patient acceptability alongside screening properties in the use of tools in elderly populations.

Reinert & Allen (2007) (Literature review)

Reinert & Allen (2007) conducted an informative literature review, in which the research findings on AUDIT were updated. The identified evidence supported the use of AUDIT in the screening of alcohol use disorders in a range of different settings and populations.

For inclusion in further discussion, primary studies pertained to a diagnosis of a recent alcohol problem using a standardised measure, use of an English language version of AUDIT and use of ≥8 as a cut-off score.

The evidence supported the validity of the English version of AUDIT in screening for alcohol dependence as well as less severe alcohol problems. However, the authors stated that the cut-off points used or the effective identification of hazardous drinking as well as dependence or harmful use in women needed to be lowered from the typically recommended threshold of 8 points. AUDIT-C appeared to perform approximately equally as well as the full AUDIT in accuracy. The psychometric properties of AUDIT (eg. test-retest reliability and internal consistency) were also relatively good.

AUDIT was found to have a high degree of internal consistency over a broad range of samples and settings. The review authors examined 18 studies published since 2002 and found a median reliability coefficient of 0.83 (range 0.75 to 0.97). The test-retest values of 0.70 to 0.89 observed at a cut-off of 8 indicated substantial temporal agreement. Evidence

from Carey *et al.* supported the stance that first 3 AUDIT questions can be employed as stand-alone as AUDIT-C.

Performance of AUDIT in subgroups

An earlier literature review by the same authors indicated that using a cut-off of 8 consistently gave lower sensitivities and higher specificities for women than men. The authors suggested that this cut-off should be lowered among women. Bradley *et al.* (2003) found that among female Veterans Affairs patients, the use of a cut-off as low as 3 gave a sensitivity of 77% and specificity of 79% for alcohol abuse or alcohol dependence and that using a cut-off of 2 may be more appropriate for the detection of hazardous drinking (sensitivity 87%, specificity 71%). Cook *et al.* found AUDIT to perform slightly more effectively among Whites than Black subjects in a population made up of young adults. The performance of AUDIT was similarly weaker among Black subjects in some studies (Cherpitel, 1998; Cherpitel, 2003; Cherpitel, 1995); whilst, in others, AUDIT was equally effective among Black and White patients (Cherpitel, 1997) or perhaps even slightly more accurate among Black subjects in the identification of harmful use (Cherpitel, 1995). In their last review, the authors reported one study of AUDIT in adolescents (Chung, 2000), in which 3 items in AUDIT were modified in order to make the tool more relevant for younger people and found that, at a cut-off of 4, sensitivity was 94% and specificity was 80%. Additional work by Knight *et al.* assessed the use of AUDIT in a sample of 14 to 18 yr old patients in a hospital-based clinic and found a cut-off of 2 to be optimal in detecting any alcohol problem (sensitivity 88%, specificity 81%) and that 3 points could be used as a cut-off for detecting abuse or dependence, with resulting sensitivities of 88% and 100% and specificities of 77% and 73% respectively. Current evidence supports the use of AUDIT in individuals with severe and persistent psychiatric disorders. Carey *et al* demonstrated that AUDIT distinguished those with a primary diagnosis of alcohol disorder from those with primary psychiatric diagnoses among psychiatric patients in India suffering from severe chronic disorders. Against a criterion of a single-item clinical-rated index of alcohol use disorder, O'Hare reported a sensitivity of 71% and a specificity of 81% at a cut-off of ≥8.

Screening for hazardous drinking

Nearly all identified studies recommended the use of a cut-off below 8 to screen for alcohol problems of lower intensity than alcohol dependence. Three studies were conducted in primary care or general practice (Dybek *et al.*, Gache *et al.*, Gual *et al.*). Each of these studies determined that the optimal cut-off for use among women for hazardous and harmful alcohol use was≥5. Sensitivities ranged from 73% to 96% and specificities from 88% to 96%.

Recommended cut-offs for the detection of hazardous drinking among men ranged from 5 to 7. In a general population sample, Rumpf *et al.* recommended the use of a cutoff of 5 for identifying at-risk drinkers (sensitivity 77%, specificity 80%). A cut-off of 5 was also found to be optimal for identifying high-risk drinkers among college students in Nigeria (Adewuya *et al.*), with a sensitivity of 94% and specificity of 92%. The slightly higher cutoff of 6 was suggested by Kokotailo *et al.* in identifying high risk drinking in US college students. In a study based in an emergency department (Neumann *et al.*), it was recommended that a cutoff of 8 should be used among men (sensitivity 75%, specificity 84%) for identifying any alcohol use disorder), but that the cut-off for women should be lowered to 5 (sensitivity 84%, specificity 81%).

Abbreviated versions of AUDIT

AUDIT-PC was found to perform comparably to the full AUDIT in detecting hazardous drinkers in primary care (Gomez *et al.*) and among elderly psychiatric inpatients (Philpot *et al.*). In identifying hazardous drinkers, AUDIT-3 had a low sensitivity of 51% but a specificity of 100% at a cutoff of 1 (Gordon *et al.*). However, Gomez *et al.* found that, in identifying binge drinkers in highly educated employees, AUDIT-3 was more accurate (sensitivity 73%, specificity 93%) than the full AUDIT (sensitivity 35%, specificity 98%) or CAGE (sensitivity 67%, specificity 84%).

The sensitivities of AUDIT-C were described as being higher for the detection of dependence than lower intensity problems. The review authors recommended the use of a cut-off of 4 for identifying hazardous drinking among men and that a cut-off of 5 should be used to identify individuals with any alcohol use disorder.

Two studies identified by the review authors evaluated the performance of the Fast Alcohol Screening Test (FAST) questionnaire for the identification of alcohol problems (Hodgson *et al.*, 2002; 2003). FAST was described as being a 4-item scale, derived from item 3 (modified for men by increasing number of drinks on one occasion to 8) as well as items 5, 8 and 10 from AUDIT. Two scoring methods exist for this tool. Reinert & Allen quoted the sensitivities and specificities of FAST at a reported cut-off of ≥ 1. FAST was found to have a sensitivity of 91% and a specificity of 95% in males and females in a primary care setting in the UK (Hodgson *et al.*, 2002). FAST used at this same threshold but among males and females in a dental hospital setting in the UK demonstrated a sensitivity of 97% and a specificity of 91% in the detection of alcohol problems. Hodgson *et al.* (2003) observed that FAST also displayed good screening properties in the identification of alcohol problems

among males and females presenting to an accident and emergency care setting in the UK, with a sensitivity of 93% and a specificity of 88%. In both studies by Hodgson *et al.,* the diagnostic measure used was a positive result (≥8) for an alcohol problem on the full AUDIT scale, rather than an independent formal diagnosis. Gomez *et al.* (2005) tested a modified version of FAST (maintaining the wording of item 3 for both men and women) and found that it performed less well (having a sensitivity of 80%, specificity of 94% and an AuROC of 0.93) at a cut-off of ≥3) than either AUDIT-C or AUDIT-PC among males and females at a primary care setting in Spain.

Rist *et al.* (2009) (Secondary analysis of cross-sectional data) Germany

The study by Rist *et al.* (2009) involved the secondary analysis of AUDIT data from a cross-section of 6529 patients of 26 general practitioners in an urban area of Germany in order to explore the structure of the questionnaire and function of items. No recommended quality assessment checklist was available for use in this context.

The authors concluded that the AUDIT items fall into 3 separate domains: consumption, harmful and dependent use and that there was a potential for loss of information in using shorter versions of AUDIT comprising only the AUDIT consumption items.

Rodríguez-Martos & Santamarina (2007) (Cross-sectional diagnostic evaluation, +) Spain

Rodriguez-Martos & Santamarina (2007) evaluated the performance of AUDIT-C in a trauma emergency department. AUDIT-C was found to be appropriate for use in this setting.

The accuracy of AUDIT-C was assessed in a sample of 120 traffic casualties (78% male, media age 27 yrs, inter-quartile range 22 to 34) at an urban emergency room in Spain, with (67%) and without (33%) a positive blood alcohol level (0.2 g/l and over). The full version of AUDIT was used as a gold standard (sensitivity 80% and specificity of 90% for cut-off scores of ≥8 for men and ≥6 for women). 36% of screening patients had a positive score on the full AUDIT, with a median value of 5 (inter-quartile range 3 to 9). AUDIT-C mean score was 4.08 (4.65 in males and 2.04 in females), with a median of 4.00. Optimal thresholds were defined as ≥ 5 for men (76% sensitivity, 73% specificity, PPV 66%, NPV 82%) and ≥4 for women (sensitivity 100%, specificity 95%, PPV 83%, NPV 52%) for the detection of hazardous drinking. AUDIT-C had an AuROC of 0.861 in men and 0.990 in women.

Seppä *et al.* (1998) (Cross-sectional diagnostic evaluation, +) Finland

The aim of this study (Seppä *et al.*, 1998) was to test the effectiveness of the Five-shot questionnaire in screening for heavy drinking among middle-aged men. The evidence showed that the developed questionnaire, Five-shot, is effective in detecting heavy drinking in this population.

40 year old men in Tampere, Finland were invited to attend health screening in primary care. Participating patients (n=817) completed the Five-shot and CAGE questionnaires. The Five-shot questionnaire consists of a combination of 2 questions from AUDIT (relating to consumption) and 3 from CAGE (equivalent to CAGE questions 2, 3 and 4). Subjects self-completed their questionnaires during an interview with a nurse and were asked to estimate their mean weekly alcohol consumption during the previous month. Subjects were categorised into 2 groups according to self-reported consumption of alcohol: moderate drinkers and heavy drinkers. The moderately drinking group contained 557 subjects who reported consuming <140 g/wk of alcohol; whilst the heavy drinkers group contained 70 subjects who reported consuming 280g/wk or over.

Using CAGE, an acceptable effectiveness could not be obtained in this population. Using Five-shot with a cut-off score of ≥2, specificity was 87% but sensitivity was low at 47%. A combination of high sensitivity and specificity was obtained using Five-shot at a cut-off of ≥2.5, giving a sensitivity of 96% and a specificity of 76%. Good properties were also observed at a cut-off of ≥3 (sensitivity of 77% and specificity of 83%). Five-shot therefore appears to be an effective means of identifying heavy drinking in this population group.

Soderstrom *et al.* (1997) (Cross-sectional diagnostic evaluation, ++) USA

Soderstrom *et al.* (1997) assessed the accuracy of questionnaires in screening for lifetime alcohol dependence in trauma centre patients. CAGE was found to be most effective in identifying alcohol dependence in this group.

AUDIT, CAGE and BMAST were evaluated against diagnoses of alcohol abuse and dependence made according to DSM-III-R criteria (with diagnosis defined as current or not current). 1118 patients were studied at a trauma centre in the USA. Eligibility criteria included age of 18 yrs or over, admission directly from injury scene with a length of stay of 2 days or more, with intact cognitive abilities. Patients were excluded if participation was considered to be detrimental to clinical course. Interviewers (including a social worker, who conducted most interviews, a nurse and two psychologists) administered the diagnostic

interview and screening tools. The interviewed sample was 72.1% male (mean age of 35.5 yrs) and 27.9% female (mean age 42.3 yrs).

Of the 1118 patients studied, lifetime alcohol dependence was diagnosed by in 397 subjects (35.5%) and alcohol abuse was diagnosed in 90 (8.1%) others. An approximate 4:1 ratio of dependence to abuse observed in men (81%) and women (83%), those aged 21 to 59 yrs (83%), whites (81%) and non-whites (83%) and victims of unintentional (79%) and intentional (86%) trauma. As most diagnoses were of dependence, further analysis confined to that diagnosis.

CAGE was found to be the most efficient predictor of lifetime alcohol dependence. Of the 3 questionnaires, CAGE had the largest AuROC for identification of lifetime alcohol dependence (93.0, SE=0.9, P<0.003 vs AUDIT) and AUDIT (89.8, SE=1.0) had a significantly larger AuROC than B-MAST (84.9, SE=1.5) (P<0.001). Compared with AUDIT and B-MAST, CAGE also had the highest sensitivity (84%), specificity (90%), PPV (0.82) and NPV (0.91) at the standard cut-off point (ie. 2). The optimal threshold for AUDIT was identified as being ≥9 (1 more than standard score) (73%, 89%, 0.80, 0.86). Accordingly, the optimal cutoff for B-MAST was found to be 5 (1 unit less than standard score) (80%, 85%, 0.74, 0.89). CAGE was also the most effective test in both men (sensitivity 84%, specificity 87%) and women (80%, 96%).

Tuunanen *et al.* (2007) (Cross-sectional diagnostic evaluation, ++) Finland

The authors of this work (Tuunanen *et al.*, 2007) evaluated the identification of binge drinking among middle-aged men using AUDIT, AUDIT-C and AUDIT-3 in primary care. The full version of AUDIT and short variations were found to be appropriate for use in this population.

All 45 yr old men were invited for a health check-up in Tampere, Finland. Participants completed an interview to assess drinking behaviour. Self-reported drinking data were available for 555 subjects. Abstainers were excluded. Based on the outcomes of their interview, patients were grouped according to the intensity of their drinking and frequency of bingeing as follows:

a) non-binging moderate drinkers (N-BMD) (n=352, 63.5%) (those who drank less than 280g absolute alcohol per week and those who binged (drank 6 or more drinks at one sitting) less than once a week.

b) binging moderate drinkers (BMD) (n=130, 23.5%) (who drank less than 280 g absolute alcohol per week and who binged (drank 6 or more drinks in 1 sitting) at least once a week)

c) non-binging heavy drinkers (N-BHD) (n=10, 1.6%) (who drank at least 280 g absolute alcohol per week and who binged (drank 6 or more drinks in 1 sitting) less than once a week)

d) binging heavy drinkers (BHD) (n=63) (who drank at least 280 g absolute alcohol per week and who binged (drank 6 or more drinks in 1 sitting) at least once a week)

The full version of AUDIT, AUDIT-C (first 3 AUDIT questions on consumption only), and AUDIT-3 (question 3 from AUDIT on binging frequency) were self-completed and evaluated against self-reported alcohol consumption determined during an interview with a nurse.

The full version of AUDIT was shown to be effective in identifying binging drinkers using a threshold of ≥8 or ≥7. The optimal cut-off score for AUDIT-C was ≥6 and ≥2 and in the case of AUDIT-3.

The AuROC among all risky drinkers (binging moderate and binging heavy and non-binging heavy drinkers) for AUDIT was found to be 0.824 (95%CI 0.789 to 0.859), for AUDIT-C 0.829 (95%CI 0.795 to 0.864), and for AUDIT-3 0.779 (95%CI 0.739 to 0.818). AuROC values among binging moderate drinkers for AUDIT were 0.809 (95%CI 0.769 to 0.848), for AUDIT-C 0.816 (95%CI 0.777 to 0.854) and for AUDIT-3 0.756 (95%CI 0.712 to 0.8000). Use of the AUDIT cut-offs of ≥8 for bingeing moderate drinkers resulted in a sensitivity of 60% and specificity 81%; whilst the use of a threshold of ≥7 or more gave a sensitivity of 73% and specificity of 76% in this group. The AUDIT-C cut-off ≥6 generated a sensitivity of 70% and specificity of 77%. The use of an AUDIT-3 cut-off of ≥2 gave similar results of a sensitivity of 70% and specificity of 73%. Among binging heavy drinkers, the AuROC value for AUDIT was 0.814 (95%CI 0.770 to 0.859), for AUDIT-C 0.817 (95%CI 0.773 to 0.861) and for AUDIT-3 0.767 (95%CI 0.718 to 0.816). Using the typically recommended AUDIT cut-off of 8 or more gave 65% sensitivity and 81% specificity; 7 or more led to a sensitivity of 72% and specificity of 76%. The AUDIT-C threshold of ≥6 and over resulted in sensitivity of 72% and specificity of 77%. As previously the use of an AUDIT-3 cut-off of ≥2 and over gave similar values of a sensitivity of 72% and 73% specificity. The sensitivity and specificity of AUDIT and the derived short forms (AUDIT-C and AUDIT-3) in the identification of all risky drinkers (binging moderate drinkers, non-binging heavy drinkers, and binging heavy drinkers) was investigated. Both cutoffs of ≥7 and ≥8 for the full AUDIT were relatively

effective in identifying all risky drinkers and binging moderate drinkers and binging heavy drinkers separately. Thus, the short forms of AUDIT were seen to perform effectively in comparison with the full version of AUDIT. Among all risky drinkers and separately among binging moderate drinkers and binging heavy drinkers, AUDIT-C was as effective as the full AUDIT. AUDIT-3 showed only a slightly poorer performance than the full AUDIT and AUDIT-C.

CAGE and MAST

Bisson & Milford-Ward (1994) (Cross-sectional diagnostic evaluation, ++) UK

Bisson & Milford-Ward (1994) investigated the performance of CAGE, MAST, Severity of Alcohol Dependence Questionnaire and laboratory markers including CDT, GGT and MCV.

The study sample was made up of male soldiers under the age of 30 yrs (n=58) admitted to an alcohol treatment unit in London, UK. All subjects had a primary diagnosis of alcohol misuse or dependence. Gender-matched controls (n=51) confirmed that they had consumed less that 30g of alcohol per day over the preceding 6 month period. The screening tests were administered and participants were interviewed to obtain a full drinking history. To control for the fact that a proportion of subject group had not been drinking heavily in week leading up to study, the subject group was redefined to include only those 35 subjects (60%) who had been drinking over 80g alcohol in the 3 weeks leading up to participation and had continued to drink at this level in week before study. The control group was as before.

CAGE (97%), MAST (100% sensitivity), and the Severity of Alcohol Dependence Questionnaire (77%) were observed to be more sensitive than the laboratory markers measured. Using standard thresholds, laboratory markers yielded low sensitivities, even among subjects who reported drinking over 80g alcohol daily for at least 3 weeks immediately prior to study. Of the alcohol markers, CDT was seen to be most sensitive (31%), followed by MCV (14%) and GGT (11%).

Dhalla & Kopec (2007) (Systematic review, +)

Dhalla & Kopec (2007) systematically reviewed the evidence published in English for the effectiveness of the CAGE questionnaire across different patient populations in the identification of alcohol-related problems. The evidence showed CAGE to be short, practical to use and easy to apply in clinical practice.

Reference standards used were the use of the Diagnostic Interview Schedule and the Composite International Diagnostic Interview (CIDI). Less commonly, some studies used self-report and the use of another screening questionnaire (eg. MAST) as criterion standard.

CAGE had high test-retest reliability (0.80 to 0.95) and adequate correlations (0.48 to 0.70) with other screening instruments. CAGE was shown to be a valid tool for the identification of alcohol abuse and dependence in medical and surgical inpatients, ambulatory medical patients and psychiatric inpatients (average sensitivity 71%, specificity 90%). Optimal cut-offs were ≥1 or ≥2. Performance in primary care patients varied, and CAGE did not appear to perform well in white women, prenatal women and college students. The authors also stated that CAGE was not an appropriate screening test for less severe forms of drinking.

Forsberg *et al.* (2002) (Cross-sectional diagnostic evaluation, ++) Sweden

This cross-sectional diagnostic study was performed by Forsberg *et al.* (2002) in order to compare measures for screening of binge drinking among patients on an emergency surgical ward. The impact of age and gender on the validity of the tested tools was also taken into account. All alcohol biomarkers tested showed low sensitivity to binge drinking among women. Mm-MAST alone and CAGE and CDT combined were sensitive to binge drinking in men aged 30-73 yrs. The 3 questionnaires tested combined had a sensitivity of 82% for identifying binge drinking among men aged 30-73 yrs.

One hundred and forty nine emergency surgical patients aged 16 to 73 yrs participated in the study undertaken at Danderyd Hospital, Stockholm, Sweden. The intake diagnoses of patients were grouped in 11 categories as follows: appendicitis (32.2%), abdominal observation (19.5%), trauma (12.1%), diverticulitis (7.4%), ulcer/vomiting (6.0%), bile/icterus (5.4%), GI bleeding (5.4%), pancreatitis (2.7%), ileus/subileus (2.7%), anal (2.0%) and a rest category (4.7%). Subjects completed 3 questionnaires: the Malmö modification of the brief Mast (Mm-MAST), CAGE and Trauma Scale. In addition, CDT and GGT were measured. These tools were assessed both separately and as used in combination. Questionnaires were completed in interviews with nurses (16%) and psychologists (84%). The Timeline Follow Back method was used to determine alcohol consumption for the preceding 14 day period, with the addition of questions relating to binge drinking. Binge drinking was defined as 6 standard drinks for men and 3 for women. To be classed as a binge drinker, a subject should have been binge drinking on 2 or more occasions per month over the previous 12 months and secondly, a person should have also consumed at least 1.65/1.10g (men/women) of alcohol per kg of bodyweight on some occasion during that period. Abstainers were defined according to

having had no use of alcoholic beverages during last 12 month period. The cut-off level for binge drinking was 2 or more positive answers in each of the questionnaires.

Of 149 patients, 50 (33.6%) reported binge drinking according to the criterion standard. Binge drinking was reported by 42% of male patients aged 16-29 yrs; 66% of female patients aged 16-29 yrs; 27% of male patients aged 30-73 yrs; and 16% of female patients aged 30-73 yrs. Among men aged 30-73 yrs, Mm-MAST had a very high sensitivity (92%). Relatively good sensitivities were observed for both CAGE (75%) and CDT (75%), which improved when they were combined (83%). No combinations further improved the high sensitivity of Mm-MAST. Trauma Scale and GGT both had low sensitivities (42% and 17%), which were not improved when combined with other tools. Among men aged 16-29 yrs, CAGE had sensitivity of 27% and the Trauma Scale of 37%. However, when combined with Mm-MAST, the 3 questionnaires obtained higher sensitivity (82%). Both CDT and GGT had sensitivities of only 9% in this group. For women, no tools or combinations were found that had a sensitivity to binge drinking of 70% or above.

Wetterling *et al.* (1998) (Cross-sectional diagnostic evaluation, +) Germany

The objective of the research by Wetterling *et al.* (1998) was to evaluate CAGE and MAST, with the laboratory markers CDT, GGT, alanine aminotransferase, aspartate aminotransferase and MCV. The authors concluded that low sensitivity was a barrier to the use of questionnaires and laboratory markers in screening for alcoholism in general hospitals.

Patients aged less than 65 yrs (n=204; 74 women (mean age = 43.7 yrs, SD = 15.1), 130 men (mean age = 43.1 yrs, SD = 15.1 yrs) admitted to the internal or surgical departments of a general hospital in Germany participated in the study. Reported alcohol consumption or an ICD-10 diagnosis was used as a reference standard. Useful self-reports of alcohol consumption were obtained from 174 patients. History of alcohol consumption obtained by structured questionnaire. Subjects consuming more than 350g/wk (men) or 225 g/wk (women) and at least twice in a month more than 100g (men) or 65g (women) alcohol/day were diagnosed with 'alcohol problems.' These patients and those with positive results in a screening questionnaire or needing withdrawal medication were interviewed using section 11 of the Schedules for Clinical Assessment in Neuropsychiatry (SCAN:WHO) to provide diagnoses of alcohol dependence or abuse according to ICD-10 or DSM-III-R.

According to ICD-10 criteria, 50 subjects were classed as alcohol dependent and 5 were alcohol abusers. 55 cases were of same age as rest of sample (43.9 SD=13.4 yrs vs. 43.1 SD=15.6 yrs). Using the recommended cut-offs for CAGE (≥2) and MAST (≥5), 30 (14.7%)

and 28 (13.7%) subjects respectively were identified as 'problem drinkers.' Daily alcohol consumption during 4 weeks before admission was estimated by self-report. The mean alcohol intake/day was 22.6g (SD=60.3). Men consumed more alcohol (33.7 SD=74.6 g/day) than women (11.1 SD=27.1 g/day) ($p<0.001$). According to the WHO definition (Bohn *et al.* 1995), 22 males (19.8%) and 4 women (6.3%) showed harmful level of alcohol consumption ($p<0.05$).

According to self-reported recent harmful alcohol consumption (women >225 g/wk, men >350 g/wk), sensitivities and PPV values were relatively low for all screening tools (sensitivity <60% and PPV <50%). Using ICD-10 diagnosis as standard, CAGE and MAST showed high specificity (>95%) and PPV (>90%). Sensitivities of CAGE, MAST and alcohol markers were relatively low (<60%), both for ICD-10 diagnosis and for harmful alcohol consumption as reference standard. CDT displayed the best PPV of all alcohol markers (60%). However, the sensitivity of CAGE, MAST and alcohol markers for ICD-10 diagnosis was relatively poor (<60%).

Paddington Alcohol Test

Huntley *et al.* (2001) (Before and after study, ++) UK

In this study, Huntley *et al.* (2001) assessed the feasibility of use of the Paddington Alcohol Test in emergency departments.

The minimum criteria for a patient to be PAT positive were as follows: a) drank more than 8 units/day (male) or 6 units/day (female) or b) if attendance related to alcohol. Patients were PAT negative if they replied in the negative to the units/day question and further denied attendance related to alcohol.

A limitation of the original PAT questionnaire was the large number (26) of PAT possible complaints. The authors judged that these could be grouped into a smaller number of sections. Of 139 PAT-positive patients, 77% (n=107) were accounted for by a set of top 10 complaints/groupings. The 10 most common PAT positive categories, accounting for 77% of all PAT positive complaints were fall>collapse (including fit, blackout)> head injury (including facial injury) > assault (including domestic violence and other) > non-specific GI problem > 'unwell' > psychiatric (including depression, overdose, confusion) > cardiac (including chest pain, palpitations > self-neglect > repeat attendance. PAT was therefore simplified to further aid its use

Patton *et al.* (2002) (Short communication) UK

In this short communication, Patton *et al.* (2002) reported that the PAT was a rapid and reliable method for identifying early onset hazardous drinkers in an emergency department in the UK (presenting a sensitivity of 70%, and specificity of 85% in adults aged between 16 and 75 yrs) (screening properties as reported by Hodgson *et al.,* 2003). Time to administer was 42s (SD=31.9). The original paper (Hodgson *et al.,* 2003) also presented evidence that (compared with a reference standard of the full AUDIT), FAST had higher sensitivity (93%) and specificity (88%) than PAT (70%; 85%) and CAGE (40%; 98%)). FAST was also quickest to administer (12.52s, SD=14.2).

Patton *et al.* (2003) (Before and after study, ++) UK

This work by Patton *et al.* (2003) was performed to demonstrate the positive impact of health consequences feedback on the willingness of patients to accept advice relating to their alcohol consumption.

281 PAT-positive patients aged 18 yrs and over were included in the study at an accident and emergency department in London, UK. Male patients were PAT positive if they drank 8 or more units on one or more occasions per week, with the limit for women being 6 units. If a patient stated that their visit was alcohol-related they were also classed as PAT positive. Patients were predominantly male (77%), with an average age of 44.4 yrs (as stated) and a mean level of 21.8 units of alcohol consumed in a single session. No significant differences between control and feedback intervals on these variables were observed. Patients identified as hazardous drinkers were offered advice about alcohol consumption. After a control period, Senior House Officers received a brief training session to emphasise the importance of stressing the link between screening positive for alcohol misuse and the potential health consequences for the patient by relaying to the patient 'you are drinking at a level which is harmful to your health' and offering advice. In the experimental phase, patients were given feedback as to the health consequences.

The introduction of health consequences feedback resulted in a 23% increase in the proportion of patients who were willing to accept brief advice. On average, 64% of patients accepted advice during feedback period, compared with 52.1% during the control period ($p<0.05$, 95%CI 0.23 to 23.5) (22.8% increase). The authors estimated that this increase could equate to an additional 350 patients per year in a typical emergency department accepting advice to reduce their alcohol consumption.

Patton *et al.* (2004) (Short communication) UK

The authors of this communication (Patton *et al.,* 2004), undertaken at an accident and emergency department in London, UK, presented PAT in a slightly modified form.

The latest version of PAT amended item 3 (frequency of heavy drinking episode) to include a monthly cut-off. Lengthening the timeframe over which alcohol consumption is measured allows detection of binge drinkers over this period, who may have otherwise have been missed. PAT was found to have a sensitivity of 79% and a specificity of 88% in the detection of alcohol misuse against AUDIT as a reference standard. PAT was described as concording fairly well with the AUDIT questionnaire, but could be administered in approximately one fifth of the time taken to complete AUDIT. PAT scoring of units was also described as being rapid and specific to UK. The time taken to complete PAT and AUDIT was assessed for a sub-sample of 47 participants and was found to be 20 seconds for PAT (SD=9.53) and 1 min 13 seconds for AUDIT (SD=27.6). The authors estimated that 5750 patients could be screened over 1 year. A Senior House Officer was estimated to cost £23 per hr, and therefore screening with PAT would be anticipated to add £735 to annual departmental costs, compared with £2682 for the use of AUDIT.

Smith *et al.* (1996) (Before and after study, ++) UK

The goal of this work by Smith *et al.* (1996) was to develop an effective and practical screening questionnaire for use by emergency department staff in the identification of alcohol misuse in adult patients presenting at emergency department and to integrate an alcohol health worker into the setting to deliver counselling to positively screened and referred patients.

Patients aged 16 yrs and over were included in the evaluation at St Mary's Hospital, London, UK. The results of 2 pilot studies led to the development of the final questionnaire: the 1 minute Paddington alcohol test (PAT). This tool was used for 12 months with the aim of identifying as many adult patients as possible for referral to the alcohol health worker. PAT was recommended for completion where there was suspicion of alcohol abuse (eg. falls, assaults, head injuries, GI problems, 'unwell', fits, blackouts, collapse, insomnia, sweating, palpitations, chest pain, gout, rashes, depression, overdoses and especially repeat attendance (eg with unexplained symptoms) or delayed attendance (as intoxicated at time of incident)). Three questions were included: 'What is the most you will drink in 1 day' (positive screen for 10 units for man and 6 for woman). If a positive response was given to the first question, patients were then asked, 'how often does this happen', and 'do you feel your current

attendance is related to alcohol?' and, following consent, were subsequently referred to the alcohol health worker.

The development and use of PAT resulted in a referral rate of 1 patient per 158 accident and emergency adult attendees, facilitating counselling rate of 1 patient per 263 adult attendees by the alcohol health worker. This counselling rate was constituted a 10-fold increase on the rate of 1 patient per 2610 adult attendees observed in a study undertaken during 1988-90. PAT was estimated by the majority of emergency department doctors (using self-timing) to take approximately 1 minute or less to complete) (excluding CAGE) for more than 50% of completed questionnaires. The 4 optional CAGE questions were completed in 74% of 306 PAT questionnaires for patients accepting referral. CAGE was positive (for 2 or more stems) in all but 8% of the total. Review of all completed PAT questionnaires showed that completion of the optional CAGE questions did not identify any patient who had not already been detected by first 3 questions of PAT.

Csipke *et al.* (2007) (Cross-sectional study, ++) UK

This study (Csipke *et al.*, 2007) was performed in order to assess the use of blood alcohol concentration (BAC) in the emergency department resuscitation room, by comparing it with a subsequent alcohol questionnaire and by surveying patients' attitudes to BAC testing.

Blood samples from all patients aged 16 years and over cared for in the resuscitation room of the emergency department at St Mary's Hospital, London were sent for BAC analysis. Patients admitted to a ward from the resuscitation room were followed up to apply the PAT and acceptability questionnaires. Data were obtained for 273 patients. The mean age of the sample was 62 yrs (SD=18.24) (58% male. 89% presented with medical complaints and 10.5% with surgical complaints). The PAT questionnaire (5 items) was considered to be positive in men drinking more than 8 units and women drinking more than 6 units in a single session, at least once a week, or anyone who believed their attendance was alcohol-related. Patients were grouped into those who had a BAC under or over 80mg/100ml.

The level of agreement between positive screening by questionnaire (positive PAT status) and a BAC of >80mg/100ml was low ($\kappa = 0.29$, 95%CI 0.12 to 0.46). Authors attributed this to the fact that each test was measuring different attributes of drinking (ie. PAT ongoing status of drinking vs BAC recent episode of drinking). The level of agreement between specific question 'is your attendance related to alcohol' and BAC >80mg/100ml was also low ($\kappa =$ 0.30 (95%CI 0.11 to 0.49). Patients were accepting of the use of BAC tests, but a small

minority were concerned over confidentiality. The authors concluded that the use of BAC testing complements later questionnaire screening to identify alcohol misuse in patients brought initially to the resuscitation room.

Substance Abuse Subtle Screening Inventory (SASSI)

The SASSI screening tool was first developed for use with adults in the 1980s, with an adolescent version published in 1990 following requests from professionals. Subsequent versions have been developed that include original and new items, tested on large samples of participants. The original SASSI was found to be 87% accurate in identifying the presence or absence of substance dependence.

SASSI-A2 is a more recent version consisting of 2 scales that measure frequency of experiences related to substance use, as well as a set of true-false questions. Nine scales (2 frequency and 7 true-false) combine to form decision rules that lead to identification of probability of substance abuse or substance dependence disorder (DSM-IV). In addition, face validity is checked using 3 scales that explore current and past use, student status and history of legal problems.

Definition of SASSI scales

Scales that differentiate between presence or absence of substance dependence or substance abuse:

- **FVA**: Face Valid Alcohol
- **FVOD**: Face Valid Other Drugs
- **FRISK**: Family-Friends Risk
- **ATT**: Attitudes
- **SYM**: Symptoms
- **OAT**: Obvious Attributes
- **SAT**: Subtle Attributes
- **SAM**: Supplemental Addiction Measure

Other scales:

- **DEF:** Defensiveness Scale – differentiates between substance dependent adolescents that respond under normal instructions and those that attempt to conceal evidence of substance misuse.
- **VAL:** Validity Check – differentiates between profiles in which the Decision Rule accurately or inaccurately corresponds to clinical assessments of the presence or absence of a diagnosis of substance misuse.

- **RAP:** Assesses whether or not responses are meaningful
- **SAS:** Secondary Classification Scale – differentiates between
  - people that do not have a substance use disorder
  - people that have a substance abuse disorder
  - people that have a substance dependence disorder

- **COR:** Correctional Scale – differentiates between people involved in the criminal justice system and those who are not.

Feldstein *et al.* (2007) (Literature review)

Feldstein *et al.* (2007) conducted a literature review of the evidence relating to the use of the Substance Abuse Subtle Screening Inventory (SASSI) screening instrument. Versions of this tool are available for use among adults and adolescents for the detection of substance abuse.

Limited electronic searches were made that identified 36 studies for inclusion. Ethnic minorities were found to be significantly more likely to be classified as 'high probability' of substance use disorder relative to Caucasians and to score higher on the DEF, RAP and COR scales. Studies suggest that SASSI scores are influenced by general distress and deviance; positive relationships with SASSI scales reported for conduct disorder, depression, social anxiety, general distress and traumatic histories, and suicidal ideation or attempts. This is particularly linked with the indirect scales. There were also significant but directionally inconsistent gender effects on scale scores and on the probability of scoring positive in 3 studies. One study found that learning disability and poverty were associated with higher overall scores.

Internal consistency of SASSI was measured using Chronbach's coefficient alpha (α); the original authors claimed that α ranged between 0.27 and 0.95, with highest values corresponding to the direct scales (FVOD, FVA, SYM), and 0.93 for the entire SASSI tool. Adult studies reviewed (n=5) support high internal consistency for direct scales though not as high as those originally reported. Lower internal consistency was found for subtle scales, with high variation across studies. No adolescent study reported internal consistency for the whole SASSI, though 2 studies reported values of 0.74 and 0.66 for their abbreviated versions.

Convergent validity was measured in comparison to other similar tools. Moderate to modest correlations (kappa = 0.34, 0.29) of the decision rule were found when compared to a

derivative of the MMPI in 3 studies. Sub-scales showed more modest correlations (r = 0.25-0.35) with other MMPI scales in one study. Convergence was high (kappa = 0.61, 0.49) with the 4-item CAGE, and with MAST (r=0.53, kappa = 0.52) in the same 2 studies. A correlation of r=0.43 with the Rutgers Alcohol Problem Index was found in one study.

SASSI was evaluated against the DSM-IV-TR. Sensitivity ranged from the low value of 33% in a college sample (n=495) to 87% in a corrections sample (n=1837) averaging 69.8% (weighted by N). SASSI detected approximately 7 of 10 cases with actual substance use disorder diagnoses on average. This rate is comparable to briefer face valid screening scales such as MAST and CAGE and slightly lower than AUDIT. One study found that MAST had a higher sensitivity, specificity and accuracy than the SASSI in detecting lifetime diagnosis of substance use disorder. The test manual reported that face-valid scales detected 79% of actual substance use disorders, increasing to 94% when subtle scales were added (84% detected by face-valid scales alone). Other studies estimate 87% and 89%. Several studies have reported that the direct scales perform as well as or better than the total SASSI. One study found that the indirect scales increase the rate of positive screens, though the accuracy of this estimate is unknown.

SASSI appeared to be able to detect substance use disorders regardless of perceived honesty in self-reporting. In the manual, of 839 cases only 10 (1.2%) were classified incorrectly as 'probable substance use disorder'. Independent studies (apart from 1 with a sample of brain-injured participants) failed to replicate this; the weighted mean specificity being 62%, indicating that 38% of those screening positive are incorrect on average. Contrary to the manual, the SASSI's false positive rate was reported to be higher than the false negative rate. (349 out of 625 or 56%).

No empirical evidence was identified to show that the SASSI is more sensitive, accurate or less susceptible to falsification than available simpler direct scales. There was evidence that the SASSI is prone to a high rate of false positives (56% average) which may be due to the focus on life-time diagnosis.

Lazowski *et al.* (1998) (Cross-sectional diagnostic evaluation, ++) USA

The objective of Lazowski *et al.* (1998) was to psychometrically assess the Substance Abuse Subtle Screening Inventory-3 (SASSI-3). The instrument was described as being accurate and valid, but needs to be assessed in other settings.

Participants were recruited via clinical centres and advertisements. The study population (n=1901) was drawn from across the USA from clinical settings (addiction centres, general psychiatric hospitals, a vocational rehabilitation programme, a sex-offender treatment programme); correctional centre; and the community via advertisements for participants with family history of alcohol abuse). Two sub-groups divided by random selection to include equal numbers of individuals that were criterion-positive for DSM-III-R or DSM-IV diagnosis and individuals that were criterion negative. One sub-group used to develop the tool and the other for cross-reference. The population was approximately 70% male, 32% employed, 72% substance dependent, 51% White, with a mean age of 35 yrs.

SASSI-3 was found to have a sensitivity of 96% and specificity of 93% for the identification of substance dependence. No outcome measures were reported for alcohol abuse alone.

Rogers *et al.* (1997) (Cross-sectional diagnostic evaluation, +) USA

Rogers *et al.* (1997) evaluated the screening properties of the SASSI-A instrument among dually-diagnosed youth offenders, with a focus on the impact of ethnicity on effectiveness. The study was indicative of the effectiveness of SASSI-A in detecting alcohol abuse in adolescents who openly acknowledge substance abuse, but that effectiveness may be lower in Hispanic American vs. White subjects.

The study population was made up of juvenile offenders with a dual diagnosis at a state psychiatric clinic in Texas, USA (n=317, 242 male, 75 female). The mean age of the sample was 15.4 yrs (SD=1.06). The median educational level reached was that of 8th Grade. 38.8% of the sample were White, 9.1% African American, 30.3% Hispanic American and 21.8% classed as other/missing data. Subjects were classed into 4 groups: non-users (n=19, alcohol only (n=25), drugs only (n=66) and alcohol-drugs (n=201).

Findings supported the hypothesis that variations would occur between different types of user on the FVA and FVOD scales. Regular alcohol users showed significantly higher elevation on the FVA scale than non-users and those who used drugs but not alcohol. Similar effects were shown with the FVOD scale, suggesting that these scales are effective at identifying these differences. There were few differences between user groups on the OAT and SAT scales, and on the DEF.

The tool was described as being 90.8% successful in identifying chemically dependent adolescents. Details of sensitivity and specificity were not explicit. For non-admitters (which

SASSI-A is designed to elucidate), the success rate was approximately 5% less for Hispanic Americans than Whites.

The authors conclude that it remains uncertain whether SASSI-A is sufficiently validated for clinical practice. The study suggests that for adolescent users, the tool is effective, though such use can be more easily detected using simpler measures such as MAST. For the classification of non-users, the authors are less convinced of the usefulness of SASSI-A, given the high rate of false positives. Usefulness for identifying use in non-admitters remains uncertain.

Stein *et al.* (2005) (Cross-sectional diagnostic evaluation, ++) USA

Stein *et al.* (2005) evaluated the use of SASSI-A in a juvenile correctional facility with focus on the presence of any age or ethnic-related biases.

A sample of 178 young people at a juvenile correctional facility in the USA (mean age of 17 yrs, SD=1.9, 92.1% male, 39.6% Hispanic, 19.5% Black and 40.9% White) participated in the study. Adolescents read the SASSI-A, and completed the written version in private. Clinical interview with a chemical dependence counsellor followed.

The mean frequency of alcohol use alone was 1.73 (SD 1.0), which equated to between once a month or less and more than once per month, but no more than twice per week. Correlations between frequency of use and relevant SASSI-A scales were non-significant. There was significant correlation between history of suicide ideation and the DEF scale ($p<0.0001$). There was no difference in this interaction between Black and White adolescents.

Classification rates for alcohol were as follows: sensitivity 84%; specificity 63%; positive predictive power 84%. There was no indication of age-related bias, but it was found that the SASSI-A operates differently for Whites as compared to Hispanics (differences in OAT scores predict higher or lower alcohol use for Hispanics, but not for Whites). ChemDep appeared to be a better predictor of alcohol use for Hispanics than for Blacks or Whites. The COR was not related to the continuous measure of crime, which was an unexpected finding given that the COR purports to measure recidivism.

For scales significantly related to their respective dependent variables, cut-off scores and classification rates were developed. Alcohol use less than once per month was defined as non-problematic for this purpose, whereas multiple times per month were considered more problematic. Optimal cut-off scores and classification rates were generally lower than those

suggested in the adolescent SASSI Manual, which may be due to differences between samples. The best rates for detecting problematic use (base rate = 70%) were found in an FVA raw scare of = or > 3, an OAT T-score of = or > 50, a SAT T-score of = or > 60, and a DEF2 raw score of = or > 8 (Miller 1990). These scores classified between 61% and 78% of adolescents correctly.

Authors concluded that the means and SDs of SASSI-A in this sample were comparable with those reported in the manual (Miller 1990). The scales correlated with relevant variables, supporting the construct validity of the tool in a correctional setting. The usefulness of COR may have increased in the SASSI-A2 version. OAT appears to be unrelated to alcohol use in Whites in this setting. It is difficult to make direct comparisons between these results and those in the SASSI manual due to the lack of clear sample descriptions in the manual.

SASQ

Canagasaby & Vinson, 2005 (Cross-sectional diagnostic evaluation, ++) USA

The study by Canagasaby *et al.* (2005) was performed in order to determine the effectiveness of quantity-frequency (QF) questions in screening for hazardous or harmful drinking.

Three groups were included as participants and were interviewed: i) patients presenting to emergency departments for care of an acute injury (n=1537); ii) or a medical illness (n=1151); and community controls interviewed by telephone (n=1112). Cases were recruited from patients presenting to care to one of three emergency departments in Columbia, Missouri, USA within 48 hrs of an acute injury. Patients were eligible if they were 18 yrs or over, English speaking, of intact cognition, not in police custody, or if the injury did not occur in a setting where access to alcohol was controlled (eg. nursing home). Research staff trained in the use of the structured interview were involved. Cases were matched with 2 separate groups of control participants by age, sex and rural vs urban status (with the same inclusion criteria applied), with one group made up of patients presenting to the same emergency departments for care of a medical illness; and a second group approached randomly by telephone. The first alcohol-related questions was a single alcohol screening question (SASQ) which asked ‘when was the last time you had more than X drinks in one day’ (defined as 4 for females and 5 for males, 1 drink = 14 g ethanol), with a positive screen indicated by a response relating to any time in the past 3 months. Patients were administered a calendar-based review of recent drinking and the alcohol questions from the diagnostic interview question relating to usual frequency and average quantity of consumption. The first question was ‘in the last yr, have you had 6 or more drinks?’ (with patients stating negative not being administered the following questions. The next question covered frequency of drinking, with

responses on a 5 point ordinal scale from 'less than once a month' or 'almost every day.' The third question related to the 'average' number of drinks per occasion. A QF measure was created by multiplying the usual frequency of drinking times average quantity. Hazardous drinking was classed as the consumption of >4 drinks per day or > 14 drinks per week among men (with values of 3 and 7 respectively among women) (NIAAA).

The AuROC values for the three samples combined were 0.81 (95%CI 0.79 to 0.82) for SASQ, 0.80 for a question about average frequency alone (95%CI 0.79 to 0.82) and 0.85 (95%CI 0.84 to 0.86) for the product of usual frequency times average quantity. The QF product and the question about average frequency were found to perform consistently across the 3 groups. Differences according to age and gender were described as minor. The performance of the screening questions in African American (n=330) and White subjects (n=3262) was assessed. Whilst the AuROCs for QF were almost identical (0.84 and 0.85 respectively) and were similarly so for the quantity question (0.80 and 0.81), values were different for SASQ, being 0.74 (95%CI 0.69 to 0.79) for African Americans and 0.81 (95%CI 0.80 to 0.83) for Caucasians.

Sensitivity and specificity values for SASQ (with a positive response for consuming stated number of drinks in 3 months) were 85% and 70% for men and 82% and 77% for women.

The authors suggested that, in practice, it may be appropriate to screen subjects first with a single question, such as SASQ, a single question about typical quantity or a question about frequency of heavy drinking (eg. AUDIT question 3).

TWEAK and T-ACE

Burd *et al.* (2003) (Cross-sectional study, +) USA

The use of the TWEAK questionnaire in screening for alcohol misuse in pregnancy was investigated by Burd *et al.* (2003).

Pregnant women <28 weeks gestation at risk from alcohol misuse were included as the population (n=1081) in this US-based study.

The mean TWEAK score obtained was 0.69 (SD=1.25, range 0-7). 253 women (23.4%) had a score of 2 or more. Of those identified, over half the women had drunk before, about a quarter were at risk, 6% reported drinking during the previous month, and 4% during this pregnancy. In logistic regression analysis, age, marital status, previous abortion and smoking were predictors of TWEAK score ($p<0.001$).

Chang *et al.* (1998) (Cross-sectional study, ++) USA

Chang *et al.* (1998) tested the effectiveness of T-ACE in an ethnically and socio-economically diverse sample at risk of alcohol misuse.

The study population was based in the USA. Pregnant women attending first pre-natal appointment were asked to complete a health and habits survey while waiting. The survey contained T-ACE and other lifestyle questions. Women beyond a gestational period of 28 weeks were not eligible.

Over half (55%) of the sample were T-ACE positive. 105 of a total of 350 women were risk drinkers as measured by AUDIT scores; these were more likely to be current drinkers (45.3% compared to 29.5%; p=0.004). 40% of T-ACE positive women and 14% of T-ACE negative women satisfied the DSM-III-R criteria for lifetime alcohol abuse ($p<0.001$). T-ACE was found to be the most sensitive screening tool for detecting lifetime alcohol diagnoses (88%), risk drinking (92%) and current drinking (89%), but was the least specific. AUDIT performed significantly better than either the T-ACE ($p<0.005$) or the SMAST ($p<0.005$) as a predictor of lifetime alcohol diagnoses, and current drinking (T-ACE $p<0.04$; SMAST $p>0.05$))

The T-ACE was described as being an efficient screen for potential risk drinking by pregnant women and is short and simple to score.

Dawson *et al.* (2001) (Cross-sectional study, ++) USA

The purpose of this US-based study by Dawson *et al.* (2001) was to evaluate TWEAK and alternative screening tools for predicting high-risk and moderate-risk drinking during pregnancy.

Screening was self-administered. Data for 404 subjects were analysed (mean age 26.6 yrs (SD=6.3), mean gestational age at time of interview 24 weeks (SD=11).

Almost a third (29.5%) of lifetime drinkers (23.5% of sample) reported drinking since they knew they were pregnant. The majority (70.5%) did not report any drinking since they knew they were pregnant and were classified low-risk. 21.1% met the criteria for moderate-risk drinking during pregnancy, whilst 8.4% were classified as high-risk. 30.4% had a TWEAK score of 2 or higher. TWEAK displayed a sensitivity of 70.6% in predicting high-risk drinking during pregnancy (at a threshold of 2 points). At a cut-off of 1, the sensitivity was

65.6% to predict any risk or moderate-risk (57.6%). Specificity was 73.2% for high-risk and 63.7% for any risk.

Russell *et al.* (1996) (Cross-sectional study, +) USA

Russell *et al.* (1996) undertook a study to investigate the efficacy of screening for risky drinking during pregnancy using TWEAK and T-ACE questionnaires, and to compare performances of screens in detecting risk drinking among obstetric patients.

The study sample was made up of disadvantaged African American obstetric patients (n=2717) in the USA. TWEAK contains 5 items, whilst T-ACE is made up of 4 items.

Periconceptional risk drinking was assessed using the Timeline Follow Back method. All tested instruments were effective in distinguishing risk drinkers from non-risk drinkers. TWEAK and T-ACE displayed optimal combinations of sensitivity and specificity at a cut-off point of 2. At every cut-off score, TWEAK was more sensitive than T-ACE. At threshold scores of 1 and 2, TWEAK and T-ACE were more sensitive to risk drinking than MAST or CAGE. However, at a threshold of 3, MAST was comparable. CAGE was not particularly sensitive at any cut-off score. The reported sensitivity of T-ACE alone was 67%, specificity 86%, with a positive predictive value of 33%. The sensitivity of T-ACE decreased when administered alone compared to alongside CAGE or MAST. However, the length of MAST was described as making the tool unfeasible to administer.

Clinical indicators

Santolaria *et al.* (1997) (Cross-sectional study, ++) Canary Islands

Santolaria *et al.* (1997) investigated physical signs and biological markers predictive of excessive alcohol consumption in apparently healthy people. No checklist is currently recommended within the NICE methods guide; therefore quality assessment was not possible.

The study sample was made up of 492 (232 males, 260 females) randomly selected inhabitants aged older than 15 yrs of a rural village in Tenerife. 65% of the sample consumed alcohol. 18.2% (34.1% males, 4.2% females) of the sample reported excessive alcohol intake (>80g/day and 40 g/day respectively). Men consumed 62.3 g/day (SD=4) alcohol, whilst women drank 8 g/day (SD=1). Variables associated with excessive alcohol consumption were assessed by logistic regression. Liver enlargement, parotid swelling, hoarseness, retches and tremor in the morning were shown to be independent predictors of excessive alcohol consumption.

Saunders & Conigrave (1990) (Literature review)

In their review, Saunders & Conigrave (1990) discussed the use of clinical examination findings in the identification of alcohol misuse.

The development of the Alcohol Clinical Index by Skinner *et al.* (1986) was described. The clinical signs included several from the Le Go grid used extensively in France for the screening of alcoholism, with further clinical indicators including tandem gait, deep knee bend, oedema of the soft palate, bruises, abrasions, trauma-related scars and cigarette burns. The use of clinical signs in screening for alcohol misuse was investigated in a WHO collaborative study reported by Saunders and Aasland (1987). The association between clinical signs and alcohol-related problems was not strong (r=0.2 to 0.4). A relationship appeared only to be present above alcohol consumption in excess of 80g/day. Clinical signs (with the exception of scars and bruises) were perceived to reflect prolonged and extensive daily drinking with advanced alcohol-related harm. The study found the 5 most discriminatory clinical signs indicative of alcohol misuse to be abnormal skin vascularisation, conjunctival infection, hand tremor, tongue tremor and soft hepatomegaly.

The review authors postulated that, whilst clinical indicators may not be appropriate as a formal screening tool, awareness of the clinical signs that may be associated with excessive drinking may aid the identification of alcohol-related harm.

Wahie & Lawrence (2006) (Case study) UK

Wahie & Lawrence (2006) described the cases of 3 patients who presented with a total of 4 episodes of inflammatory dermatosis associated with alcohol abuse. The rash was observed to have similar characteristic features in each case and was stated to be itchy, scaly and erythematous and typically located over the legs and groin before spreading across the body. The skin condition responded well to emollients and topical steroids but not to zinc replacement therapy. Long term remission required alcohol consumption to be reduced. The authors concluded that the rash may be a manifestation of chronic alcohol misuse.

5.2.3. Narrative synthesis of review findings presented by subgroup

Setting of delivery

The majority of primary research relating to screening for alcohol misuse was undertaken in primary care settings. AUDIT was found in a number of studies to be effective in the identification of hazardous and harmful drinking in adults in primary care, with evidence suggestive of a requirement to use lower threshold scores among women. AUDIT and shorter

versions were found to be broadly equivalent in their performance in identifying alcohol misuse in middle-aged women in primary care (Aalto *et al.,* 2006). Bradley *et al.* (2007) also considered AUDIT-C to be as effective as the full AUDIT for identifying alcohol misuse. AUDIT-C is also as effective as the full AUDIT in detecting bingeing in primary care (Tunaanen *et al*., 2007). Aertgeerts *et al.* (2001) also confirmed the utility of AUDIT in the detection of alcohol abuse or dependence in primary care. A systematic review of the evidence for the use of screening tools for alcohol misuse in primary care (Fiellin *et al.,* 2000) recommended the use of AUDIT for the identification of hazardous or harmful alcohol consumption and that CAGE should be used to detect alcohol abuse or dependence. The WHO ASSIST Working Group (2002), Newcombe *et al.* (2005) and Humeniuk *et al.* (2008) demonstrated ASSIST to be appropriate for use among primary care patients for the detection of alcohol abuse and dependence.

Additional evidence was identified relating to the use of alcohol screening questionnaires in hospitals and emergency care settings. The Five-shot questionnaire was shown to detect alcohol misuse in inpatients (Aertgeerts *et al.,* 2001), whilst AUDIT was also demonstrated to be suitable for screening general medical admissions for hazardous and harmful alcohol consumption (McCusker *et al.,* 2002). Soderstrom *et al.* (1997) reported that CAGE was most effective for screening for a lifetime diagnosis of alcohol dependence in trauma centre patients. FAST has also been demonstrated to be effective across a range of healthcare settings. A recent body of UK-specific evidence relating to the development of the Paddington Alcohol Test has shown this tool to be fast, acceptable for use and having reasonable screening properties for identifying alcohol misuse when implemented in response to clinical 'trigger' conditions in emergency medicine (Smith *et al.,* 1996; Huntley *et al.,* 2001; Patton *et al.,* 2002; Patton *et al.,* 2003; Patton *et al.,* 2004). The current version, PAT 2009, also includes education on clinical signs of alcohol misuse and advice on when to request a blood alcohol concentration test (Touquet & Brown, 2009). However, no effectiveness evidence was identified for this updated version. A further study (not meeting inclusion criteria for this review) demonstrated that a number of clinical presentations were associated with a positive blood alcohol concentration among patients presenting to the resuscitation room of the emergency department - collapse from alcohol or drugs; self-harm; trauma; gastrointestinal bleeding; and non-cardiac chest pain - providing further contextual information for this setting (Touquet *et al.* 2008).

The vast majority of the identified research was conducted in healthcare settings. The study by McCambridge & Thomas (2009) was web-based; whilst the evaluation of SASSI-A by Stein *et al.* (2005) was set in a juvenile correctional facility.

Within the identified evidence, screening tools were typically self-administered or delivered by research staff, clinicians, nurses or psychologists. Reference standards for comparison of screening properties were delivered by professional staff.

A further important issue to take into account during consideration of the effectiveness of screening measures is the time taken to administer each tool. These data have been included in the review, where available, since the shortness of a tool can be anticipated to influence the degree to which it can be implemented in clinical practice.

Gender

Whilst alcohol screening questionnaires effectively identified alcohol misuse among both men and women, a number of authors recommended the use of lower cut-off scores among female populations (Aalto *et al.*,2006; Aertgeerts *et al.*, 2001; Bradley *et al.*, 1998; Reinert & Allen, 2007). The screening questionnaires TWEAK and T-ACE were also shown to be appropriate in identifying alcohol misuse in pregnant women (Russell *et al.*, 1996; Chang *et al.*, 1998; Dawson *et al.*, 2001; Burd *et al.*, 2003). Screening for maternal alcohol consumption and referral to necessary treatment is of particular importance in the prevention of fetal alcohol spectrum disorders.

Age

Whilst studies were most typically undertaken in adult study populations, evidence was identified that specifically related to screening for alcohol misuse in younger and older samples.

Kelly *et al.* (2002; 2004) recommended that AUDIT be used for the detection of hazardous drinking in adolescent emergency department patients. Additional work by Knight *et al.* (2003) was also supportive of the use of AUDIT in young people. Miles *et al.* (2001) described the 5-item AUDIT tool as being effective for detecting hazardous drinking among young people in colleges. McCambridge & Thomas (2009) stated that the short forms of AUDIT may require further validation among young people.

Three systematic reviews were performed that focused specifically on screening for alcohol misuse in older people. Berks & McCormick (2008) recommended that AUDIT be used to detect hazardous and harmful drinking and that CAGE was most suitable for identifying dependence. Beullens & Aertgeerts (2004) were most favourable of the use of CAGE and MAST-G in identification of alcohol abuse and dependence in older people. O'Connell *et al.* (2004) stated that CAGE performed weakly in elderly psychiatric patients but that AUDIT-5 showed potential as an appropriate tool.

Ethnicity

The effectiveness of alcohol screening questionnaires was influenced by ethnicity of those screening. Bradley *et al.* (1998) found AUDIT and TWEAK to be appropriate in Black and White women in screening for dependence, but that CAGE was relatively sensitive in White populations. The authors suggested screening thresholds should be tailored according to ethnicity. AUDIT-C was observed to perform well in primary care among White, African American and Hispanic patients in detecting alcohol misuse but that differences in sensitivity by ethnic group existed (Frank *et al.*, 2008). In their literature review, Reinert & Allen (2007) also stated that variation in performance by ethnicity was observed. Therefore, whilst research was suggestive of differences in alcohol screening questionnaire performance by ethnicity, such evidence was inconclusive and largely specific to ethnic groups based in the USA.

Questionnaires vs. lab markers and clinical indicators

Laboratory markers were found to have relatively poor screening properties and therefore to be of limited value in the detection of alcohol misuse when compared with alcohol screening questionnaires (Coulton *et al.* 2006; Aertgeerts *et al.*, 2001; Bisson & Milford-Ward 1994; Wetterling *et al.*, 1998). Evidence was identified for a number of clinical indicators potentially associated with excessive alcohol consumption (Santolaria *et al.*, 1997; Saunders & Conigrave, 1990; Wahie & Lawrence, 2006). However, authors supported the use of clinical signs as an aid for clinicians in identifying alcohol misuse rather than as a formal screening method.

Summary of alcohol questionnaire screening properties

The screening properties and characteristics of the alcohol screening questionnaires identified in the available evidence are tabulated in summary form as Appendix 14.

5.2.4. Evidence statements

Evidence statement 5.1: AUDIT is effective in the identification of hazardous and harmful drinking in adults in primary care (systematic review, ++)[1]; (systematic review, ++)[2]; (literature review)[3]; (cross-sectional diagnostic evaluation, ++)[4]; (cross-sectional diagnostic evaluation, ++)[5], (systematic review, ++)[6] . The use of lower thresholds in conjunction with alcohol screening questionnaires was recommended for women (cross-sectional diagnostic evaluation, ++)[4], (cross-sectional diagnostic evaluation, ++)[7], (systematic review, ++)[8], (literature review)[9]. Optimal screening thresholds for the detection of hazardous or harmful drinking using AUDIT appeared to be ≥7 or ≥8 among men (systematic review, ++)[1,] (systematic review, ++)[2,] and ≥6 to ≥8 among women (systematic review, ++) [2], (cross-sectional diagnostic evaluation, ++)[4], (literature review)[9]. Optimal screening thresholds for identifying binge drinking using AUDIT were≥7 or ≥8 for adult males (no data available for females) (cross-sectional diagnostic evaluation, ++).[10] Primary studies included in a systematic review (++) recommended higher AUDIT thresholds for males (5 to 8) than females (2 to 6).[11]

[1] Berks & McCormick, 2008 (Systematic review, ++)

[2] Fiellin *et al.,* 2000 (Systematic review, ++)

[3] Reinert & Allen, 2007 (Literature review)

[4] Aalto *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) Finland

[5] Coulton *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) UK

[6] Berner *et al.,* 2007 (Systematic review, ++)

[7] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation ++) Belgium

[8] Bradley *et al.,* 1998 (Systematic review, ++)

[9] Reinert & Allen, 2007 (Literature review)

[10] Tuunanen *et al.,* (Cross-sectional diagnostic evaluation, ++) Finland

[11] Kriston *et al.,* 2008 (Systematic review, ++)

Applicability: The evidence included in the reviews was international in origin. One of the 4 primary studies described above was conducted in the UK.

Evidence statement 5.2: The evidence for the effectiveness of shorter versions of AUDIT in adults in primary care was variable, with some authors of cross-sectional diagnostic evaluations observing comparable performance between the full AUDIT and shorter versions (++)[1]; (++)[2]; (++)[3]; (++)[4], whilst other findings drawn from primary care were more cautious

of the utility of the shorter forms of this questionnaire (systematic review, ++).[5] The optimal screening threshold for the detection of hazardous drinking using AUDIT-C was ≥3 among men (++)[6] and women (++)[6], (++)[7]. However, thresholds of≥5 for the detection of heavy drinking among females[1] and ≥6 for identifying bingeing moderate and heavy drinking men were also recommended (++).[4] Primary studies included in a systematic review (++) recommended higher AUDIT-C thresholds for males (3 to 6) than females (2 to 5).[5] FAST was described as being effective in the detection of alcohol problems at a cut-off point of ≥1 in males and females in a primary care setting in the UK (literature review)[8].

[1] Aalto *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) Finland

[2] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[3] Bradley *et al.,* 2007 (Cross-sectional diagnostic evaluation, ++) USA

[4] Tuunanen *et al.* (Cross-sectional diagnostic evaluation, ++) Finland

[5] Kriston *et al.,* 2008 (Systematic review, ++)

[6] Berks & McCormick, 2008 (Systematic review, ++)

[7] Frank *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) USA

[8] Reinert & Allen, 2007 (Literature review) UK-specific primary study

Applicability: The systematic reviews included evidence that was international in origin. One of the primary studies referred to in the literature review by Reinert & Allen was performed in the UK.

Evidence statement 5.3: CAGE was found by authors of a number of systematic reviews to be effective in the detection of alcohol abuse and dependence in adults in primary care (++)[1]; (++)[2]; (+)[3]. Optimal thresholds for screening for alcohol abuse or dependence using CAGE in primary care appeared to be ≥1 or ≥2 for adult men [1,2,3] and women.[1,2,3,4] CAGE was described as performing poorly in an elderly psychiatric population (systematic review, +)[5].

[1] Berks & McCormick, 2008 (Systematic review, ++)

[2] Fiellin *et al.,* 2000 (Systematic review, ++)

[3]Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[4] Frank *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) USA

[5] O'Connell *et al.,* 2004 (Systematic review, +)

Applicability: The systematic reviews included evidence that was international in origin. None of the above primary studies were performed in the UK.

Evidence statement 5.4: Limited evidence was identified that demonstrated that the ASSIST screening questionnaire (evaluation and qualitative study, ++)[1]; cross-sectional diagnostic

evaluation, +)[2]; cross-sectional diagnostic evaluation, ++)[3]) shows promise and is appropriate for use for the detection of alcohol abuse and dependence among adults in primary care.

[1] WHO ASSIST Working Group, 2002 (Evaluation and qualitative study, ++) International sites

[2] Newcombe *et al.,* 2005 (Cross-sectional diagnostic evaluation, +) Australia

[3]Humeniuk *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) International sites

Applicability: The above studies were conducted across a range of international collaborative sites (Australia, Brazil, India, Ireland, Israel, UK, Zimbabwe, the Palestinian Territories and Puerto Rico). The study by Newcombe *et al.* specifically relates to an adult Australian primary care sample.

Evidence statement 5.5: Only a limited amount of evidence could be identified relating to the performance of alcohol screening questionnaires in hospital settings. The Five-shot questionnaire was shown to detect alcohol misuse in adult male inpatients at a cut-off of ≥2.5 (cross-sectional diagnostic evaluation, ++).[1] AUDIT was effective in screening UK male and female adult general medical admissions for hazardous and harmful alcohol consumption (cross-sectional diagnostic evaluation, +).[2] AUDIT was also described as performing well among general hospital inpatients (systematic review, ++)[3].

[1] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[2] McCusker *et al.,* 2002 (Cross-sectional diagnostic evaluation, +) UK

[3] Berner *et al.,* 2007 (Systematic review, ++)

Applicability: One primary study was conducted in the UK.

Evidence statement 5.6: Evidence was identified for the use of alcohol screening questionnaires among adults in emergency care settings. One study (++)[1] found that CAGE was effective in screening for a lifetime diagnosis of alcohol dependence in trauma centre patients. AUDIT-C was shown to effectively identify hazardous drinking among male and female adult traffic casualties in an emergency department (cross-sectional diagnostic evaluation, +)[2]. FAST displayed good screening properties in the identification of alcohol problems among males and females presenting to an A&E setting in the UK (literature review)[3]. The Paddington Alcohol Test has been shown to be rapid, feasible to use, be UK-specific and to have reasonably good screening properties for the detection of alcohol misuse when implemented in response to clinical 'trigger' conditions in A&E care (listed as follows: fall; collapse; head injury; assault; accident; unwell; non-specific GI; psychiatric; cardiac;

repeat attender) (before and after study, ++)[4]; (before and after study, ++)[5]; (short communication)[6]; (before and after study, ++)[7]; (short communication)[8.]

[1] Soderstrom *et al.,* 1997 (Cross-sectional diagnostic evaluation, ++) USA

[2]Rodriguez-Martos & Santamarina, 2007 (Cross-sectional diagnostic evaluation, +) Spain

[3] Reinert & Allen, 2007 (Literature review) UK-specific primary study

[4] Smith *et al.,* 1996 (Before and after study, ++) UK

[5] Huntley *et al.,* 2001 (Before and after study, ++) UK

[6] Patton *et al.,* 2002 (Short communication) UK

[7] Patton *et al.,* 2003 (Before and after study, ++) UK

[8] Patton *et al.,* 2004 (Short communication) UK

Applicability: The evidence relating to the use of the Paddington Alcohol Test is specific to UK A&E populations.

Evidence statement 5.7: AUDIT was shown to perform more effectively in the identification of alcohol abuse or dependence (when used at a cut-off of≥10) than CAGE, CRAFFT or RAPS-QF in male and female young people (median age of 19 yrs) (++).[1] AUDIT was also demonstrated to have higher sensitivity (when used at an optimal cut-off of ≥3) than CAGE, CRAFFT or POSIT in the detection of problem use (ie. hazardous/harmful consumption not reaching the diagnostic threshold for an alcohol-related disorder, abuse and dependence) in a sample aged between 14 and 18 yrs (++).[2] The identified evidence for the effectiveness of SASSI in screening for alcohol misuse was limited and inconclusive (literature review)[3]; (cross-sectional diagnostic evaluation, ++)[4]; (cross-sectional diagnostic evaluation, +)[5]; (cross-sectional diagnostic evaluation, ++)[6]). AUDIT was found to perform reasonably well in elderly populations (systematic review, ++),[7] whilst AUDIT-5 was described as showing potential as an appropriate tool for use among older people (systematic review, +).[8]

[1]Kelly *et al.,* 2004 (Cross-sectional diagnostic evaluation, ++) USA

[2]Knight *et al.,* 2003 (Cross-sectional diagnostic evaluation, ++) USA

[3] Fieldstein *et al.,* 2006 (Literature review)

[4] Lazowski *et al.,* 1998 (Cross-sectional diagnostic evaluation, ++) USA

[5] Rogers *et al.,*(1997) (Cross-sectional diagnostic evaluation, +) USA

[6] Stein *et al.,* (2005) (Cross-sectional diagnostic evaluation, ++) USA

[7] Berner *et al.,* 2007 (Systematic review, ++)

[8] O'Connell *et al.,* 2004 (Systematic review, +)

Applicability: All of the above evidence is specific to the USA.

Evidence statement 5.8: The screening questionnaires TWEAK and T-ACE are both appropriate for the identification of alcohol misuse during pregnancy (+)[1]; (++)[2]; (+)[3]; (++)[4]. However, AUDIT performed significantly better than T-ACE as a predictor of lifetime alcohol diagnoses, and current drinking (++)[2]. TWEAK was more effective than T-ACE or CAGE in detecting risky drinking in pregnancy (+)[4]. TWEAK and T-ACE displayed optimal combinations of sensitivity and specificity at a cut-off point of ≥2 (+)[4].

[1] Burd *et al.,* 2003 (Cross-sectional diagnostic evaluation, +) USA

[2] Chang *et al.,* 1998 (Cross-sectional diagnostic evaluation, ++) USA

[3] Dawson *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) USA

[4] Russell *et al.,* 1996 (Cross-sectional diagnostic evaluation, +) USA

Applicability: All the above studies were conducted in the USA.

Evidence statement 5.9: The screening properties of questionnaires were influenced by the ethnicity of recipients and authors suggested that the use of appropriate cut-off scores should be considered (systematic review, ++)[1]; (cross-sectional diagnostic evaluation, ++)[2]; (literature review)[3]).

[1] Bradley *et al.,* 1998 (Systematic review, ++)

[2] Frank *et al.,* 2008 (Cross-sectional diagnostic evaluation, ++) USA

[3] Reinert & Allen, 2007 (Literature review)

Applicability: The primary evaluation above was conducted in the USA.

Evidence statement 5.10: Laboratory markers are of limited value in the detection of alcohol misuse when compared with alcohol screening questionnaires.[1,2,3,4] However, the use of blood alcohol concentration testing may complement the use of later questionnaire screening in the identification of alcohol misuse among patients treated in the emergency department resuscitation room (++)[5].

[1] Coulton *et al.,* 2006 (Cross-sectional diagnostic evaluation, ++) UK

[2] Aertgeerts *et al.,* 2001 (Cross-sectional diagnostic evaluation, ++) Belgium

[3] Bisson & Milford-Ward, 1994 (Cross-sectional diagnostic evaluation, ++) UK

[4] Wetterling *et al.,* 1998 (Cross-sectional diagnostic evaluation, +) Germany

[5] Csipke *et al.,* 2007 (Cross-sectional study, ++) UK

Applicability: 3 of the listed studies[1,3,5] are specific to the UK.

Evidence statement 5.11: A number of clinical indicators were described as being associated with excessive alcohol consumption.[1,2,3] Awareness of such indicators may serve useful in alerting health professionals to alcohol-related physical problems.

[1] Santolaria *et al.,* 1997 (Cross-sectional study, ++) Canary Islands, Spain

[2] Saunders & Conigrave, (1990) (Literature review)

[3] Wahie & Lawrence, (2006) (Case study) UK

Applicability: The case study above related to a small number of patients in the UK.

5.2.5. Discussion

A considerable body of key evidence has been identified demonstrating the effectiveness of questionnaires in screening for alcohol misuse in a range of settings and populations. As reported by Raistrick *et al.* (2006), the settings in which questionnaires were evaluated were predominantly healthcare-based, most notably in primary care and emergency care. The majority of the identified evidence related to adults, with some data available for the effectiveness of some alcohol screening questionnaires among adolescents. The importance of selecting and using screening cut-offs appropriate to the screened population was highlighted, with a key focus on the requirement to use lower thresholds when screening female subjects. The effectiveness of screening questionnaires in the identification of alcohol misuse has been demonstrated in this review. Furthermore, RCT evidence has shown that screening patients using AUDIT can reduce self-reported hazardous alcohol consumption among participants recruited from University settings in the UK (McCambridge & Day 2008). A small number of studies indicated the potential influence of ethnicity of screening recipients on the performance of alcohol questionnaires, although these findings were not conclusive and were largely specific to the USA. Laboratory markers were shown to be of limited use in the detection of alcohol misuse, whilst clinical indicators, rather than serving as a formal screening measure, may alert the clinician to the presence of physical alcohol-related harm.

5.3. Review 6: The effectiveness of brief interventions in preventing hazardous and harmful drinking among adults and young people

5.3.1. Quantity and key characteristics of included research

As a result of the searches outlined above, a total of 620 citations were identified, following removal of duplicates, and were screened for inclusion in the review of clinical effectiveness (see Figure 4). Due to the large body of systematic reviews and meta-analyses identified, a decision was made to include only systematic reviews and meta-analyses as evidence to address this review topic. 504 citations were rejected at the title stage, yielding 116 abstracts for screening. 56 abstracts were rejected upon examination. Of 60 full papers retrieved, 35 were excluded after close scrutiny. Papers that were excluded at this stage are presented in Appendix 9, together with the justification for their exclusion. Further systematic reviews were identified through handsearching of the reference lists of included systematic reviews. Therefore, a total of twenty seven systematic reviews were included in the review of effectiveness of brief interventions.

A range of outcomes were reported in the 27 included systematic reviews, including alcohol consumption, mortality, morbidity, alcohol-related injuries, alcohol-related harm, alcohol-related social consequences, health care resource use, referral to specialist treatment, readiness to change, and impact on smoking.

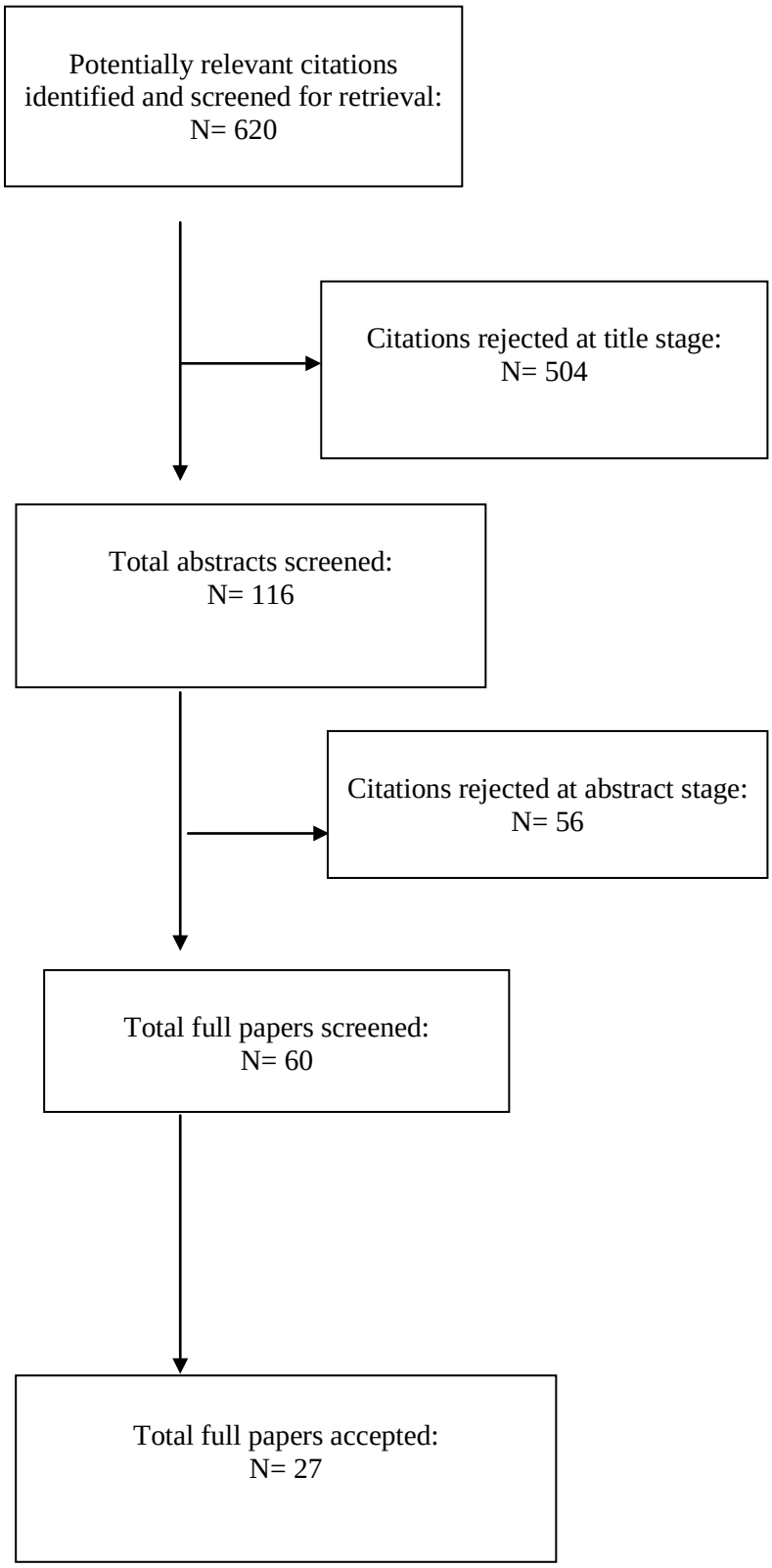
Considerable heterogeneity was observed between included reviews. Variation was evident in the characteristics of the brief interventions evaluated in primary studies, in terms of length and duration of intervention, inclusion of any booster sessions, intervener, and mode of delivery (for example, with some interventions incorporating written materials or use of feedback via telephone or computer). Study populations also varied considerably, with a range of inclusion and exclusion criteria applied within primary studies. Some studies excluded patients with physical or mental co-morbidities. Others excluded individuals with a history of alcohol dependence, those having received previous advice to cut-down drinking or those who were classed as seeking treatment for alcohol misuse. Setting varied in terms of country of study and in service context.

Due to the limited availability of evidence relating to young people in identified systematic reviews, additional searches were conducted in order to identify primary research evidence relating to the effectiveness of brief interventions for alcohol misuse in young people aged 10 yrs and over (delivered outside of educational settings). Findings are described within a narrative synthesis. Additional searches were also conducted with the aim of identifying any

primary research with a focus on the effectiveness of brief interventions for alcohol in ethnic minority groups within the UK. No such effectiveness evidence was identified.

Key characteristics of included systematic reviews and main findings are presented in Appendix 15.

Figure 4: **Flow chart of study inclusion and exclusion in review of systematic reviews of effectiveness of brief interventions (Review 6)**



5.3.2 Overall narrative synthesis of review findings

Ashenden *et al.* (1997) (Systematic review, ++)

The authors of this systematic review (Ashenden *et al.*, 1997) (++) investigated the impact of general-practice-based lifestyle advice on patient behaviour. The review covered a range of behaviours and included a subsection in the data synthesis specifically relating to alcohol. Limited evidence for a positive effect of brief interventions on alcohol consumption and GGT levels were presented.

The findings from 6 included primary studies were reported. Baseline alcohol consumption of included subjects was stated as being above recommended safe levels (where safe levels were described as being below 2 standard drinks per day for women and 4 for men) (no further data presented). The ages of included participants ranged from 17 to 69 years. In 5 of the 6 trials, verbal advice delivered by a GP was supplemented by written materials. The duration of interventions was not reported.

In 3 of the 6 included studies, a significantly greater proportion of intervention group subjects moderated their drinking to a safe level compared with control group participants (who received no intervention). In 1 trial of a single intervention of intensive advice with written advice, reductions in alcohol consumption were observed of 10.1 standard drinks/wk ($P<0.001$) (men) and 5.2 drinks/wk ($P<0.05$) (women). Differences in the change of proportion of subjects drinking heavily (no further detail): (intervention group vs control) were 18.2% ($P<0.001$) (men) and 18.5% ($P<0.05$) (women). A further trial of a multifactorial intervention (no further detail) of verbal advice with written materials resulted in a difference in the change of proportion of subjects drinking heavily (no further detail) (intervention group vs control) of 15.5% ($P<0.01$). Furthermore, an additional trial showed that a single intervention of brief advice delivered to men only, with written materials brought about a reduction in alcohol consumption of 6.5 standard drinks/wk ($P<0.05$) (difference in change of proportion of subjects drinking heavily (no further detail): intervention group vs control = 13% ($P<0.05$)). Two trials found significantly lower GGT levels in intervention group subjects, particularly amongst males (no further data). However, the authors made only tentative recommendations for the use of brief interventions, which could be considered to be due in part to the limited existing evidence base at the time in publication.

Ballesteros *et al.* (2004a) (Systematic review, ++)

The authors (Ballesteros *et al.*, 2004a) evaluated the effectiveness of various categorisations of intervention: minimal intervention (session of general alcohol-related advice lasting 3 to 5

min but without specific advice on reducing consumption), brief interventions (10 to 15 min in 1 session, with the option of booster sessions of 3 to 5 min duration) and extended brief interventions (10 to 15 min in 1 session, with a number of specific booster sessions of 10 to 15 min duration) versus control (no specific advice on alcohol consumption unless required by health condition or requested by patient) delivered to hazardous drinkers in primary care. Brief interventions and extended brief interventions were found to have a significant benefit on alcohol consumption.

Hazardous drinkers were categorised as moderate or heavy drinkers (moderate where the study inclusion criteria for alcohol consumption were >132 to 168 g/wk in men and >96 to 132 g/wk in women; heavy where study inclusion criteria were >280 g/wk in men and >160 g/wk in women (as stated)). All studies recruited patients in the age range of 18 to 70 years, with the exception of 1 study which included older patients (≥ 16 years) only. The study populations did not include hazardous drinkers satisfying criteria for dependence. Participants were classed as non-treatment seekers if all the practice population were targeted for screening; subjects were considered to be treatment-seeking if screening was restricted to individuals attending the practice for medical consultation. Of the primary studies included in the review, 4 were drawn from the UK, 5 from the USA, 3 from Spain and 1 from Australia.

A significant benefit of brief intervention versus control was observed, with an odds ratio (OR) (representing a decrease in the proportion of hazardous drinkers) of 1.6 (95% confidence interval (95%CI) 1.33 to 1.93). Extended brief interventions were also demonstrated to be effective, compared with control (OR=1.5, 95%CI 1.12 to 1.95). Minimal interventions did not produce any significant effects from the control condition (OR=0.95, 95%CI 0.72 to 1.25). Interventions were reported to be more effective in heavy drinkers (consuming >280 g/wk (for men) or >160 g/wk (for women) (OR=1.94, 95%CI 1.55 to 2.43)) than in moderate drinkers (consuming >132 to 168 g/wk (for men) or >96 to 132 g/wk (for women) (OR=1.43, 95%CI 1.19 to 1.68)). Brief interventions appeared to be more effective in trials in which all the registered practice population were targeted for screening for hazardous drinking (OR=2.19, 95%CI 1.68 to 2.84) compared with effectiveness in trials in which screening was restricted to patients attending medical consultation (OR=1.41, 95%CI 1.20 to 1.65). No evidence of a dose-effect relationship between intensity of intervention and outcome was observed.

Ballesteros *et al.* (2004b) (Systematic review, ++)

A further systematic review by the above team (Ballesteros *et al.*, 2004b) (based on apparently separate searches) investigated the impact of gender on the effectiveness of brief

interventions in hazardous drinkers in primary care. Brief interventions were found to have a broadly equivalent positive effect on alcohol consumption in both men and women.

Seven primary studies were included, of which 3 were from the UK, 3 from the USA and 1 from Australia. Baseline alcohol consumption was measured in terms of weekly alcohol consumption (with the lowest cut-off for inclusion ranging from >154 g/wk or binge drinking for males and >115 g/wk for women to >280 g/wk for men and > 168 g/wk for women or by AUDIT score (>7 and <21)) The types of intervention evaluated were the same as those reported in the related publication by Ballesteros *et al*. (2004a) also included in the review and described above. Standardised effect sizes for weekly alcohol consumption were calculated and found to be similar by gender, with reductions in alcohol consumption observed in both subgroups. The standardised effect sizes of brief intervention vs. reference treatment were –0.26 (95%CI –0.34 to –0.17) for men and –0.26 (95%CI –0.38 to –0.13) for women. The standardised effect size when pooled for both genders was – 0.26 (95%CI -0.33 to -0.18). Four studies explored the frequency of subjects consuming alcohol below hazardous levels (where reported in terms of weekly alcohol consumption ranging from < 176 g in men and < 112 in women to < 280 /wk and < 168 g/wk in male and female subgroups. The pooled odds ratio for both genders was 2.32 (95%CI 1.86 to 2.78).

Beich *et al.* (2003) (Systematic review, ++)

This review (Beich *et al.*, 2003) was undertaken to assess the effectiveness of screening programmes for alcohol misuse (and delivering brief interventions) to non-alcohol-dependent patients in general practice. The purpose of the review was to assess how effective general practice-based screening is for identifying patients who misuse alcohol and could benefit from receiving brief interventions. The review authors found that 2.6 patients per 1000 patients screened achieved sensible drinking levels following brief intervention.

The lowest age of participants was 17 years. In 1 study, the population was aged 65 years and above only. Definitions of excessive drinking used at baseline in standard drinks per week or per occasion (12 g alcohol) ranged from > 11 wk for men and > 8 wk for women to > 29 wk for men and > 17 wk for women. Of the 8 studies included in the meta-analysis, 3 were from the UK, 4 from the USA and 1 from Australia. Brief interventions included feedback on present drinking, information and education on risk and advice for reducing consumption. Exposure ranged from consultation of 10 min duration to up to 5 consultations lasting 5 to 20 min. Treatment goals were to reduce alcohol consumption to a maximum number of drinks per week, ranging from 12 to 23 maximum drinks per week. Nine percent of patients screened positive for excessive alcohol consumption. 2.6 patients per 1000 patients screened achieved

sensible drinking levels following brief intervention. Screening effect values in individual primary studies ranges from 0.1 to 6.2 patients per 1000 patients screened. The authors therefore concluded that, although brief interventions may be considered effective, screening in general practice may not be an effective precursor to intervention. However, the purpose of this review was not to specifically determine the effectiveness of brief interventions and the included trials may have only limited relevance to clinical practice and should therefore be interpreted with caution.

Bertholet *et al.* (2005) (Systematic review, ++)

This review (Bertholet *et al.*, 2005) evaluated the efficacy of brief interventions in reducing long-term alcohol use and related harm in primary health care patients. The authors concluded that brief interventions were effective in the reduction of alcohol consumption at 6 and 12 months follow-up.

Study participants were not seeking treatment for alcohol misuse or alcohol dependent. Nineteen studies were included: 9 conducted in North America; 7 in Europe; 2 in Africa and 1 in Australia. Participants were aged 15 years and above. Eligible interventions included interventions delivered on an individual, face-to-face basis, focusing on reducing alcohol misuse. The length of intervention ranged from 5 to 45 min. Intervention was repeated or included the use of booster sessions in 10 studies. No restrictions were applied to repeated interventions or booster sessions. All studies (with a single exception) included feedback regarding individual alcohol consumption. Interveners included GPs, nurses, psychologists, research staff and a trained interventionist.

The review team stated that 8 of the 17 included primary studies measuring alcohol consumption reported a statistically significant reduction following brief intervention that was maintained across 6 and 12 month follow-up points. An overall pooled mean difference of –50 (95%CI -65 to -34) g/wk vs control groups was observed, equating to a reduction in consumption of 15% or 5 drinks between groups. The use of meta-regression demonstrated that the characteristics of brief interventions (such as intervener, motivational technique used, duration, use of written materials and booster sessions) made little impact on the observed effect size. Follow-up rates ranged from 31.5% to 92.4%. The authors found only a small difference in effect between men and women (P=0.75, no further data presented).

Bien *et al.* (1993) (Systematic review, +)

Bien *et al.* (1993) presented evidence for the effectiveness of brief interventions drawn from a range of study settings, of which 13 of 32 included studies were based in healthcare settings

(no further data presented). In 15 studies, patients were presenting for alcohol problems. Setting of studies according to country was not reported. Interventions were delivered to excessive drinkers (no further detail) with a mean age of 41 years, of whom 75% were male. Brief interventions varied, with some incorporating the use of feedback/advice and/or written materials. Hours of assessment ranged from 0.5 to 6. Number of sessions ranged from 1 to 5. No information was presented on interveners.

Comparisons were made of brief intervention vs control (typically no treatment) and of brief intervention vs extensive treatment (in specialist treatment setting in patients referred or self-referred for treatment). The authors produced pooled effect sizes, having combined a range of outcomes relating to alcohol consumption (for example, weekly alcohol consumption and days since last drink). For brief intervention vs control, a small to moderate between-group mean pooled effect size of 0.38 (SD=0.33) was observed. For brief intervention vs extensive treatment, a negligible between-group mean pooled effect size of 0.06 (SD=0.31) was reported. Therefore, this review suggests that brief interventions have a small to moderately positive effect vs control (typically no treatment) on outcomes relating to alcohol consumption. Again, the relatively early date of this review and the limitations in the available evidence base should be considered during the interpretation of these results.

Burke *et al.* (2003) (Systematic review, ++)

Burke *et al.* (2003) sought to investigate the efficacy of adaptations of motivational interviewing (AMI) which incorporated the use of feedback to the patient on problem behaviours, including alcohol. Small to moderate positive effects of intervention on alcohol consumption vs no treatment/place control were described. Reported details of included interventions were limited; however the dose of AMI ranged from 30 to 240 total min. Six studies were undertaken in a substance abuse clinic, 3 on college campuses, and the remainder in hospital (n=3), trauma (n=1) and prenatal care (n=1) settings. No information on population characteristics, including baseline alcohol consumption, was presented.

The authors calculated a small to moderate combined effect size (Hedges' *g*) of 0.25 (95%CI 0.13, 0.37), showing a positive impact of AMI on alcohol consumption (in terms of standard ethanol intake) vs. no-treatment/placebo control. Subjects receiving AMI reduced their drinking frequency from 35.7 (SD=32.9) standard ethanol content (SEC) drinks/wk to 15.6 (SD=25.4) SEC drinks/wk, representing a 56% decrease in alcohol consumption (although the relatively large SD values and the associated uncertainty around these reported mean values must be taken into consideration). However, this review presented evidence for a beneficial impact of AMI on drinking activity.

Cuijpers *et al.* (2004) (Systematic review, ++)

Cuijpers *et al.* (2004) investigated the impact of brief interventions for alcohol misuse on mortality. Brief interventions appeared to reduce mortality.

The relative risk of dying was calculated using mortality data that could be verified by a reliable source (eg by death certificates) relating to 4 studies. In 3 studies, the population was made up of heavy/problem adults with an age range of 18 to 69 years; in 1 study the population was limited to heavy drinking elderly subjects. No further detail or information relating to baseline alcohol consumption were presented. Interventions were delivered within general practice (2 studies), screening programme (1 study) and hospital ward settings (1 study). Apparent countries of study (estimated according to reported information relating to the method of verification of mortality used) were the USA (2 studies), Australia (1 study) and was unclear for a further study. Trials of treatment-seeking subjects were excluded, as were studies in patients with psychiatric disorders. Brief interventions consisted of a maximum of 4 sessions. No limit was set on contact time. Interveners included GPs and nurses.

The review team calculated the relative risk of death in subjects receiving brief intervention vs control (no further detail on brief interventions or control conditions presented). A reduced relative risk of mortality in individuals receiving brief intervention vs control group subjects was reported (for 4 studies with verified mortality rates RR=0.47 (95%CI 0.25 to 0.89). The number needed to treat (i.e. to prevent 1 death) was 282 (no statistics reported). Therefore, published evidence indicates that brief interventions can reduce mortality.

D'Onofrio & Degutis (2002) (Systematic review, +)

D'Onofrio & Degutis (2002) presented evidence supporting the use of screening and brief intervention for alcohol misuse.

Study populations included high school/college students, adults and adolescents in emergency care and hospitalized adults, with an age range of 12 to 70. Four studies were specific to the emergency department, 2 were set in primary care, 4 in prenatal clinics (and therefore outside the remit of this assessment and not discussed), 2 in outpatients clinics, 3 in the general population, and 1 in inpatient care. One study included a range of care settings. The setting of studies by country was not reported. Four studies reported on the use of brief interventions in emergency departments. Brief interventions were frequently reported as being of unknown

duration, but where reported ranged from 5 to 60 min and included up to 4 follow-up sessions.

In 4 of the 32 studies (mixed healthcare settings) included in the review, a reduction in alcohol-related social problems was observed following brief intervention (no further data presented). A reduction in emergency department/outpatient visits and hospitalisations amongst subjects having received brief interventions (in 4 of the 32 included studies) was reported (no further data presented). An increase in referrals for specialist alcohol treatment (in 4 of 32 included studies) was also observed (no further data presented).

The authors described the 4 studies set in emergency departments in more detail. A significant reduction in alcohol consumption (no further data presented) as a result of brief intervention of 30 min duration vs standard care delivered in emergency departments was observed in 1 trial focusing on 18 and 19 year old adolescents presenting to emergency care after an alcohol-related event. The authors also described a significant reduction in the incidence of alcohol-related injuries after 6 months follow-up ($P<0.01$, no further data presented) and alcohol-related problems (such as with personal relationships, school or police) ($P<0.05$) in this group.

In a further study, the delivery of a brief interview (15-20 min) based on readiness to change principles by community outreach workers to primary alcohol/other-drug-dependent adults, a 56% reduction in alcohol consumption was reported. The setting of the study by country was not reported.

In 1 study originating in the UK, 65% of subjects (details not reported) receiving brief intervention reported drinking less alcohol ($P<0.0001$). However, it should be noted that, in this study, the intervention was delivered by alcohol health workers. A reduction in alcohol consumption (no further data presented) was observed in 29 of the 32 studies (mixed healthcare settings) included in the review. The evidence presented in this review would therefore support the use of brief interventions in preventing alcohol-related negative outcomes in healthcare settings, including emergency departments.

Emmen *et al.* (2004) (Systematic review, ++)

Emmen *et al.* (2004) investigated the effectiveness of brief interventions in a general hospital setting and concluded that the evidence base for effectiveness was inconclusive.

The review included primary studies conducted in hospital inpatients and outpatients of medical specialist clinics. The setting of studies by country, age and ethnicity of participants were not reported. Mean baseline alcohol intake ranged between included studies from 179 g/wk (SD=106) (intervention group) vs 160 g/wk (SD=140 (control group) to 600 g/wk (SD=252) (intervention group) vs 551 g/wk (SD=228) (control group). Subjects with severe alcohol dependency were excluded. Problem drinkers received either brief intervention or usual care.

Of the included studies, only 1 trial (described by the authors as having a relatively intensive intervention and a short 2 month follow-up period) demonstrated a statistically significant reduction in alcohol consumption. The mean baseline alcohol consumption in this study population was also relatively high (mean intake = 600 g/wk (SD=252) (intervention group), 551 g/wk (SD=228) (control group). In this trial, evaluating brief interventions of 10 to 15 min duration (and 4 follow-up sessions) delivered by a clinician in a hypertension clinic, a statistically significant reduction in alcohol consumption was observed (mean difference = -309 (95%CI -470 to -148) g/wk). The authors suggested that this effect may be due in part to the intervening clinician emphasising the need to reduce alcohol consumption at every visit to the hypertension clinic and the advice given to the control group to continue with their typical alcohol consumption activity. Two trials presented a statistically significant reduction in GGT levels (no further data presented). In 4 studies, a reduction in alcohol-related problems was reported (no further data presented).

Havard *et al.* (2008) (Systematic review, ++)

This review (Havard *et al.,* 2008) investigated the use of brief motivational counselling in emergency departments and concluded that existing evidence pointed towards brief interventions being effective in reducing alcohol-related injuries.

The setting by country of included studies was not reported. Studies focusing on the specialist treatment of alcohol-dependent patients were excluded from the review. Ten studies used at least 1 alcohol-related criterion for participant inclusion: blood alcohol concentration >0%, 0.02% or 0.03%; CAGE score≥1; AUDIT score >5 or >7; positive PAT score; hazardous drinking according to National Institute on Alcohol Abuse and Addiction; self-reported alcohol consumption in 6 hours before injury (no upper level values for inclusion reported). Reported mean age ranged from 16 to 44. Six studies restricted inclusion to those presenting to an emergency department with an injury or by accident type. Exclusion criteria included patients being too intoxicated on presentation; an AUDIT score >14 or a history of alcohol dependence. Interventions consisted of brief motivational counselling, with some studies

including written materials or personalised feedback. Ten studies included 1 session of counselling. Eight of the interventions assessed included principles of motivational interviewing. The majority of studies provided written materials with a combination of general advice and/or personalised feedback. Reported lengths of sessions ranged from 5 to 60 min. Six studies stated that the majority of counselling occurred during the emergency department visit, with a minority of studies including intervention on an outpatient basis. Interveners included emergency department staff, research staff, health promotion workers, nursing and social work staff and therapists. Control group conditions included standard care, standard care plus generic written advice or generic written advice alone.

A non-statistically significant pooled effect size for alcohol consumption at 12 months follow-up of -0.14 was observed (no further data presented). A non-significant small pooled effect size for frequency of heavy drinking of 0.03 at both 3 months and 12 months follow-up was also reported. Thus, it can be seen that brief intervention did not have a significant effect on the quantity or frequency of alcohol consumption. A non-significant pooled effect size for drinking consequences (no further detail presented) at 6-12 months follow-up of -0.14 was also reported. A clear reduction in the incidence of alcohol-related injuries at 6-12 months follow-up was observed following intervention (pooled OR=0.59 ($P<0.005$)). Therefore, this review shows that whilst brief interventions delivered in emergency departments did not produce a significant effect on alcohol consumption, a clear reduction in the likelihood of an individual sustaining an alcohol-related injury following intervention could be observed.

Hettema *et al.* (2005) (Systematic review, ++)

Hettema *et al.* (2005) assessed the impact of motivational interviewing on alcohol misuse. Motivational interviewing was found to result in small to moderate positive effects on alcohol-related outcomes.

A total of 32 studies were included focusing on alcohol misuse. Comparisons included: MI vs. no treatment/placebo; testing additive effects of MI to standard/established treatment; and MI vs standard/established treatment. Dose ranged from 0.55 to 6 hours (although was typically of 1-2 hrs). Reported mean ages of study participants ranged from 19 to 58 yrs. The gender composition of samples ranged from 0 to 100% male. Samples were typically largely European American. Baseline alcohol consumption was not reported. Interveners included psychologists, masters level counsellors, research students, physicians and were unspecified in some cases. Settings were mainly healthcare-based but included general practice, emergency care, outpatient or inpatient care, educational and mixed settings and were unspecified in some cases.

The authors calculated effect sizes for all outcome variables related to the problem under study (no further detail reported). A mean effect size of 0.41 (95%CI 0.31, 0.51) was reported at 3 months or less post-treatment and 0.26 (95%CI 0.18, 0.33) across all follow-up points. The largest effect sizes (>0.7 in each case) were observed in studies where MI was compared with no treatment, waiting list or education control groups or where MI was added to standard treatment. Therefore, motivational interviewing appears to have a small to moderately positive effect on alcohol-related outcomes.

Hunter Fager *et al.* (2004) (Systematic review, +)

The review (Hunter Fager *et al.*, 2004) was undertaken to evaluate the effectiveness of brief interventions amongst undergraduate college students. The authors found evidence to support the use of brief motivational interventions in the reduction of alcohol misuse and harm.

The majority of studies were conducted in the USA (with the exception of a single study based in Sweden). Approximately a half of the included studies used brief motivational interventions (BMIs, of 1 or 2 time-limited interventions, including a session in which education was provided on alcohol). No data on baseline drinking levels were reported. Mean age of participants ranged from 18.1 (SD=0.03) to 21.3 (no statistics reported). Participants were predominantly White, with the study with the lowest proportion of White participants comprising 62% White subjects. Interventions included the use of screening, brief motivational intervention, feedback, bartender education and group sessions. No data on duration of interventions were reported.

Nine included studies presented evidence of at least a short-term effect of reducing alcohol consumption (no further data presented). One study was identified in which reductions in alcohol-related problems (no further detail) were observed at 4 years follow-up (no further data presented). Thus, this review presents limited evidence for the effectiveness of brief interventions in undergraduate college students.

Hyman (2006) (Systematic review, +)

Hyman (2006) investigated the effectiveness of nurse-delivered interventions amongst hazardous, harmful and heavy drinkers (no detail on baseline alcohol consumption presented). Studies focusing on alcohol-dependent patients were excluded.

One study (based on general medical wards in England) was identified presenting alcohol-related outcomes and demonstrated a 63 to 68% reduction in alcohol consumption following

nurse-delivered brief intervention (of 60 min duration with follow-up 1 month after discharge) vs. 7% in control subjects (receiving no intervention) (no further data presented).

Kahan *et al.* (1995) (Systematic review, +)

Kahan *et al.* (1995) found evidence to support the effectiveness of brief interventions delivered by physicians to problem drinkers.

Trials were conducted in general practice (n=4), general population (n=2), inpatient (n=1), outpatient (n=3) and mixed health and non-health (n=1) settings. The ages of participants were not reported. Sessions were described as lasting 30 min or less (no further information) and baseline alcohol consumption of subjects was not presented. Interveners included GPs, clinic and research physicians, nurses, social workers and psychiatrists. It was noted that in several control groups subjects received minimal advice by the intervener to cut down on their drinking. The authors presented findings for men and women separately and are described in detail in the narrative summary of evidence according to gender later in this section.

Kaner *et al.* (2007) (Systematic review, ++)

Kaner *et al.* (2007) undertook an extensive systematic review of the effectiveness of brief interventions in primary care. The authors concluded that brief interventions are effective in reducing alcohol consumption, particularly amongst male subjects, and that longer duration of intervention was likely to have little additional benefit.

Primary care was operationalised to include all immediately accessible general health care services, including accident and emergency care. Twenty four studies were conducted in general practice and 5 in emergency settings. Eleven trials were based in the USA, 5 in the UK, 5 in Spain, 2 in Finland, 1 in France and 1 in Australia. Included patients presented to primary care not specifically for alcohol-related treatment. Patients were excluded if heavily alcohol dependent. Baseline alcohol consumption was measured in 21 trials and ranged from 89 to 456 g/wk (mean = 313 g/wk, no further data). Four trials reported a baseline drinking frequency of 0.9 binges/wk (no further data). Baseline intensity of drinking was reported in 5 trials, with a mean value of 110 g per drinking day reported (no further data). Included brief interventions ranged from a single session up to a maximum of 5 sessions. Total exposure time ranged from a mean of 7.5 min to 60 min. Interventions comprised patient engagement and provision of advice and information to reduce alcohol consumption and/or related problems. Interveners included GPs, nurse practitioners and psychologists. Control conditions compared against brief interventions included assessment only, usual care or no intervention.

The authors reported a pooled mean difference of brief intervention (of up to 4 sessions and total exposure ranging from 7.5 min to 60min) vs control of -38 (85%CI -54 to -23) g/wk, demonstrating a reduction in alcohol consumption after 1 year or longer of follow-up. The review also covered the impact of gender on the effectiveness of brief interventions (and is described in detail). The authors identified 3 trials in which the number of drinking days per week was presented, finding no significant effect of brief intervention vs control (mean difference = -0.04, 95%CI -0.5 to 0.4 drinking days/wk). Three trials reported the frequency of binge drinking and found there to be no significant differences observed between groups (mean difference = - 0.3 (95%CI -0.6 to 0.0) binges/wk. No significant reduction in drinking intensity was observed following brief intervention, in terms of alcohol consumed per drinking day (mean difference = -3.1 (95%CI -8.8 to 2.6) g/drinking day. The review reported no significant reduction in alcohol consumed per drinking day following brief intervention (vs control) (mean difference = -3.1 (95%CI -8.8 to 2.6 g/drinking day). One identified trial reported a 47% reduction in the incidence of new injuries requiring readmission to trauma services. A 48% reduction in inpatient readmission to hospital for alcohol-related injury was reported. No significant difference in GGT levels were observed between brief intervention and control groups (mean difference = -1.1 (95%CI -3.9 to 1.7) U/l. Furthermore, no significant difference in MCV levels between brief intervention and control subjects was observed (mean difference = 0.6 (95%CI -1.6 to 2.8) fl. The review described a reduction in negative social consequences (as classed by the Drinker Inventory of Consequences/DrInC) following brief intervention. One trial was identified which reported 0.5 fewer emergency department visits by the intervention group during the year after randomisation to study groups.

Five trials investigated the use of extended brief interventions. Sessions ranged from 2 to 7, with the duration of initial and booster sessions ranging from 15 to 50 min. Extended psychological interventions (of 2 to 7 sessions, with a duration of initial and booster sessions of 15 to 50 min) (not typically delivered in routine practice due to length and duration of intervention) were reported to be more effective than brief interventions in the reduction of alcohol consumption amongst participants (mean difference = -28 (95%CI -62 to 6) g/wk). Extended interventions appeared to be more effective in reducing drinking intensity (mean difference = -0.7 (95%CI -1.3 to -0.1) g/drinking day). One trial reported the number of drinking days following extended intervention, with a statistically significant benefit of extended intervention vs brief intervention demonstrated (mean difference = -0.7, 95%CI -1.3 to -0.1 g/drinking day). No significant differences were observed between groups in drinking intensity (mean difference = - 5.8 (95%CI – 12.7 to 24.4) g/drinking day. No significant

differences in GGT levels between subjects receiving extended interventions and brief interventions were observed (mean difference = -2.6 (95%CI -15.7 to 10.4) U/l.

This review provides clear supportive evidence for the use of brief interventions for alcohol misuse, with positive effects reported for a range of alcohol-related outcomes.

Laker *et al.* (2007) (Systematic review, +)

The review by Laker *et al.* (2007) focused on the efficacy of brief interventions and motivational interviewing in the treatment of patients with a dual diagnosis of a psychiatric condition and substance abuse. This review provides a small amount of evidence to support the use of motivational interviewing in patients with a dual diagnosis.

Three included articles reported on the impact of intervention on alcohol misuse. One study (Hulse & Tait, 2002), investigating the use of brief interventions for alcohol misuse in adult psychiatric in-patients, found a significant improvement (according to the National Health and Medical Research Council classification of categorisation according to levels of improvement) in subjects in the motivational interviewing group vs control subjects receiving an information package alone (no further data). A further study in adult inpatients with psychiatric disorders showed no difference in effect between motivational interviewing and control group (receiving information package only) in terms of hospital admissions at 5 years (Hulse & Tait, 2003). A third study (by Graeber *et. al.,* 2003) in patients with schizophrenia and alcohol use disorders reported significantly reduced alcohol consumption at 4, 8 and 24 weeks in the motivational interviewing group vs control group subjects receiving an educational treatment (no further data).

Littlejohn (2006) (Systematic review, +)

A systematic review by Littlejohn (2006) was undertaken to explore the impact of socioeconomic status on the effectiveness of brief interventions for non-dependent alcohol misuse (and is described in detail). Socioeconomic status does not appear to have an impact on the effectiveness of brief interventions.

Brief interventions comprised feedback and advice to reduce alcohol consumption and were delivered by generalist medical or nursing staff in primary care. No information was available on the control conditions used in included studies. Country of setting of included studies was not reported. None of the 4 included studies reported socioeconomic status (defined by social class, employment and education) as having an effect on alcohol consumption following brief interventions delivered in primary care (no further data presented).

McCambridge & Jenkins (2008) (Systematic review, ++)

McCambridge & Jenkins (2008) determined the impact of brief interventions for alcohol misuse on cigarette smoking. No secondary effects of alcohol-focused brief interventions on smoking were found.

Studies were based in primary care, occupational health clinic setting, emergency hospital settings, general hospital wards, teaching college and a health screening agency. Studies were conducted in Finland (1 study), Sweden (1 study), USA (4 studies) and across 10 countries (1 study). Baseline alcohol consumption was not reported. Two publications were identified which reported that brief intervention did not result in a reduction in alcohol consumption (where 2 sessions of brief interventions were delivered in primary care practices comprising a workbook with feedback and information and a follow-up phone call) vs control (where subjects received a general health booklet only). In addition, a further 2 included trials reported a reduction in consumption (no further data presented). The authors reported no impact of brief interventions for alcohol misuse on smoking cessation, with a non-significant mean difference in mean number of cigarettes smoked per day of -0.08 (95%CI -1.38 to 1.21). Therefore, it does not appear that brief interventions for alcohol misuse have any secondary effects on other addictive behaviours, such as smoking.

Moyer *et al.* (2002) (Systematic review, ++)

Moyer *et al.* (2002) explored the effectiveness of brief interventions in treatment-seeking and non-treatment seeking populations. Individuals were classed as treatment-seeking if they responded to advertisements or were referred/mandated for alcohol treatment. Patients were categorised as non-treatment-seeking if they were identified opportunistically during non-alcohol-related care. Evidence was identified demonstrating the effectiveness of brief interventions.

Care settings and country of study were not reported. The majority of studies excluded alcohol dependent patients (27/32 for brief intervention vs control studies; 10/20 for brief intervention vs extended treatment studies). Baseline alcohol consumption was not reported. Brief interventions included no more than 4 sessions. Length of treatment contact ranged from 5 min to 2 hrs. Some interventions involved no contact with an intervener, but were based on written self-help materials. Interveners included psychologists, social workers, nurses, health advisors and primary care physicians.

The effectiveness of brief interventions was compared with control in non-treatment-seeking subjects (who were identified opportunistically during general health care). For a composite measure of all drinking-related outcomes, pooled effect sizes were calculated at various follow-up points. Brief interventions resulted in statistically significant small to moderate effect sizes favouring a positive effect on drinking outcomes at ≤3 months (0.300, P<0.01), >3-6 months (0.144, P<0.001) and >6-12 months (0.241, P<0.01) follow-up. In terms of alcohol consumption alone, statistically significant small to large effect sizes indicating reduction were observed at ≤3 months (0.669, P<0.001), >3-6 months (0.160, P<0.001), and >6-12 months follow-up (0.263, P<0.001). Therefore, brief interventions can be seen to have positive effects on drinking outcomes and reducing alcohol consumption. At >3-6 months follow-up, the observed effect size was larger if alcohol-dependent subjects were excluded from the analysis.

For extended treatment (including longer sessions of counselling and treatment by alcohol specialist staff) (vs brief intervention) in treatment-seeking subjects (including individuals responding to advertisements or referred for treatment) (positive values indicate better outcomes for extended interventions), no statistically significant effect sizes were observed for the composite outcome variable. For alcohol consumption, the only follow-up point at which a statistically significant positive effect size was observed was at >3-6 months (0.415, P<0.01).

Nilsen *et al.* (2008) (Systematic review, ++)

The authors of this work (Nilsen *et al.*, 2008) reviewed the effectiveness of brief interventions delivered to injury patients in emergency care settings.

Fourteen relevant studies were identified. Twelve included studies compared pre- and post-brief intervention outcomes. Eight studies focused on injury patients treated in emergency departments and studies involved patients admitted to hospital inpatient service (3 in Level 1 trauma centres, 2 in hospitals). Nine studies were conducted in the USA and 5 originated in Europe (Finland, Wales, Spain, Germany, Switzerland). All studies (with the exception of 2 studies by Antti-Poika *et al.* and Smith *et al*, in which males were the sole focus) included both genders. Six studies included patients aged 18 yrs and over, whilst Blow *et al.* included patients aged 19 yrs and over. Maio *et al.* included a younger study population, consisting of patients aged 14 to 18 yrs. Most studies focused on non-dependent 'at risk' or hazardous drinkers. Maio took a 'universal' approach and did not apply any alcohol inclusion criteria. The number of patients ranged from 85 (Dauer *et al.*) to 1139 (Neumann *et al*).

Brief interventions were delivered by a range of routes including via nurses (Antti-Poika *et al.* (in inpatient hospital and outpatient department), Smith *et al.*, Dauer *et al.*, Sommers *et al.*), physicians (Antti-Poika *et al.* (outpatient department)), psychologists (Gentilello *et al.*), research assistants (Runge *et al.*), social worker or trauma surgeon (Schermer *et al.*), trained masters and/or PhD-level counsellors or psychology students (Longabaugh *et al.*, Daeppen *et al.*, Soderstrom *et al.*), computer-based BIs with provision of computer-generated feedback (Maio *et al.*, Blow *et al.*, Neumann *et al.*). The duration of brief intervention sessions varied from a few minutes to 1 hour. Most studies included one brief intervention session; however Sommers *et al.* and Longabaugh *et al.* both included two sessions, whilst Antti-Poika *et al.* employed two to five sessions. The brief interventions in the studies by Gentilello *et al.*, Longabaugh *et al.*, Smith *et al.*, Duer *et al.*, Schermer *et al.*, Sommers *et al.*, Daeppen *et al.*, and Soderstrom *et al.* were based on motivational interviewing principles and guided by FRAMES methodology. Three studies did not use traditional control group conditions but compared brief intervention groups of varying intensity. Blow *et al.* compared four brief intervention conditions. Dauer *et al.* compared a regular brief intervention group with a shorter intervention of simple advice. Soderstrom *et al.* compared a personalised motivational interview with an information and advice intervention.

Brief intervention group patients showed greater reductions in negative outcomes than control group subjects. However, control group patients also tended to show improvements. Antti-Poika *et al.* observed that more than twice as many brief intervention patients vs control group subjects had 'improved' at 6 months after intervention, with improvement classed as decrease in alcohol consumption by at least one third and decrease in GGT by at least 20%. Alcohol intake decreased in both brief intervention and control groups at 6 months but at 12 months follow-up, the difference was maintained solely in brief intervention subjects. Smith *et al.* observed greater improvements at 12 months in brief intervention patients vs control patients in alcohol problems, drinking above recommended levels and proportion of hazardous drinkers. The most intensive condition but not regular brief intervention condition reduced alcohol-related negative consequences more than control group at 12 months. Five studies (Dauer *et al.*, Schermer *et al.*, Sommers *et al.*, Daeppen and Soderstrom) did not yield significant differences between treatment groups. Maio was the only study in which favourable results for either brief intervention or control conditions were not observed. Blow and Neumann reported favourable results.

More intensive interventions typically yielded more favourable effects, but the review authors were unable to make any dose-response conclusions. Longabaugh *et al.* found a booster session to be required for effectiveness of brief intervention.

One study focused on facial injury patients treated in outpatient clinic following emergence department care in Wales (Smith *et al.*, 2003), in which male patients aged 16-35 yrs, with an alcohol intake of 8+ units prior to injury were included. Brief intervention constituted one session delivered by a nurse during follow-up care at an outpatient clinic (duration not reported), consisting of manual-guided counselling based on MI principles. At 3 months follow-up, the proportion of subjects drinking above recommended levels showed slight reduction. At 12 months follow-up, a decrease from 60% at baseline to 27% for brief intervention group subjects was observed vs. 54% to 51% for control. Furthermore, 70% of brief intervention subjects reported no alcohol problems at 12 months vs 58% of control. The proportion of hazardous drinkers (according to unstated AUDIT cut-off) reduced from 95% at baseline to 58% at 12 months for brief intervention group patients vs 96% to 81% for control group subjects.

A number of study authors suggested that alcohol-related injury alone may result in a degree of self-initiated behaviour change, explaining why control group subjects also showed some improvements in alcohol-related measures.

Eleven of the 12 studies presented a significant effect of brief intervention on at least one of the following outcomes: alcohol intake, risky drinking practices, alcohol-related negative consequences, or injury frequency.

Poikolainen (1999) (Systematic review, ++)

This review (Poikolainen, 1999) explored the effectiveness of very brief interventions (of 5 to 20 min duration) and extended brief interventions (several visits) vs. no intervention in primary care. Extended brief interventions and very brief interventions appeared to be effective in reducing alcohol consumption in both men and women.

Interventions were classed as ‘very brief’ (approximately 5 to 20 min) and ‘extended’ brief intervention (including several visits). The range of interventions included advice, feedback, written materials and follow-up. The ages of included participants ranged from 17 to 70 years. Inclusion criteria included consumption of 35 British units or more for males or 21 units for females; females drinking 220 to 700 g/wk; elevated GGT levels (50-200 U/l or more for men and 45-200 U/l or more for women; intake exceeding 350g/wk for men and 210 g/wk for

women; and 14 drinks or more/wk for males and 11 drinks/wk (each 12 g of alcohol) for females.

Very brief interventions were effective in reducing alcohol consumption for both genders combined vs. no intervention (mean difference = - 70 (95%CI -99 to -40) g/wk). Extended brief interventions were effective in reducing alcohol intake (vs control) for both genders (mean difference = -65 (95%CI -79 to -51) g/wk). However, the authors noted that the considerable degree of statistical heterogeneity observed in the analysis would mean that these pooled estimates would not be meaningful. The review reported on the effectiveness of brief interventions in males and females (and is described in greater detail below). Very brief intervention resulted in a decrease in pooled GGT levels of -9.4 (95%CI -15 to -3.3) U/l, whilst extended brief interventions produced a non-significant reduction in GGT levels by -1.4 (95%CI -3.0 to 1.2) U/l.

Tait & Hulse (2003) (Systematic review, ++)

Tait & Hulse (2003) presented evidence for a small but significant positive effect of brief intervention for alcohol misuse in adolescents.

Eight studies related brief interventions for alcohol were presented, all of which were undertaken in the USA. The majority of participants (58%) were recruited via university based interventions, 26% through school-based interventions, 9% through hospital emergency department and 7% through outpatient clinic. Mean age ranged from 13.8 (SD=0.9) years to 19.6 (SD=0.90) years. Populations ranged from 22 to 84% female. Baseline alcohol consumption was not reported. The majority of interventions were based on the motivational interviewing (MI) approach. Some interventions also incorporated the use of written materials/telephone contact. Studies concerning school-curriculum-based interventions and studies where the outcome was simply attitudinal rather than behavioural change were excluded. Interventions exposure was not reported. Interveners not reported, bar one trial in which nurses delivered the intervention. Control groups included no treatment/usual care/booklet or group feedback.

Effect sizes were calculated (Cohen's *d*). Where multiple outcome measures were reported, the mean effect size was used. An overall small positive effect size of 0.275 ($P<0.0001$) was observed for intervention vs control. Subanalysis of only the interventions that used an MI approach yielded a slightly smaller effect size of 0.241 ($P<0.01$). However, the review did not describe any assessment of the methodological quality of the included studies. The clinical heterogeneity within the studies in terms of follow-up periods, interventions, settings and

outcome measures means that the pooling of results in a meta-analysis caution should be used in the interpretation of these findings.

Vasilaki *et al.* (2006) (Systematic review, ++)

Vasilaki *et al.* (2006) reviewed the effectiveness of brief interventions delivered with motivational interviewing principles vs no intervention in reducing alcohol consumption. The authors concluded that brief motivational interviewing for alcohol misuse was effective.

Studies were undertaken in college student settings (7 studies), outpatient community settings (6 studies) emergency room/clinical settings (5 studies), and specialist treatment agencies (2 studies). The setting of studies by country was not reported. The mean age of participants was 31.77 years (SD=10.26). 996 (of a total of 2767) subjects were classed as dependent drinkers. 1771 participants were categorised as heavy or abusive drinkers. The mean duration of brief MI was 87 min in studies of MI vs. no treatment. The control condition in 9 studies was no treatment. No data on baseline alcohol consumption were presented.

The authors presented evidence for a reduction of relatively small magnitude in alcohol consumption following brief intervention (delivered with motivational interviewing principles) vs no treatment (aggregated effect size = 0.18 (95%CI 0.07 to 0.29). The effect size was greater for ≤ 3 months follow-up (0.60, (95%CI 0.36 to 0.83) than ≤ 6 months (0.06, 95%CI -0.06 to 0.18). The effect size of intervention was significant when drinkers with more severe problems (no further detail) were excluded (yielding a moderate effect size of 0.40, 95%CI 0.36 to 0.44). The authors concluded that approximately 87 min of brief intervention with motivational interviewing principles was effective in reducing alcohol consumption amongst non-dependent drinkers on a short-term basis (≤ 3 months). Four studies included dependent drinkers. It was noted that the magnitude of the observed effect sizes (not reported) increased according to the inclusion of a low-dependent, treatment-seeking population. The authors suggested that this may be based on a greater readiness to change amongst such a sample.

Webb *et al.* (2009) (Systematic review, ++)

This review by Webb *et al.* (2009) was performed in order to assess which work-place interventions are effective in the reduction of alcohol-related problems. Findings relating to brief interventions are presented here.

Counselling and brief intervention strategies were among those considered in the review, including the feedback of results of self-reported drinking, lifestyle factors and general health

checks. An RCT conducted in Sweden in which paper, pulp and wood industry workers at routine Occupational Health Service checks were offered alcohol screening and randomised to brief counselling or intensive counselling (by Occupational Health Service staff) or no counselling (no further data available on experimental conditions) showed no significant differences between groups (Hermansson *et al.,* 1998). A trial in the USA by Heirich & Sieck (2000) suggested that industrial workers selected through cardiovascular health screening decreased their alcohol consumption following an individual outreach counselling intervention by research staff (no further detail). Lapham *et al.* (2003) reported a significant reduction among USA-based healthcare professionals invited to attend health appraisals in the desire to binge drink following a project included brief counselling. Cook *et al.* (1996) found, in their study based in the USA, that printing company workers showed improved outcomes in drinking behaviour as a result of a working people programme based on self-efficacy, social resistance skills and social support. However, the evidence base was described as being limited both methodologically and in the scarcity of available studies. The authors concluded that brief interventions have potential in reducing alcohol-related problems.

Whitlock *et al.* (2004) (Systematic review, ++)

This review (Whitlock *et al.,* 2004) investigated the efficacy of brief behavioural counselling in primary care to reduce risky and harmful alcohol consumption.

Studies were undertaken in the USA (9 studies), UK (3 studies), Norway (2 studies) and Australia (1 study). The lowest age cut-off for inclusion was 12 years, with the upper age unspecified. Baseline alcohol consumption ranged from 14.9 drinks/wk to 62.2 drinks/wk. Approximately one third of participants were female. Proportions of non-White subjects were low where reported in recent USA studies (4 to 27% non-White). Interventions were classified according to intensity of exposure, and were classed as very brief interventions (1 session of up to 5 min duration (2 studies), brief interventions (1 session of up to 15 min duration) (6 studies) and brief multi-contact interventions (up to 15 min duration and follow-up contact) (7 studies). Control group conditions were not reported. Interveners included clinicians, research staff, and nursing staff.

A reduction in alcohol consumption in 4 good quality trials following brief multi-contact interventions (13% to 34% greater reduction in subjects following brief intervention vs control) (resulting in 2.9 to 8.7 fewer mean drinks/wk) was reported. Two trials included in the review reported a significant reduction in binge drinking following brief multi-contact interventions (no further data presented). A non-statistically significant trend towards a reduction in all-cause mortality (P>0.10) was observed following brief multi-contact

intervention. The authors also stated that brief multi-contact interventions resulted in fewer self-reported hospital days vs control at 48 months follow-up (429 vs. 664 days, P<0.05). Three studies of very brief interventions (a single session of up to 5 min duration) presented findings of a statistically significant reduction in alcohol consumption (no further data). Therefore, this review suggests that very brief interventions and brief multi-contact interventions are effective. All interventions producing significant improvements in outcomes included 2 of the 3 following key elements: feedback, advice and goal-setting.

Wilk *et al.* (1997) (Systematic review, ++)

The review by Wilk *et al.* (1997) investigated the effectiveness of brief interventions in heavy drinkers. The identified evidence showed that brief interventions were effective in reducing alcohol consumption.

One study was undertaken in Sweden; 1 study in Norway; the country of study setting was not reported by remaining authors. Participants were drawn from the general population and outpatient and inpatient settings. Inclusion criteria for age covered the range 19 to 65 years. Nine studies included participants drinking more the 20 to 35 drinks/wk. Other inclusion criteria used were elevated GGT levels, positive CAGE or MAST questionnaire scores and scales of alcohol-related problems. Five of the 12 included studies excluded patients with severe alcohol dependence. Interventions were described as 'short motivational counselling sessions' with feedback, education and advice to reduce consumption. Advice sessions ranged from 10-15 min to 60 min, with follow-up sessions varying from 0 to 3 sessions. Control subjects received no intervention.

Subjects who received brief intervention were almost twice as likely to have moderated their drinking at 6-12 months follow-up vs control (OR=1.95, 95%CI 1.66 to 2.30). The authors reported a greater likelihood of subjects moderating their drinking with greater intensity of intervention (OR=2.12, 95%CI 1.66 to 2.70 for over 1 session vs OR=1.83 (95%CI 1.46 to 2.28) for 1 session).

The effectiveness of brief alcohol interventions in young people

5.3.3 Overall narrative synthesis of primary evidence of effectiveness of brief interventions for alcohol misuse in young people

Due to the limited evidence available in the above systematic reviews relating to young people, further searches were conducted to identify primary studies of the effectiveness of brief interventions in young people. School-based interventions are outside the remit of this guidance and were therefore excluded. A total of eight trials relating to the effectiveness of brief interventions in young people delivered outside educational settings were identified and included in this subsection of the review.

Characteristics of trials

The characteristics of the eight included trials evaluating the effectiveness of interventions in the reduction of alcohol use amongst young people are summarised in Table 1. The trials were published between 1999 and 2008. Seven of the trials were carried out in the USA (Boekeloo *et al.* 2004; D'Amico *et al.,* 2008; Maio *et al.,* 2005; Monti *et al.,* 1999; Monti *et al.,* 2007; Peterson *et al.*, 2006; Spirito *et al.,* 2004), and one in Australia (Bailey *et al.,* 2004). The majority of studies were of relatively high quality (++). However, two trials were judged to be less robust in study design. Bailey *et al* (RCT, +) used a relatively weak method of randomisation and concealment of allocation. The method of randomisation, concealment of allocation and baseline characteristics of treatment groups were unclear in the study reported by D'Amico *et al.* (RCT, +). Therefore, these studies were considered to be at relatively higher risk of bias.

Population

Study population sizes ranged from 34 to 655 young people. The age of participants ranged from 12 to 24 yrs. Data on previous drinking history of participants is presented in Table 1 where available. Three trials targeted the intervention at socioeconomically disadvantaged groups where drug and alcohol abuse were more prevalent, in order to access young people who were at risk of alcohol misuse (Bailey *et al.,* 2004; D'Amico *et al.,* 2008; Peterson *et al.,* 2008). Four trials recruited and conducted the intervention in an emergency department in order to maximise what could potentially be a 'teachable moment' for young people (Maio *et al.,* 2005; Monti *et al.,* 1999; Monti *et al,* 2007; Spirito *et al.,* 2004). Two studies recruited adolescents from a primary care setting during routine general check-ups (Boekeloo *et al.,* 2004; D'Amico *et al.*, 2008).

Interventions

Five trials (D'Amico *et al.,* 2008; Monti *et al.*, 1999; Monti *et al.,* 2007; Peterson *et al.,* 2006; Spirito *et al.,* 2004) tested a brief motivational interview (MI) which lasted between 20 to 45 minutes. A range of professionals including psychologists, clinicians, and youth workers, all of whom received training in motivational interview techniques, delivered the intervention. A pilot study tested a more intensive programme of motivational interviewing, which included 4 sessions during a one-month period (Bailey *et al.,* 2004). One study tested an audio programme (Boekeloo *et al.,* 2004) and one an interactive laptop based intervention (Maio *et al.,* 2005). It should be emphasised that the studies by Boekeloo *et al.* (2004) and Maio *et al.* (2005) were based on alternative modes of delivery of brief intervention, different to the traditional discussion form of brief intervention (as focused on in the review of systematic reviews). However, since the evidence base relating to brief interventions for alcohol misuse in young people (delivered outside of school-based settings) was relatively limited, these additional studies were included to reinforce the evidence available for this population group. The length of follow-up varied between 2 months and 12 months. The numbers included in final follow-up evaluations were high (79.6 to 100%) showing less attrition by study participants than might be anticipated, with the exception of D'Amico *et al.* (2008), with 34.4% of study population lost to follow-up.

Table 1. Key features of trials of the effectiveness of brief interventions in young people

Study details, design and quality	Country and Setting	Subjects Intervention/control	Age Mean (SD)	Drinking history	Intervention/control	Assessment tool	Follow-up periods	Follow-up n (%)
Bailey *et al.*, 2004 RCT, +	Australia Recruited from youth centre in area of low socio-economic status	12 to 19 year olds Volunteers 17/17 17 males (50%) Intervention group = 6 females, 11 males Control group = 11 females, 6 males Some participants were homeless (no further detail) Still at school n=22 (65%)	15.4 years (1.80)	Mean age of first alcohol intoxication = 12.6 yrs (SD=2, range 8 to 17) Non-drinkers at pre-treatment n=4 (12%) Intoxicated by age 13 yrs = 70% Ever consumed 6 or more drinks per session = 37, 80%	Intervention: Brief motivational interviewing (MI) and cognitive–behavioural based group programme of 4 group sessions (of up to 10 young people of mixed age and gender) of 30 minutes duration over 4 week period delivered by psychologist. Session 1 included basic information about alcohol, effects of drinking, attitudes towards drinking, setting limits and alcohol refusal skills. Session 2 included signs of alcohol dependence and alcohol overdose.	i) First 3 items of AUDIT, ii) Readiness to Change Questionnaire, iii) locally designed alcohol knowledge questionnaire, iv) Drug and Alcohol Problem (DAP) Quick Screen Tools	2 months	34 (100%)

				Predominantly drank with peers n= 23, 68%	Session 3 covered attitudes and beliefs towards alcohol, with beliefs challenged through motivational interviewing techniques of reflection, reviewing past experiences, provision of information and weighing of decisional balance (positive and negative aspects of drinking). Session 4 focused on safe drinking plans and alcohol refusal skills. Control group: fortnightly access to counsellor and information about services	administered at pre-treatment, post-treatment and at 1 and 2 month follow-up periods		
Boekeloo *et al.*, 2004 RCT, ++	USA Primary care practices	12 to 17 year olds seeing primary care provider for general check up 150/147/150 44% male 79% African American	12 to 17 years	16% currently drank 6-9% binged in last 3 months 13-19% drank alcohol in last 30 days	Intervention 1: 15 minute audio programme Intervention 2: 15 audio programme and prompts from primary care provider based on self assessed sheet Intervention audio programme messages around Social Cognitive	Adolescent alcohol beliefs, self-reported behaviours	12 months	409 (91.5%)

					Theory and Health Belief Model, with resistance to peer pressure to drink and abstinence from alcohol use being targeted behaviours, with audio tape working through questions relating to alcohol use and addressing consequences of each response, testimonials from other adolescents who wished they had avoided alcohol and activities that do not involve alcohol, with brochure on handling peer pressure to drink. Participants in intervention groups listened to audio programme over telephone at 6 month follow up telephone interview, to serve as a booster session/ Control group: Given headphones to listen to radio programme of their choice			
D'Amico *et al.*,	USA Primary care	12 to 18 year olds Socioeconomically	12 to 18	Reported last 30 day use: alcohol	Intervention group: Brief motivational interviewing	Screened positive at	3 months	42 (65.6%)

2008 RCT, +	setting providing care to underserved populations	deprived 47.6% male 85.7% Hispanic or Latino, 9.5% African American, 4.8% White 38/26	year olds	n=33, 78.6%, marijuana n=22, 52.4%, cigarettes n=16, 38.1% Reported lifetime use: alcohol n=42, 100%, marijuana n=34, 81%, cigarettes n=31, 73.8%	intervention duration 15 to 20 minutes ('Project CHAT'), with 5 to 10 min booster telephone session 1 month after completing Project CHAT (received by 11 of 22 participants) (delivered by trained case managers in mental health division of clinic). Session focused on assessment of motivation to change, enhancement of motivation to change, and making a plan. Booster reviewed session and goals/ Control group: Usual care	baseline using CRAFFT for inclusion in the study (using cut-off score of 1). Measured alcohol and marijuana use using RAND Adolescent/Young Adult Panel Survey.		
Maio *et al.*, 2005 RCT, ++	USA Minor injury department	14-18 year olds with a minor injury 67% male 67% White 94% in school 329/326	15.9 (1.5) 62% in 14 to 16 age range	Intoxicated patients excluded. 14 (2.4%) participants drank alcohol in previous 6 hrs before injury	Intervention group: baseline computer-based questionnaire survey and laptop-based interactive programme addressing alcohol misuse and based in the setting of a virtual house party, with content covering knowledge about alcohol, increasing refusal	Alcohol Misuse Index (Amidx) Alcohol Frequency/Quantity Index	12 months	580 (88.5%)

				43% drank alcohol, 26% binge drank, 12% of drivers reported drinking and driving within previous 12 months	skills and decreasing intentions to misuse alcohol (5.5% of participants required assistance from research assistant to complete laptop programme) (programme took approximately 25 min to complete) / Control group: computer-based questionnaire survey and standard care			
Monti *et al.*, 1999 RCT, ++	USA Hospital Emergency Department	18-19 year olds 52/42 64% male Mean 11.5 yrs (1.2) in school 80% White, 13% African American, 5% Asian/East Indian, 2% Hispanic	18.4 yrs (0.5)	Eligibility criteria included positive BAC or report of drinking alcohol before event precipitating treatment. Mean BAC (mg/dl) 159 (69); mean 8.0 drinking days/month	Intervention group: Brief motivational interview (35-40 min). Supplemented with same handouts as control patients, plus information sheet on effects of alcohol on driving and personalised feedback sheet. Mean time between admission and intervention = 35.8 hrs (SD=61.3). Delivered by bachelors to masters level staff members with 1 to 2 yrs of experience. All received extensive	Adolescent Drinking Index, Young Adult Drinking and Driving Questionnaire, Adolescent Injury Checklist, Health Behaviour Questionnaire, Adolescent Drinking	3 and 6 months	93% completed 3 month interview; 89% completed 6 month interview (no differential rates by group or gender)

				(7.8); mean 5.4 drinks/episode (1.9)	MI training. Control group: standard care consistent with handling alcohol-involved young people in urgent care setting, including leaflet on drinking and driving and details of local treatment agencies (approximately 5 min).	Questionnaire		
Monti *et al.*, 2007 RCT, ++	USA Level I trauma centre	18 to 24 yrs Intervention 69.4% male, control 66.0% male White 61 to 70%, Hispanic 12 to 13%, Black 5 to 8%, Asian 1 to 2%, American Indian 0 to 3%, other 9 to 15% 12 to 13 yrs in education	Mean age 20 yrs	Alcohol positive in admission (BAC above 0.01%), reported drinking alcohol in 6 hours prior to precipitating event, or met screening criteria for alcohol problems (score of 8 and above on AUDIT)	Intervention group: Brief Motivational Interview (1 session of 30-45 min duration) supplemented by discussion of graphic personalised feedback report (derived from baseline assessments) with telephone booster sessions at 1 month (20 min) and 3 months after baseline (25-30 min)). Control group: computer-generated personalised feedback report only (derived from baseline assessment), with minimal conversation with counsellor to	Timeline Follow Back method used to measure alcohol use. Other measures included Rutgers Alcohol Problem Index, Adolescent Injury Checklist	6 and 12 months	83.3% completed 6 month follow-up and 81.3% completed 12 month follow-up assessment

					address questions or concerns as appropriate of 1-3 min contact. Participants also received 1 month telephone call from counsellor with assessment as for MI group (5-10 min) (discussion of progress) and at 3 months as for MI group (assessment and new generation of new feedback sheet, 10-15 min). Interveners were bachelors and masters level clinicians with previous experience, with approximately 30 hrs of MI training.			
Peterson *et al.*, 2006 RCT, ++	USA Recruited from drop-in centres at agencies, from street intercept, and using	Homeless 14 to 19 year olds 92/99/94 54.7% male 72.3% Caucasian, 15.9% mixed race, 3.2% African American, 3.2%	17.4 (1.54)	Inclusion criteria: had at least 1 binge drinking episode (4 or more standard drinks for females, 5 or more for males)	Intervention group: Brief motivational enhancement interview (1 session) (personal feedback about alcohol-related or substance-related risk, personal goals and motivation to change, including hard copy booklet) (intervention sessions lasted for	Study scales	3 months	227 (79.6%)

	word of mouth or flyers	Native American, 1% other. 67.4% heterosexual. 44.3% not in school, 22% currently enrolled in school or general education degree programme, 17.7% held general education degree, 17% held high school diploma. Left home at average of 12.7 yrs and had been away from home 2.5 yrs. 21% had stayed with parents at least once in past 30 days (for an average of less than 2 days). 51% lifetime history of injection drug use. Approx 75% met DSM-IV criteria for		or used illicit 'street' drugs at least 4 times in last 30 days. 58% met DSM-IV criteria for alcohol abuse or dependence.	an average of 30 min, range 10 to 70 min) delivered by trained counsellors at field-site offices (additional feedback sessions offered but few scheduled and none completed) / Control group: assessment only/assessment at follow-up only			

		substance abuse or dependence. No between group differences at baseline on demographic characteristics.						
Spirito *et al.*, 2004 RCT, ++	USA Emergency departments	13 to 17 year olds in an emergency department with a positive blood alcohol concentration 78/74 63.8% male Non-Hispanic White 72% School status: middle school 28%, high school 55-59%, high school graduate 1.4-4%, dropped out/expelled 11-13% Reasons for ED visit	15.6 (1.2)	Participants included if they had a positive blood alcohol concentration or self-reported drinking in preceding 6 hrs before injury. Participants not approached until their BAC was <0.1 and/or they passed mental status examination.	Intervention: Brief motivational interview during or soon after ED visit (including same set of handouts as those in control group, plus information sheets on negative effects of alcohol, effects on driving and personalised feedback). Duration 35 to 45 minutes. Delivered by bachelors and masters level interventionists trained in MI (of approx 24 hrs duration) with 1 to 2 yrs of clinical research experience / Control group: standard care – 5 minutes of advice regarding drinking behaviour and a handout	Assessment battery, including Adolescent Drinking Questionnaire, Adolescent Drinking Inventory, Young Adult Drinking and Driving Questionnaire, Adolescent Injury Checklist, Adolescent	12 months	124 (81.6%)

		included: intoxication only 51-54%, motor vehicle crash 15-19%, assault 10-13%, fall 9-10%, other injury 6%, illness 1%			on avoiding drinking and driving.	Health Behaviour Questionnaire, and Short MAST.		

Assessment

Included studies used a range of assessment tools, which are described in Table 1.

Outcomes

Outcomes of the eight included trials are presented in Table 2. Four trials reported significant positive effects of brief interventions on measures of alcohol consumption (Bailey *et al.*, 2004; Monti *et al.*, 1999; Monti *et al.*, 2007; Spirito *et al.*, 2008). The trial by Bailey *et al.* (2004) showed a consistent pattern of effectiveness across a range of outcomes measuring alcohol consumption. The intervention group in this study reported significantly less frequent drinking and episodes of hazardous drinking than the control group at follow-up. Subjects in the brief motivational interviewing group in the study by Monti *et al.* (1999) were less likely to drink and drive or experience alcohol-related injury than those in the control arm of the study, whilst both treatment groups significantly reduced their alcohol consumption. Alcohol consumption was also significantly decreased in both brief motivational interview and control groups in the study by Monti *et al.* (2007). Sprito *et al.* (2008) only observed differences between treatment groups when baseline alcohol problem use was taken into account in the analysis, with adolescents scoring above the ADI clinical cutoff for alcohol problems who received MI reporting lower frequency of drinking ($p<0.01$) and lower frequency of high volume drinking ($p<0.01$) at follow-up than control group subjects. However, one trial (Boekeloo *et al.* 2004) reported an increase in alcohol use and binge drinking amongst intervention group subjects, representing possible harm to participants as a result of intervention. No other trials reported adverse outcomes associated with the intervention.

Table 2. Outcome measures for alcohol intervention in young people

Study	Outcome	Endpoint sample	Intervention mean (SD)	Control Mean (SD)	Statistical significance
Bailey *et al.*, 2004	Frequency of drinking (range 0-4) (AUDIT item 1)	17/17	1.88 (1.05)	2.35 (0.93)	P<0.05
	Hazardous drinking (range 0-12)		5.06 (2.70)	7.06 (2.22)	P<0.05
	Risk taking behaviours		2.59 (1.33)	2.18 (1.07)	P<0.05
	Frequency of binge drinking (AUDIT item 3)		1.65 (0.93)	2.35 (0.93)	P<0.05
	Drinks consumed per occasion (AUDIT item 2)		1.53 (1.37)	2.35 (1.32)	P<0.05
Boekeloo *et al.*, 2004	Binged in last 3 months	136/135/138	I: 11.1% II: 13.0%	5.1%	I vs control: OR 3.0 (1.44 to 6.24) II vs control: OR 2.86 (1.13 to 7.26)
	Drank in last 30 days		I: 37.8% II: 29.7%	23.5%	I vs control: OR 2.31 (1.31 to 4.07) II vs control: OR 1.25 (0.76 to 2.06)

	Refused drink when asked by others		I: 65.2% II: 71%	61%	NS
D'Amico *et al.*, 2008	Number of days consumed (last month)	20/22	Effect of estimate of intervention -0.80 (SE=0.63)		P= 0.210
	Number of drinks consumed		-0.18 (SE=2.72)		P = 0.675
	Number of days consumed 3+ drinks		-0.22 (SE=2.27)		P = 0.542
Maio *et al.*, 2005		295/285			
	Amidx used to measure alcohol misuse	279/271	1.8	2.1	NS
	Binge drinking (times in past 3 months)	289/275	1.4	1.2	NS
	Alcohol frequency-quantity (drinks/month)	289/277	7.1	7.5	NS
Monti *et al.*, 1999	Drinking and driving	52/42	OR (SC:MI) = 3.92		95%CI 1.21 to 12.72
	Alcohol-related injury		OR = 3.94		95%CI 1.45 to 10.74
	Alcohol-related problems		Effect size of		P<0.05

			intervention = 0.23		
	Alcohol consumption (ADQ total scores)		Significant reductions in ADQ total scores ($p<0.001$), with no difference by group		No difference by group
Monti *et al.*, 2007	Number of drinking days past month	78/83	Mean (SD) Baseline: 8.27 (6.35) 6 month FU: 4.73 (5.64) 12 month FU: 4.52 (5.70)	Mean (SD) Baseline: 7.31 (6.27) 6 month FU: 6.19 (6.58) 12 month FU: 6.54 (6.24)	
	Number of heavy drinking days past month	78/83	Mean (SD) Baseline: 5.49 (5.94) 6 month FU: 2.87 (4.77) 12 month FU: 2.72 (4.70)	Mean (SD) Baseline: 4.01 (4.48) 6 month FU: 3.64 (4.47) 12 month FU: 3.53 (4.28)	
	Average number of	78/83	Mean (SD)	Mean (SD)	Both groups

	standardised drinks per week past month		Baseline: 13.07 (11.95) 6 month FU: 6.63 (9.22) 12 month FU: 6.10 (8.33)	Baseline: 10.77 (10.73) 6 month FU: 9.20 (12.16) 12 month FU: 8.83 (9.67)	significantly reduced alcohol consumption from baseline to 6 and 12 month FU. MI group had significantly greater reductions in consumption than control on all 3 measures at 6 and 12 month FU.
	Alcohol-related injury, past yr	65/73	Baseline: 52 (80.0%) 12 month FU: 31 (47.7%)	Baseline: 56 (76.7%) 12 month FU: 32 (43.8%)	
Peterson *et al.*, 2006	Binge drinking Days of alcohol use	69/77/58	Authors reported that there was no differential reduction in alcohol use according to intervention group		NS

			(interaction *F* statistics ranging from 0.001 to 1.087). No differential intervention effects observed on basis of demographic characteristics.		
Spirito *et al.*, 2004	Frequency (days/month)		2.88 (4.04)	5.01 (6.11)	NS
	Quantity (per occasion)		3.56 (2.54)	3.67 (2.77)	NS
	High volume drinking (days/month)		1.66 (2.85)	3.11 (4.74)	NS
			Adolescents scoring above the ADI clinical cutoff for alcohol problems who received MI reported lower frequency of		

			drinking ($p<0.01$) and lower frequency of high volume drinking ($p<0.01$) at FU than control group subjects.		

Discussion

Eight trials published between 1999 and 2008 studied the effectiveness of a range of brief interventions in the reduction of harmful and excessive alcohol use and related problems among young people. Four studies described statistically significant benefits as a result of intervention. Bailey *et al.* (2004) found brief intervention to result in a consistent pattern of effectiveness across a range of outcomes relating to alcohol consumption. However, this small-scale pilot study differed from other trials, being judged to be of less robust study design (+) and having a greater intensity of intervention, which was group-based, spanned a month and included 4 sessions with the interventionist. The length of follow-up was also shorter (2 months) than any of the other trials; therefore it is not possible to say whether the changes at 2 months would still be apparent at a later follow-up or were only short-term. Subjects in the brief motivational interviewing group in the study by Monti *et al.* (1999) were found to be less likely to drink and drive or experience alcohol-related injury than those in the control arm of the study, whilst both treatment groups significantly reduced their alcohol consumption. Alcohol consumption was also significantly decreased in both brief motivational interview and control groups in the later study by Monti *et al.* (2007). Both these studies were based on longer follow-up periods than in the study by Bailey *et al.* (2004). The statistically significant differences between treatment groups observed by Spirito *et al*. (2008) were present when the presence of an alcohol problem at baseline was taken into account in analyses.

However, one study (Boekeloo *et al.* 2004) found negative consequences following intervention, with an increase in heavy alcohol use amongst the intervention group. The study was of relatively small sample size. The authors suggested that, whilst the use of the audio intervention was not effective in reducing alcohol-related outcomes, the programme may have resulted in recipients becoming more open and forthright in discussing alcohol-related issues, with a bias in self-reporting of alcohol consumption between treatment groups.

The evidence for effectiveness of brief interventions to reduce alcohol consumption in young people appears inconclusive. Four trials reported significant positive effects of brief intervention, whilst a further study described negative alcohol-related consequences as a result of intervention. Other trial findings were not statistically significant. Spirito *et al*. (2008) suggested that among individuals with low alcohol use, a visit to an emergency department for an alcohol-related event may provide sufficient motivation for behaviour change in both intervention group and control group subjects, with no further benefit yielded by brief intervention, unless the subject was displaying problematic alcohol use at baseline. It was also suggested in a number of studies that control group subjects may have experienced

assessment reactivity, with study contact and assessment yielding behaviour change in the absence of brief intervention and mitigating the potential effect size between treatment groups.

It may also be that the design of the brief interventions used in among young people need further consideration in order to optimise suitability for use in this age group. Natarajan & Kaner commented that the patterns of alcohol consumption of young people should be taken into account, in that adolescents drink less frequently but at a higher intensity, and therefore that intervention with this age group may require a different approach to that employed among adults. The considerable heterogeneity among young people in psychological development, particularly along the age spectrum and among vulnerable young people must also be taken carefully into account.

The evidence base was largely based on trials set in the USA and may not be readily generalisable to the UK setting. The systematic review by Tait & Hulse included in the review found a small but significant positive effect of 0.275 ($P<0.0001$) for intervention vs control. The systematic review did not describe any assessment of the methodological quality of the included studies. The clinical heterogeneity within the studies in terms of follow-up periods, interventions, settings and outcome measures means that the pooling of results in a meta-analysis should be interpreted with caution.

The evidence identified in this review should be considered alongside the conclusion of previous NICE guidance relating to school-based alcohol brief interventions. This work found that brief intervention programmes targeting children aged 12-13 yrs and based on nurse-led consultations relating to a young person's alcohol use (eg. the STARS for Families programme) may produce short-term, but not medium-term decreases in heavy drinking. The previous review of school-based alcohol interventions suggested that other in-school approaches to prevent or reduce alcohol use such as counselling programmes, peer support and teacher training also did not produce reductions in alcohol use behaviours.

5.3.4. Narrative synthesis of review findings presented by subgroup

Setting of delivery

A considerable number of reviews (all of which were systematic reviews of relatively high quality (++)) identified evidence for the effectiveness of brief interventions delivered in primary care in the reduction of a range of negative alcohol-related outcomes, including alcohol consumption, alcohol-related injuries, GGT levels, binge drinking and mortality. It

should be noted that the operationalisation of primary care used by Kaner *et al.* incorporated the use of emergency care. Three further pieces of work by (D'Onofrio & Degutis, 2002) (systematic review, +), (Havard *et al.,* 2008) (systematic review, ++) and Nilsen *et al.* (systematic review, ++) put forward further limited evidence that brief interventions are effective when delivered in emergency care in the reduction of alcohol consumption, alcohol-related injuries and alcohol-related social consequences. The majority of systematic reviews did not state the intoxication status of the study sample within the included primary studies. However, Havard *et al.* (2008) reported in their systematic review of brief interventions in emergency care settings that exclusion criteria of primary studies typically included patients being too intoxicated on presentation. Emmen *et al.* (2004) (systematic review, ++) presented inconclusive evidence of the effectiveness of brief interventions delivered in inpatient and outpatient general hospital settings. However, one primary study included this review showed convincing evidence of the effectiveness of brief interventions delivered in a hypertension clinic (Maheswaran *et al.,* 1992). Other presented reviews included primary studies drawn from a range of mixed settings. Subjects receiving brief interventions as inpatients were more likely (OR=2.41 (95%CI 1.40 to 4.15) to moderate their drinking at 6-12 months follow-up than subjects who received brief interventions as outpatients (OR=1.91 (95%CI 1.61 to 2.27) (although it should be borne in mind that these sets of confidence intervals show an overlap) (Wilk *et al.,* 1997). Evidence has therefore been identified for the effectiveness of brief interventions across a range of settings, particularly in primary care.

The timing of delivery of screening and brief interventions was not clear from the majority of the included systematic reviews. However, Kaner *et al.* categorised studies according to clinical (effectiveness) vs research (efficacy) representativeness. Studies were classed as clinical in intervention context if fitting with current practice in terms of delivery (eg. an initial screening accompanied by a return visit for brief intervention).

Very limited evidence was identified for non-healthcare settings. A systematic review of work-place alcohol interventions by Webb *et al.* (2009) was identified that suggested that, whilst the existing evidence was limited methodologically and available studies were scarce, brief interventions may achieve favourable outcomes in alcohol-related problems in an occupational setting. The authors highlighted the requirement for further research in this area.

Gender

A number of systematic reviews (all of relatively high quality, ++) presented information relating to the impact of brief interventions for alcohol misuse.

One review (Ballesteros *et al.*, 2004b) investigated the effect of gender on the effectiveness of brief interventions in primary care in depth. Standardised effect sizes for weekly alcohol consumption were calculated by gender and were found to be similar, with reductions in alcohol consumption observed in both subgroups. The standardised effect sizes of brief intervention vs. reference treatment were –0.26 (95%CI –0.34 to –0.17) for men and –0.26 (95%CI –0.38 to –0.13) for women. The standardised effect size when pooled for both genders was – 0.26 (95%CI -0.33 to 0.18). Four studies explored the frequency of subjects consuming alcohol below hazardous levels in male and female subgroups, finding a similarly favourable impact of brief intervention for both genders (OR = 2.32 (95%CI 1.78 to 2.93) for males vs. OR=2.31 (95%CI 1.60 to 3.17). This review therefore points to a comparable positive effect of brief interventions on alcohol consumption in both males and females.

Similarly, the review by Bertholet *et al.* (2005) on the effectiveness of brief interventions in primary care found only a small difference in effect size between men and women (P=0.75, no further data presented).

No differences by gender in the effects of brief interventions vs control were found by Whitlock *et al.* (2004)

Wilk *et al.* (1997) presented evidence showing an increased effectiveness of brief interventions in females. Subjects receiving brief interventions moderated their drinking in both female (OR=2.42 (95%CI 1.70 to 3.45) and male (OR=1.90 (95%CI 1.57 to 2.31) subgroups.

Conversely, Kahan *et al.* (1995) described brief interventions as being more effective in males than females. In 3 studies, the proportion of male subjects in the intervention group decreasing their alcohol consumption to moderate levels (where moderate drinking was defined as 13 to 16 drinkers per week (no further detail)), was greater than control group subjects by 18%, 13% and 7%. Four of the 8 studies measuring GGT levels, reported a significantly greater decline in levels in male intervention group patients vs control group subjects (no further data). Two studies described a significant decrease in systolic blood pressure. The authors noted that the findings for women were less conclusive. Only 1 trial reported statistically significant improvements in alcohol consumption, with a reduction of 3.4 drinks/wk on average and a greater proportion of female intervention group subjects reducing their drinking from heavy to moderate levels vs control group participants (18.5%).

However, the relatively early date of publication of this review and limited existing evidence base should be taken into consideration in interpreting these findings.

The more recently published review undertaken by Kaner *et al.* (2007) found equivocal evidence for the impact of gender, with brief interventions appearing to be marginally more effective in men than women. Brief interventions were shown to be effective (vs control) in reducing alcohol consumption (in terms of grams of alcohol consumed per week) amongst male subjects (mean difference of -57 (95%CI -89 to -25) g/wk) but not females (mean difference of -10 (95%CI -48 to 29) g/wk). There were no significant differences in the effectiveness of extended interventions (vs brief interventions) according to gender: for men a mean difference of -17 (95%CI -90 to 57) g/wk and for women a mean difference of –52 (95%CI -18 to 77) g/wk were reported. No impact of gender on the effectiveness of brief interventions in reducing frequency of alcohol intake in terms of drinking days per week. No significant difference between genders was observed in intensity of drinking following brief intervention (vs control). Amongst females, a non-significant increase was observed (mean difference = 24.2 (95%CI -17.2 to 65.5) g/drinking day; whereas in men a non-significant decrease in intensity was evident (mean difference = - 7.4 (95%CI -31.5 to 16.8) g/drinking day. The authors found no differential impact on effectiveness according to gender in levels of laboratory markers. In terms of GGT outcomes, a non-significant decrease was observed amongst men (mean difference = - 2.2 (95%CI -6.3 to 2.0) U/l, whilst for women, a non-significant increase was reported (mean difference = 3.5 (95%CI -6.0 to 12.9) U/l.

Poikolainen (1999) presented evidence suggestive of an increased effectiveness of brief interventions in primary care amongst male patients. Amongst men, the reduction in alcohol consumption as a consequence of brief intervention in primary care (vs control) equated to a mean difference of -42 (95%CI -105 to 21) g/wk and for women, the mean difference was –4 (95%CI -50 to 43) g/wk. However, the large confidence intervals around these mean values and the uncertainly associated with these estimates should be noted. Extended brief intervention in primary care (vs control) were effective in both males and females, with a mean difference of -55 (95%CI -77 to -33) g/wk in men and a mean difference of -51 (95%CI -74 to -29) g/wk for women observed.

In summary, brief interventions appear to be effective in reducing alcohol consumption in both men and women, with a potential trend towards increased effectiveness amongst male subjects. However, one possible interpretation of the potential trend for greater effectiveness of brief interventions in men vs. women is that women in control groups not receiving a brief intervention may be more prone to assessment reactivity effects than men (which can be

viewed as the altering of behaviour as a result of its experimental measurement) (as observed by Fleming *et al.*, 1997), thus reducing the apparent effect size between female intervention and control groups. Therefore, it is possible that the effectiveness of brief interventions in male and female subjects is equivalent.

Age

The majority of reviews included adult populations of mixed age, ranging from 12 to 70 years of age.

A small amount of systematic review evidence has been identified that focuses on young people. D'Onofrio & Degutis (2002) (systematic review, +) found brief interventions to be effective in the reduction of alcohol consumption and alcohol-related injuries when delivered to young people aged 18-19 years who had presented to emergency care after an alcohol-related event. In addition, Tait and Hulse (2003) (systematic review, ++) presented evidence of a small but significant effect of brief interventions in young people. However, the primary evidence identified for the effectiveness of brief interventions in young people was inconclusive.

Vasilaki *et al.* (2006) (systematic review, ++) reported that patients receiving brief interventions with motivational principles who were older at baseline and consumed high levels of alcohol were significantly more likely to display a reduction in the number of binges following intervention (no data reported). However, the same authors also noted positive impact of interventions on college students with mean age of 18 years (no further data).

Ethnicity

No systematic review evidence was excluded on the grounds of not originating from an OECD-classified country. However, ethnicity was poorly reported in included systematic reviews. Where it was reported, the majority of included studies were biased towards Caucasian populations. No review evidence was identified that focused solely on minority ethnic groups. It is important that the cultural competence of brief interventions must be taken into account during consideration of the evidence base. Additional searches were conducted with the aim of identifying any primary research with a focus on the effectiveness of brief interventions for alcohol in ethnic minority groups within the UK. No such effectiveness evidence was identified. However, the delivery of screening and brief interventions among ethnic minority groups is discussed within Review 7.

Socioeconomic status

One systematic review (Littlejohn, 2006) investigated the impact of socioeconomic status on the effectiveness of brief interventions for alcohol misuse. Whilst only limited detail is presented in the review, the author states that socioeconomic status (defined by social class, employment and education) had no impact on the effectiveness of brief interventions to reduce alcohol consumption delivered in primary care (no further data presented). In the absence of further data, interventions could be considered to have equivalent effectiveness across all socioeconomic groups.

Treatment-seeking activity or level of alcohol consumption or dependence

No conclusive impact of levels of alcohol dependence on effectiveness of brief interventions was identified in the included systematic reviews. However, it should be noted that, for the purposes of this guidance, brief interventions were defined in the scope as any brief intervention aimed at people who are not seeking help from specialist alcohol services. Care received by individuals who are seeking treatment in specialist treatment agencies is classed as less intensive treatment and is outside the remit of this assessment. Therefore, review findings which include evidence from specialist care settings are of limited relevance and should be interpreted with caution. Furthermore, it should be noted that individuals with alcohol dependence were excluded from participation in primary studies included within the identified systematic reviews. Therefore, it is unlikely that this evidence would be capable of elucidating any such effect.

Presence of co-morbidities

The majority of primary studies included in reviews excluded patients with significant physical or mental health conditions. One review (Laker, 2007) (systematic review, +) presented limited evidence to support the use of brief interventions in patients with a mental health condition who misuse alcohol.

Effective components of brief intervention

Due to the extensive heterogeneity in the characteristics of the brief interventions evaluated (eg. population, duration, intervener) (and lack of detail in reported of interventions and controls in some cases), it is difficult to define the effective components of brief interventions. However, some reviews attempted to determine the impact of characteristics of brief interventions on effectiveness.

Wilk *et al.* (1997) (systematic review, ++) found that subjects were more likely to moderate their drinking with greater intensity of intervention (OR=2.12, 95%CI 1.66 to 2.70 for over 1

session vs OR=1.83 (95%CI 1.46 to 2.28) for 1 session). However, Ballesteros *et al.* (2004a) (systematic review, ++) stated that there was no evidence of a dose-effect relationship between intensity of intervention and outcome observed. The use of meta-regression by Bertholet *et al.* (2005) demonstrated that the characteristics of brief interventions (such as intervener, motivational technique used, duration, use of written materials and booster sessions) made little impact on the observed effect size. Hyman (2006) (systematic review, +) observed that nurses were effective interveners in the delivery of brief interventions. A further, in-depth systematic review (++) by Kaner *et al.* (2007) indicated that longer duration of intervention would be likely to have little additional benefit to recipients. Whitlock *et al.* (2004) (systematic review, ++) reported that, whilst brief multi-contact interventions were effective, very brief interventions (a single session of up to 5 min duration) also produced a statistically significant reduction in alcohol consumption (no further data). All interventions producing significant improvements in outcomes included 2 of the 3 following key elements: feedback, advice and goal-setting. Subgroup analysis of interventions based on motivational interviewing was undertaken by Tait & Hulse (2003) (systematic review, ++) and would suggest that brief interventions show positive effect sizes, irrespective of the inclusion of motivational interviewing principles. However, the benefits of brief interventions delivered in a personalised and empathetic manner should be considered in the application of this evidence.

Therefore, the limited evidence identified would suggest that even very brief interventions may be effective in reducing alcohol-related negative outcomes, with inconclusive evidence for an additional positive impact resulting from increased dose.

Trial design

Kaner *et al. (*2007) (systematic review, ++) reported that both effectiveness trials (i.e. 'real world' clinical context) (mean difference = -28 (95%CI -48 to -9) g/wk) and efficacy trials (i.e. studies carried out in tightly controlled experimental conditions) (mean difference = -51 (95%CI -77 to -25) g/wk) produced significant findings for the effectiveness of brief interventions in reducing alcohol consumption. Therefore, these findings can be considered to have relevance to clinical practice.

5.3.5. Evidence statements

Evidence statement 6.1: The 27 included systematic reviews provided a considerable body of evidence supportive of the effectiveness of brief interventions for alcohol misuse in reducing alcohol consumption, mortality, morbidity, alcohol-related injuries, alcohol-related social consequences, healthcare resource use and laboratory indicators of alcohol misuse.

Applicability: The primary studies included in the systematic reviews included in this assessment were largely drawn from the USA. However, a smaller proportion of the included studies were undertaken in the UK and therefore, the evidence base can be considered to have some applicability to a UK-based setting. The majority of included studies were also conducted in primary care.

Evidence statement 6.2: Six systematic reviews (++)[1-6] demonstrated that interventions delivered in primary care are effective in reducing alcohol-related negative outcomes. Three systematic reviews specifically focusing on the use of brief interventions in emergency care (+)[7], (++)[8], (++)[9] found limited evidence for the effectiveness of brief interventions for alcohol misuse in emergency care settings. A further review (++)[10] presented inconclusive evidence of the effectiveness of brief interventions in inpatient and outpatient settings. A systematic review of brief interventions for alcohol misuse in the workplace presented limited and inconclusive findings for the effectiveness of interventions in this setting.[11]

[1]Ashenden *et al.*, 1997 (Systematic review, ++)

[2]Ballesteros *et al.*, 2004a (Systematic review, ++)

[3]Bertholet *et al.*, 2005 (Systematic review, ++)

[4]Kaner *et al.*, 2007 (Systematic review, ++)

[5]Poikolainen, 1999 (Systematic review, ++)

[6]Whitlock *et al.*, 2004 (Systematic review, ++)

[7]D'Onofrio & Degutis, 2002 (Systematic review, +)

[8]Havard *et al.*, 2008 (Systematic review, ++)

[9] Nilsen *et al.*, (2008) (Systematic review, ++)

[10]Emmen *et al.*, 2004 (Systematic review, ++)

[11] Webb *et al.*, 2009 (Systematic review, ++)

Applicability: Four of the six primary studies included in the review by Ashenden *et al.* (1997) were conducted in primary care within the UK. The review by Kaner *et al.* also

included studies from the UK. Approximately a third of the studies reviewed by Ballesteros *et al.* (2004a) were drawn from the UK; whilst one sixth of the trials reviewed by Whitlock *et al.* (2004) were from the UK. However, none of the studies included in the review by Bertholet *et al.* (2005) were from the UK. The origin of the studies included by Poikolainen was unclear. D'Onofrio & Degutis discussed evidence drawn from the UK in emergency care. It was unclear where the studies reviewed by Havard *et al.* (2008) and Emmen e*t al.* (2004) were conducted. The majority of the studies in the Nilsen review were conducted in the USA.

Evidence statement 6.3: Brief interventions are effective in reducing alcohol consumption in both men and women (++),[1] (++),[2] (++),[3] (++)[4] (++),[5] (++)[6] (++)[7]).

[1]Ballesteros *et al.*, 2004a (Systematic review, ++)

[2]Bertholet *et al.*, 2005 (Systematic review, ++)

[3]Whitlock *et al.*, 2004 (Systematic review, ++)

[4]Kahan *et al.*, 1995 (Systematic review, +)

[5]Kaner *et al.*, 2007 (Systematic review, ++)

[6]Poikolainen,1999 (Systematic review, ++)

[7] Ballesteros *et al.*, 2004b (Systematic review, ++)

Evidence statement 6.4: The majority of included primary evidence was drawn from adult populations with an age range of 12 to 70 years. Therefore, brief interventions for adults have been shown to be effective amongst adult populations.

Applicability: The primary studies included in the systematic reviews included in this assessment were largely drawn from the USA. However, a smaller proportion of the included studies were undertaken in the UK and therefore, the evidence base can be considered to have some applicability to a UK-based setting.

Evidence statement 6.5:

Three systematic reviews were identified (+),[1] (++),[2] (++),[3] that presented limited evidence for the effectiveness of brief interventions in young people (aged up to 25 years). Of eight identified RCTs of the effectiveness of alcohol brief interventions in young people (delivered in non-educational settings), four studies showed some statistically significant beneficial outcomes.[4,5,6,7] However, a further study reported increased alcohol consumption among

adolescents as a consequence of brief intervention.[8] The remaining RCTs did not present any statistically significant differences between treatment groups. The evidence base for the effectiveness of alcohol brief interventions among young people was therefore inconclusive.

[1]D'Onofrio & Degutis, 2002 (Systematic review, +)

[2]Hunter Fager *et al.*, 2004 (Systematic review, +)

[3]Tait & Hulse, 2003 (Systematic review, ++)

[4] Bailey *et al.*, 2004 (RCT, +) Australia

[5] Spirito *et al.*, 2004 (RCT, ++) USA

[6] Monti *et al.*, 1999 (RCT, ++) USA

[7] Monti *et al.*, 2007 (RCT, ++) USA

[8] Boekeloo *et al.*, 2004 (RCT, ++) USA

Applicability: 14 of the 15 studies included by Hunter Fager *et al.* (2004) were from the USA and were based on undergraduate campuses. All of the studies included by Tait & Hulse were conducted in the USA in educational and healthcare settings. Therefore, the limited applicability of this evidence in relation to the effectiveness of brief interventions in UK-based young people must be taken into consideration. Seven of the eight identified RCTs relating to brief interventions for alcohol use among young people originated in the USA, whilst the remaining study was conducted in Australia.

Evidence statement 6.6: Whilst the ethnicity of study populations was poorly reported, where this information was provided, populations were primarily Caucasian. No review evidence could identified focusing specifically on effectiveness among ethnic minority groups in the UK.

Evidence statement 6.7: The evidence regarding the effect of socioeconomic status on effectiveness of brief interventions was very limited. One identified systematic review reported that socioeconomic status does not have an impact on the effectiveness of brief interventions (+).[1]

[1]Littlejohn, 2006 (Systematic review, +)

Applicability: The setting of included studies by country was not reported.

Evidence statement 6.8: No conclusive relationship could be observed in relation to the impact of levels of alcohol dependence on the effectiveness of brief interventions. However, it should be noted that, for the purposes of this guidance, brief interventions were defined in the scope as any brief intervention aimed at people who are not seeking help from specialist alcohol services. Therefore, review findings which include evidence from specialist care settings are of limited relevance and should be interpreted with caution. Furthermore, it should be noted that individuals with alcohol dependence were excluded from participation in primary studies included within the identified systematic reviews. Therefore, it is unlikely that this evidence would be capable of elucidating any such effect.

Evidence statement 6.9: No conclusive evidence was available for the effectiveness of brief interventions in patients with significant physical or mental co-morbidities (as the majority of primary studies included in reviews excluded these subjects). One review (+)[1] presented limited evidence for the effectiveness of brief interventions in patients with a mental health condition who misuse alcohol.

[1]Laker, 2007 (Systematic review, +)

Applicability: The setting of included studies by country was not reported.

Evidence statement 6.10: Extensive heterogeneity was evident in the characteristics of evaluated brief interventions. However, limited evidence would suggest that even very brief interventions may be effective in reducing alcohol-related negative outcomes, (++)[1] with inconclusive evidence for an additional positive impact resulting from increased dose ((++),[2] (++),[3] (++)[4]). Evidence from an additional review (++)[5] suggests that brief interventions are effective, with impact of the inclusion of motivational interviewing principles unclear.

[1]Whitlock *et al.*, 2004 (Systematic review, ++)

[2]Ballesteros *et al*., 2004a (Systematic review, ++)

[3]Bertholet *et al*., 2005 (Systematic review, ++)

[4]Kaner *et al*., 2007 (Systematic review, ++)

[5] Tait & Hulse, 2003 (Systematic review, ++)

Applicability: The above systematic reviews included primary studies conducted in primary care (with the exception of the work by Tait & Hulse, which was undertaken in educational and healthcare settings in the USA). The evidence can be considered to have reasonable applicability to the UK.

Evidence statement 6.11: Extended brief interventions were demonstrated to be effective in the reduction of alcohol consumption (whereby evaluated interventions consisted of 2 to 7 sessions with a duration of initial and booster sessions of 15 to 50 min[1] or 10 to 15 min in 1 session with number of specific booster sessions of 10 to 15 min duration[2]).

[1]Kaner *et al*., 2007 (Systematic review, ++)

[2]Ballesteros *et al*., 2004a (Systematic review, ++)

5.3.6 Discussion

A large evidence base has been identified for the positive impact of brief interventions for alcohol misuse on alcohol consumption, mortality, morbidity, alcohol-related injuries, alcohol-related social consequences, healthcare resource use and laboratory indicators of alcohol misuse.

The majority of studies were undertaken in primary care. Evidence was also was identified for the effectiveness of brief interventions in hospitals and emergency care settings. An additional UK-specific primary study of interest was conducted by Holloway *et al.* (2007) and showed that brief interventions reduced self-reported weekly alcohol consumption among general hospital patients. As highlighted in the review by Raistrick *et al.* (2006), there was a paucity of evidence relating to non-healthcare settings. One review by Webb *et al.* (2009) described the limited evidence base relating to the use of brief interventions in occupational settings. However, other non-systematic review evidence for the effectiveness of brief interventions in non-healthcare settings exists.

UK-specific evidence has demonstrated the effectiveness of motivational interviewing in the reduction of alcohol consumption among young people in further education colleges (McCambridge & Strang, 2004; McCambridge & Strang 2005; McCambridge *et al.*, 2008). McCambridge & Strang (2004) reported the findings of a cluster randomised trial of 200 young people currently using illegal drugs (age range 16 to 20 yrs) across ten further education colleges in London, UK. A single session of motivational interviewing (MI) (of up to 60 min duration) was delivered by the first author, in which the interviewer directed the focus of the session towards particular areas of risk or concern in conjunction with the interview recipient. The control group received baseline and follow-up assessments only. The

MI group were observed to significantly reduce their alcohol consumption compared with control group subjects (effect size = 0.34, 95%CI 0.09 to 0.59). The adjusted difference in mean alcohol consumption between MI and control group subjects was found to be just below 6 units/week at 3 months follow-up. MI group subjects were also significantly more likely not to be drinking alcohol at 3 months follow-up (OR=0.07, 95%CI 0.007 to 0.72, P=0.025). Further research was conducted by McCambridge & Strang (2005) to determine whether the benefits of MI observed in the above study at 3 months follow-up were maintained after a follow-up period of 12 months. At 12 months, the differences observed between MI and control group participants at 3 months follow-up had almost completely disappeared. The authors stated that this may have been attributable to deterioration of effect or the possibility of assessment reactivity at 3 months follow-up among the control group. McCambridge *et al.* (2008) performed an RCT to determine the effectiveness of MU vs drug information and advice-giving in young cannabis users who were not seeking help. Students aged 16 to 19 years who smoked cannabis weekly or more frequently were recruited across eleven further education colleges in London, UK. A single session of MI lasting no more than 1 hr (and in which the primary focus was cannabis, with alcohol a secondary area of coverage) was compared with a control group who received harm reduction information leaflets, the topic of which was selected according to the participant. No differences between MI and drug information and advice-giving in alcohol consumption and related problems were observed. The potential of individual practitioner effects to have influenced findings was discussed by the authors, who also suggested that information and advice may serve as an effective intervention in reducing alcohol consumption among young people. A trial undertaken in further education colleges in the UK that has shown that brief interventions delivered by youth workers to young people (with a mean age of 17 years) are effective in reducing alcohol consumption (Gray *et al.,* 2005). Additional evidence from the USA (Baer *et al.,* 2001) showed that a single session of brief intervention (consistent with MI principles) yielded significant additional reductions in frequency, quantity and negative consequences of alcohol consumption compared with a control group among heavily drinking college freshmen at 4 years follow-up. The control group was randomly selected from the entire screening pool to demonstrate temporal trends in the natural history of drinking among the population. These additional benefits were observed to have occurred against a background of maturational trends in this age group. Further US-specific research (Walters *et al.,* 2009) demonstrated that MI (delivered by trained counselors) with computer-generated feedback on drinking behavior significantly reduced drinking at 6 months follow-up vs. assessment only (effect size=0.54), MI without feedback (effect size=0.63) and feedback alone (effect size=0.48). Neither MI alone nor feedback alone differed significantly from assessment alone. No impact on effectiveness was observed according to gender, ethnicity or baseline drinking level.

A trial has also indicated that delivering a brief intervention in bars and taverns in Australia (consisting of a personalised risk assessment using the AUDIT questionnaire and a breathaliser) was successful in reducing alcohol consumption at follow-up (Van Beurden, 2000). A UK-based trial showed that brief intervention delivered by nurses to alcohol users in the custody suite has potential for reducing alcohol-related harm (Hopkins & Sparrow 2006). In addition, a brief intervention administered to young male violent offenders in a Magistrate's court judicial setting in Wales showed that, whilst re-offending rates remained the same, less injury and increased readiness to change were evident in the intervention group (Watt *et al.*, 2008).

Brief interventions were demonstrated to be effective in both men and women, with a potential trend towards increased effectiveness amongst male subjects (potentially influenced by increased assessment reactivity among women). However, it is interesting to note that an RCT undertaken in the UK has shown that a leaflet-based brief intervention has been shown to be effective in reducing binge drinking on Fridays amongst women (but not men) (Murgaff, 2007). The majority of studies included adult samples, with an overall age range of 12 to 70 years. However, primary studies were identified, but were not supportive of the effectiveness of brief interventions for alcohol misuse in young people. Ethnicity was poorly reported by systematic reviews. Where this information was available, study populations were primary Caucasian. No primary research could be identified that related to the effectiveness of brief interventions in ethnic minority groups in the UK. Additional trial evidence has been identified that suggest that the use of brief interventions are culturally acceptable in other ethnic groups, including in an urban Aboriginal setting (Brady *et al.,* 2002), a community setting in North India (Pal *et al.,* 2007) and amongst Mexican-American patients (with women displaying greater engagement with the intervention than men) (Burge *et al.,* 1997). A cross-sectional survey undertaken in the USA showed that black and Hispanic adults had 2-fold increased odds of reporting receiving physician counselling for alcohol consumption (Mukamal, 2007). The authors stated that the basis of this difference was unclear. Therefore, this evidence suggests that, whilst a range of ethnic groups may be receptive to brief interventions for alcohol misuse, efforts must be made to ensure that interventions are culturally appropriate and that all ethnic groups are considered for suitability for screening and brief interventions. Socioeconomic status was described as not having an impact on the effectiveness of brief interventions. No conclusive relationship between the degree of alcohol dependence and effectiveness of interventions could be observed, although a considerable proportion of the primary studies included within the systematic reviews excluded patients

with alcohol dependence. However, the work by Saitz *et al.* (2007) suggested that medical inpatients with alcohol dependence require more extensive alcohol interventions. Furthermore, a study by Guth *et al.* (2008) indicated that both alcohol-dependent and non-dependent participants benefited from brief intervention. A single review presented limited evidence for the effectiveness of brief interventions in patients with a dual diagnosis of a psychiatric condition and alcohol misuse. Indeed, many primary studies excluded individuals with significant psychiatric or somatic disease. However, Emmen *et al.* (2004) (systematic review, ++) included a primary study demonstrating convincing evidence of the effectiveness of brief interventions delivered in a hypertension clinic (Maheswaran *et al.*, 1992). Furthermore, implementation of screening and brief intervention among hypertensive patients has been shown to result in improvement in blood pressure values (Rose *et al.*, 2008).

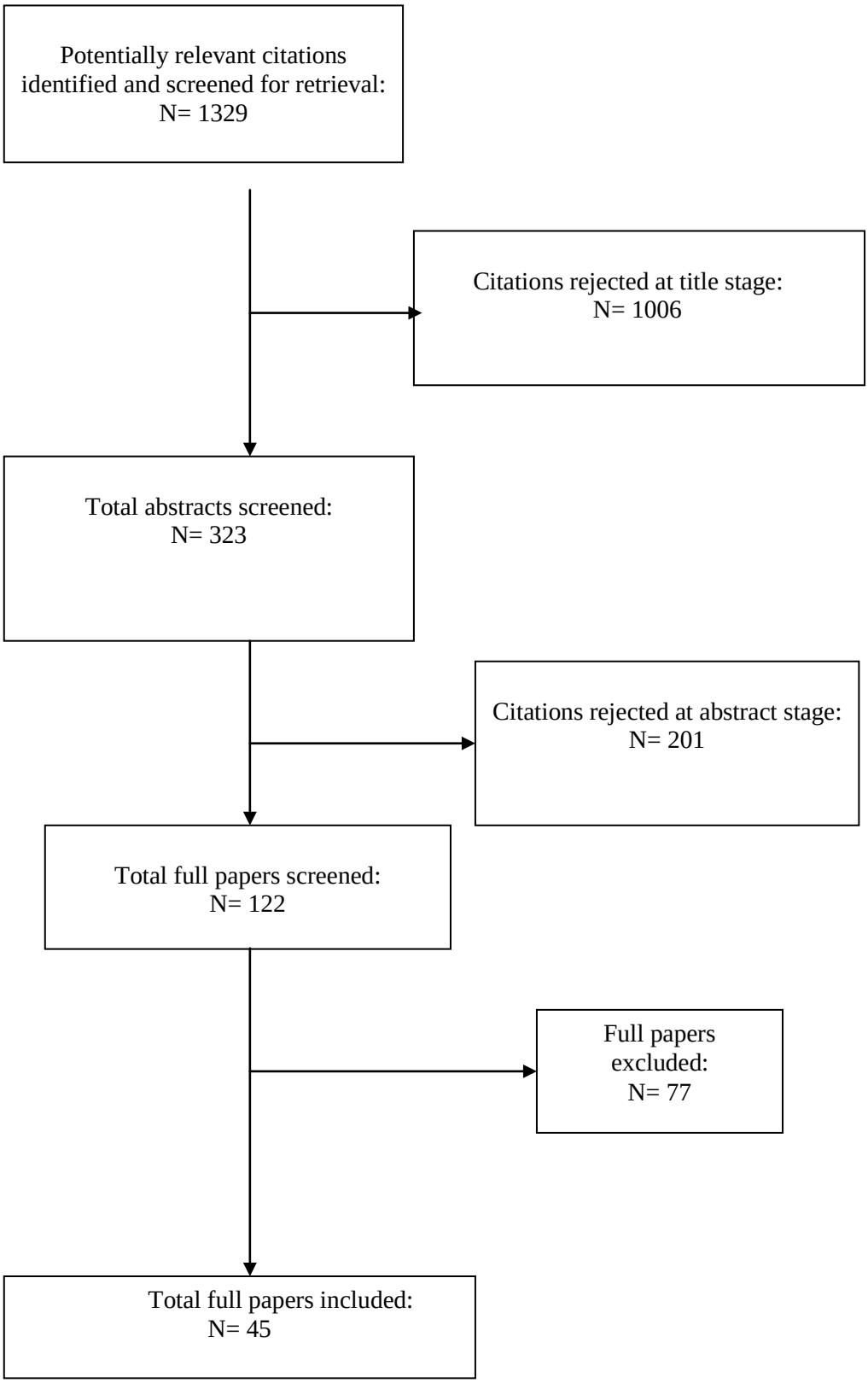
Whilst the considerable degree of variation in the brief interventions evaluated posed a challenge to the identification of the key components influencing effectiveness, limited evidence suggests that even brief interventions may be effective in reducing negative alcohol-related outcomes, with the additional benefit according to the inclusion of motivational interviewing principles or increased exposure to brief intervention both being unclear. Feedback, advice and goal-setting are key components of effective brief interventions.

5.4 Review 7: Key barriers and facilitators to the implementation of screening and brief intervention for alcohol misuse in adults and young people

5.4.1 Quantity of research available

As a result of searches undertaken to address the review topic relating to the effectiveness of brief interventions (Review 6), outlined above, a total of 625 citations were identified. As a result of the searches undertaken to address the review topic relating to barriers and facilitators to implementation of screening and brief intervention (Review 7), a total of 704 citations were identified, making a total of 1329 citations overall. Following removal of duplicates, and screening for inclusion, 1006 were rejected at the title stage, yielding 323 abstracts for screening; 201 abstracts were rejected upon examination. Of 122 full papers retrieved to date, 77 were excluded after close scrutiny. Papers that were considered but then excluded at the next stage are presented in Appendix 9, together with the justification for their exclusion. Forty five papers in total were included in the review of barriers and facilitators to implementation.

Figure 5: Flow chart of study inclusion and exclusion in review of barriers and facilitators to implementation of brief interventions (Review7)



5.4.2. Quality of included research

A review of barriers and facilitators to implementation of screening and brief intervention requires an exploration of practitioner and service user experiences and views. Information from a range of study methods allows these views to be accessed through reporting of findings from qualitative studies or evaluations that invite participants to voice their own beliefs in their own words, to survey studies that use pre-constructed questionnaires. Searches for this review identified a range of studies of varying quality that directly or indirectly included explorations of barriers and facilitators of implantation. The overall quantity of evidence generated in searches focusing on this topic was large and therefore priority was given to studies that were most relevant to the research topic in order to best inform current UK practice. The majority of the studies included were of very good quality (++) or of good quality (+), whilst 3 were of poor quality (-) but were included for their contribution where better quality evidence was not available, for example in specific settings or with particular populations.

5.4.3 Critical review and synthesis of information

5.4.3.1 Key characteristics of included studies

A range of study types was reviewed for factors that might influence implementation of screening and brief intervention for alcohol misuse. Heterogeneity is therefore necessarily high, with a wide range of study designs, populations, and settings. Although many of the studies include statistical analyses, they also contain important qualitative information that informs the review. It is this information that is reported in this section. The majority of included studies have been carried out in primary care settings, representing a gap in current literature in terms of settings such as emergency care, secondary care, and probationary services. Some studies include descriptions of particular screening tools and/or brief intervention, while the majority focuses on generic aspects of implementation.

5.4.3.2 Reported Outcomes: barriers and facilitators to helping young people and adults manage their drinking behaviour.

Due to the large number of papers reviewed and the range of outcomes that are available within the findings, only reported outcomes that relate to factors that might have an influence upon implementation of screening and brief intervention are presented in this section. Further details of included studies are described in Appendix 16. Each study is summarised separately, followed by synthesis of findings in relation to sub-groups and settings. Aspects that relate to demographic differences such as age, gender, ethnicity and socio-economic status will also be presented separately.

Evidence from systematic reviews

Beich *et al.* (2003) (Systematic Review +)

Beich *et al.* (2003) evaluated 8 included studies to assess the effectiveness of screening programmes and brief intervention in primary care. As part of this evaluation based in Denmark, they reported that, despite acknowledging the benefits of screening and intervention to some patients, primary care physicians have limited time to carry out recommendations for preventing alcohol misuse, particularly in addition to other recommended screening programmes within their practice.

Littlejohn (2006) (Systematic Review +)

The author (Littlejohn, 2006) focused on the potential effects of socio-economic status on patients' willingness to participate in brief intervention during research, and on potential influence on the outcomes of intervention. Eighteen papers were reviewed, with no evidence in either direction for the effect of socio-economic status on implementation or outcome. Although this review was carried out in the UK, the papers included were international; therefore it is not known how applicable this evidence is to UK primary care. As in all reported studies, selection bias may create differences between characteristics of the research sample and the general population**.**

Evidence from Randomised Controlled Trials

Adams *et al.* (1998) (RCT +) USA

This US-based trial by Adams *et al.* (1998) was carried out in 4 primary care sites to assess the use of a 5-10 minute brief intervention with 344 patients at risk from heavy drinking (as defined by the World Health Organisation). Physicians and nurses in the intervention arm of the trial received a training programme in brief intervention totalling 2.5 hours, as well as office system support. Those in the control continued their usual practice. Findings showed that discussion of drinking issues occurred more frequently in the intervention sites, suggesting that training and support may have a positive impact on health promotion activity. Whilst this trial was carried out in the US and is somewhat dated, and may be underpowered, the results remain interesting from the perspective of implications of training for motivation.

Babor *et al.* (2005) (RCT ++) USA

A cluster randomised trial was carried out (Babor *et al.,* 2005) in 10 US primary care clinics within five cross-state Managed Care Organisations (MCOs) to identify differences between implementation of screening and a 3-5 minute brief intervention ('Cutting Back') for alcohol misuse by medical staff (P-clinics), and mid-level professional staff (mostly nurses) (S-clinics). Usual care was used as control arm for comparisons. The RCT was underpinned by

concepts of clinical prevention influences (predisposers, enablers and reinforcers), extended by the authors to include organisational factors. The HAS and AUDIT tools were used to assess and screen patients in both arms of the trial, whilst providers were surveyed prior to training, and at the end of the project. Site visits also facilitated researcher ratings throughout the process. More at risk drinkers received BI in the S clinics than in the P clinics, though adjustment for clustered data was not feasible for this study. It was found that both models were effective, though differences were incumbent on organisational influences, with MCOs having a high heterogeneity. There is no data focussing on the effectiveness of either screening tool in the different contexts in which they were utilised for the trial.

Successful implementation in terms of screening and brief intervention rates was influenced by the clinic having prior experience in this type of work, involvement of clinic staff in planning implementation, MCO support, stable patient membership and stability of the MCO. In addition, the number of clinicians that had received training, having an influential MCO co-ordinator, the amount of technical assistance available, financial incentives and successful management of staff changes. Having receptionists involved in handing out screening tools to patients saved time for medical staff and avoided extra time taken up in consulting rooms. However, the change in job description for receptionists was problematic.

Other barriers included competing organisational priorities, receptionists' lack of time, and specific operational issues for the study, such as competing demands, limited staff time, especially to carry out consent and other data collection procedures. The implementation of the study was affected by major economic changes in the MCO industry at that particular time. The study therefore highlights that other factors than the effectiveness of the intervention or individual characteristics affect actual implementation in practice.

Goldberg *et al*. (1991) (RCT +) USA

The authors (Goldberg *et al.,* 1991) focused on nurse involvement in brief intervention to assess the feasibility of incorporating the intervention into US routine practice. They were also concerned with the implications of screening (MAST) on referral rates, and on attendance for referral. A total of 1328 patients were included in the trial; overall screening rate was 90.4%. Of those screened, 428 scored positive. Of these, 3 conditions and results were:

1) Standard care; 3 (2.3%) referrals for counselling of whom 2 (66.7%) kept their first appointment, were screened with MAST and scored positive.

2) Referral rate intervention (referral to a counsellor based on positive screening result); 18 (12.8%) referrals for counselling of whom 11 (61.1%) kept their first appointment, were screened with MAST and scored positive.

3) Show-rate referral (as for referral rate intervention plus introduction to counsellor at time of referral); 14 (9.1%) referrals for counselling of whom 7 (50%) kept their first appointment, 6 (85.7%) were screened with MAST and scored positive.

The trial showed that the majority of patients declined referral to an alcohol specialist, stating that their problem had now resolved. The authors concluded that service users are no more likely to attend for counselling with an alcohol specialist than with a physician or nurse, therefore utilising specialists is not a facilitator to uptake of intervention, and that routine practice provision of brief intervention on medical wards was appropriate.

Kaner *et al.* (1999) (RCT +) UK

Kaner *et al*. (1999b) evaluated three different training and support strategies for GPs in the North of England who had previously agreed to use the 'Drink-less' brief intervention. The AUDIT screening tool was used to assess drinking levels in 11,007 patients of whom 3531 were 'at-risk'. The trial took place across 128 practices in the UK, and found that support for GPs increased the likelihood of implementation. However, implementation was not necessarily carried out with those most at risk. In addition, receptionists were found to need support in their involvement in the trial. Following completion of the trial, most GPs stopped implementing the intervention. The authors suggest that this was most likely due to organisational factors.

Kaner *et al.* (2003) (RCT ++) UK

This trial (Kaner *et al*., 2003) evaluated three strategies for nurses in the North of England of implementing the 'Drink-less' brief intervention, comparing training alone, training and support, and guidelines only. A total of 212 nurses carried out AUDIT screening and brief intervention, with the mean duration for BIs being 8.6 minutes. It was found that nurses receiving training were more likely to carry out interventions, but not necessarily appropriate management. Anxiety regarding giving misdirected advice was reported among nurses. In addition, it was found that enlisting the help of receptionists, which occurred in a minority of practices, increased the rate of screening.

Lock *et al.* (2000) (RCT ++) UK

This paper examines UK receptionist attitudes to involvement in a primary care based trial of the 'Drink-Less' screening and brief intervention (Lock *et al.*, 2000). Eighty-four

receptionists were asked to hand out and explain AUDIT to all over 16 year old patients for a three-month period. Receptionist's attitudes to participating in the trial deteriorated for 70% of the sample over the three months, whilst for 25% attitudes improved and 5% remained stable. There were no significant differences in receptionist attitudes in the 3 trial arms (training and support, training only, and control). Attitudes had deteriorated in relation to the value of the intervention (54.5%), role in the practice (61%), the job (88%). Receptionists were less likely than GPs to feel that the intervention was suitable for use in practice (57% / 62%), and more likely to regard the programme as demanding (52% / 38%). There was also a feeling that extra payment should go with this type of work (56%), though only 29% of GPs reported being able to pay to run the programme.

This study shows that receptionist attitudes may have an impact on practice, and that all staff might be better involved from the beginning of project planning and implementation in order to address potential problem areas.

The implications of trial findings is that training can be an effective way of increasing the rate of detection and advice, but that this does not necessarily mean that the correct patients are being identified or advised. This raises the question of training content, and effectiveness, as well as its effect upon practitioner confidence. Also, involvement of staff in planning and decision making might have a positive impact on intervention implementation.

Evidence from Cross-sectional studies

Aalto *et al*. (2006) (Survey +) Finland

A survey of physicians was carried out in Finland (Aalto *et al.,* 2006) to identify potential relationships between own AUDIT scores and use of brief intervention with their patients. All GPs in Finland were surveyed, with data being excluded if physicians were specialist rather than general practice or occupational health practitioners. The response rate was 59.8% (1909 questionnaires in total). Prevalence of self-reported heavy drinking was 14.5%, with a higher rate among males (27% / 7%). Reported use of brief intervention was low, at 50% for occasional use and only 9.4% for regular use. Analysis of the data showed no prediction of brief intervention use by practitioners own self-reported drinking behaviour. However, there was an association between having a specialist license in this type of work and more frequent use of intervention. There was no association between gender or age and use of intervention.

Aalto *et al*. (2004) (Survey +) Finland

Aalto *et al.* (2004) carried out a survey of 1203 patients aged 16-65 (Mean age 44.2) in primary care, Finland, to assess the duration and content of brief intervention (no details).

Most of the respondents were females. The majority of patients (80.7%) found the discussion useful, but most were not being approached at all about their drinking, and of those that were, it was reported that the time taken up in discussion was very short (< 4 minutes) unless patients were heavy drinkers.

Aalto *et al*. (2002) (Survey +) Finland

This survey (Aalto *et al.*, 2002) was carried out to test the hypothesis that health professional activity in alcohol issues is low. A thousand primary care patients in Finland were asked when they had last been approached by a GP or nurse about their drinking and whether advice had been given. The majority of patients (82%) were positive about being approached, but had not been asked about drinking. This paper reports that patients who are young and female are the least likely to be asked, although this may be due to response bias or selection bias since the survey respondents were largely (62.6%) female.

Aalto *et al*. (2001) (Survey +) Finland

Aalto *et al.* (2001) carried out a survey in Finland to identify barriers for practitioners to implementing brief intervention. More than 50% of the participants were positive about asking patients about their drinking. However, training needs were identified, with nurses having a higher training requirement than physicians. Only 12% of participants had been involved in a training programme within the previous year. This survey may lack applicability to the UK, but emphasises the potential differences in requirements between nurses and GPs. Potential reasons for the shortfall in training are not specified.

Aalto *et al*. (2000) (Survey +) Finland

This survey (Aalto *et al.*, 2000) was carried out with a sample of 41 GPs with 1011 patients in Finland to assess compliance rates and associated factors in heavy drinkers that were willing or unwilling to participate in brief intervention. The majority of respondents were male, with a fairly even age range. Nearly half (48.2%) of the heavy drinkers in the sample agreed to undertake brief intervention. Higher levels of reported weekly alcohol consumption and drinking frequency were associated with a greater likelihood to agree to brief intervention. In addition, men and individuals in the 40-60 year age range were 1.8 times more likely to be receptive to advice than women and younger people.

Adams *et al.* (1997) (Survey +) New Zealand

A 134-item, self-administered questionnaire was used in this survey (Adams *et al.*, 1997) of 161 GPs to identify perceived skills, role adequacy, and work satisfaction in managing disease prevention and health promotion. Alcohol misuse in New Zealand is the focus of the

study; GPs state their agreement for or against 18 disincentives and 11 incentives to providing health promotion in general practice. GPs supported the use of public health education campaigns to raise awareness of alcohol misuse and its implications; financial and other incentives for GPs to carry out prevention work; readily available materials for alcohol screening and brief intervention; GP training that focuses on competencies; efforts to emphasise the importance of preventive care in general practice.

Anderson *et al*. (2004) (Survey ++) UK

Authors of this UK paper (Anderson *et al.*, 2004) aimed to explore whether GP attitudes to working with people that drink moderated the effect that training and support has on screening and brief intervention activity. The survey was carried out with 340 GPs in 340 practices. The 'Drink-less' intervention was carried out with individuals having raised AUDIT scores. The authors compared training and support group with usual practice. Rates of brief intervention were twice as high in the training and support group as for controls, suggesting a positive effect of training and support. However, change in activity was mediated by initial role security and therapeutic commitment, which suggests that GPs that do not feel comfortable with their role in alcohol work or are not committed to assisting drinkers may not benefit optimally from training and support. These findings highlight the importance of training, but also in identifying differences in requirements and in attitudes of professionals before applying standardised interventions such as training programmes.

Anderson *et al*. (2001) (Survey ++) UK

This postal survey (Anderson *et al.*, 2001) of nurses and medical staff was carried out to assess the prevalence of alcohol-related attendances in all Scottish accident and emergency units, including Minor Injury Units (MIUs), as well as the attitudes of staff toward identifying and responding to those attendances. A 57% response rate was obtained; most (63%) respondents were nurses. There was no screening taking place at 42% of the units, and recording of alcohol use was not occurring in 38% of units. Nurses lacked confidence in dealing with alcohol-related attendances, pointing to a need for training in this area. Nurses were also concerned about patient adverse reactions to discussing their drinking habits (90%), though medical staff showed less concern (56%). It was suggested by 19% of respondents that patients in emergency care settings might not be ready psychologically to receive advice at the time of their attendance. In addition, patients may not be sufficiently motivated to change their drinking behaviour. Many patients that are 'at risk' attend out-of-hours when staffing levels are stretched, and therefore carrying out extra work may be difficult to achieve, particularly in the limited time that patients are in the department. Staff may not be adequately trained for this service or motivated to carry out brief interventions, and may not be able to

access support. There were differences between attitudes in full accident and emergency departments and MIUs in that MIU staff regarded their setting as more appropriate for alcohol work than staff in full Emergency Care Units. However, 42% of staff reported that they did routinely ask about alcohol use if they suspected a problem, and 69% recorded details on drinking if they observed signs of drinking. Staff in full EC units were more likely to refer on to specialist services and to hand out written information to patients. There was an overall positive attitude to the aims of preventive work, with only a minority of staff feeling that nothing can be done to help change behaviour.

Berner *et al*. (2007) (Survey ++) Germany

This survey (Berner *et al.*, 2007a; Berner *et al.*, 2007c) assessed 2940 patients in 58 practices in Germany to determine the proportion of correctly referred patients and the patient/practitioner characteristics that predict detection and correct referral. Over 50% of patients were aged 30-59, and 56.3% were female. 13% of the sample were problem drinkers, though of these only 38.6% at most were correctly identified by GPs. GPs were reported to be most likely to overlook females and younger people in their alcohol work, although detection rates improved significantly for GPs with a qualification in addiction medicine.

Deehan *et al.* (1998) (Survey ++) UK

In two articles (Deehan *et al.*, 1998a; Deehan *et al.*, 1998b), the authors describe a survey of 5560 GPs in England and Wales that examined activity and attitudes in relation to alcohol work, as well as how this work is carried out. 78% of GPs had seen at least one patient regularly consuming at risk amounts of alcohol in the previous 4 weeks. Most of these patients were male (72.8%), with 45% over the age of 40. Health promotion leaflets were not widely used, but GPs were attempting to manage patients with different drinking habits according to their needs. There was routine reporting of problems, and advice-giving. Screening was more likely in younger patients and males. Alcohol misusers were seen as a difficult group to work with in terms of problems that needed to be addressed, the time taken up. This work was viewed as less rewarding, with 42% of GPs feeling inadequately trained and 35% unsupported. Patient self-motivation was a factor that enhanced the aims of alcohol work, and primary care was seen as appropriate for screening and intervention (87%); the latter being regarded as an effective way of reducing population level alcohol misuse, though not for GPs that lacked training. Training and support was seen as a factor in raising confidence levels in this area of work.

Graham *et al*. (2000) (Survey -) USA

Graham *et al*. (2000) assessed the attitudes of 596 emergency physicians in the US with a mean age of 42 to using brief interventions. The majority were males (81.1%). The survey methods are only briefly reported and therefore caution is required in interpretation. However, the survey provides evidence in an under-researched area of practice. Physicians were not convinced of the effectiveness of using intervention in their practice setting, due to lack of time and perceived lack of demand, despite apparent support.

Heather *et al.* (2004) (Delphi Survey ++) UK

Heather *et al*. (2004) sought the views of 79 experts in the UK, including health professionals, alcohol workers, researchers and academics were consulted on the best ways to implement brief intervention in primary care. A Delphi technique was used to elicit agreement and consensus on a range of issues. Strong agreement and/or consensus were found for appropriate primary care contexts such as new patient registrations and well-person clinics in which to deliver interventions in a non-threatening way, as well as the use of experts in the alcohol field for counselling. It was agreed that discussions would be more acceptable as negotiations rather than prescriptive, and personalised to the needs of users, at clinics and other non-threatening visits to the practice.

Heim *et al.* (2004) (Survey +) UK

A small (n= 174) community survey was carried out in the Glasgow area (Heim *et al.,* 2004) to identify prevalence of alcohol consumption and views of alcohol services in three ethnic groups (Indian, Pakistani, Chinese). This study does not focus directly on screening or brief intervention but is included as little relatively recent UK research was identified that aims to explore differences in ethnic groups regarding alcohol service provision. The results (particularly cultural influences) may therefore be taken into account when identifying potential facilitators or barriers to service provision. Findings show that the Chinese respondents were fairly satisfied with mainstream services, and didn't appear to have conflicting religious or cultural influences that might deter help-seeking. In contrast, Pakistani respondents, mainly Muslim, were influenced by religious prohibition on alcohol consumption, with fear of reprisal if found out. Alcohol problems were therefore regarded as hidden or ignored within the community. However, despite these influences, in this study, Chinese respondents reported drinking less than those from Pakistan. For some Indian respondents (13%), the Indian community was seen as less than understanding in terms of potential drinking problems. There was a general lack of awareness regarding specialist alcohol services, with many looking toward friends and family for help and advice, or

conversely, to Alcoholics Anonymous. The respondents were divided in their views on whether services should be culture-specific or mainstream.

Huntley *et al.* (2004) (Survey, ++) UK

A survey of junior doctors was carried out (Huntley *et al.*, 2004) to identify attitudes to the detection of alcohol misuse in patients presenting to emergency departments. The authors measured the relationships between these attitudes, screening behaviour, and doctor's own level of consumption. A questionnaire was given to 127 junior doctors over 5 years at morning training sessions. In addition, 26 SHOs were interviewed as part of a wider investigation of the impact of referral to an alcohol health worker on levels of alcohol consumption. Questions related to screening and brief intervention in the emergency department.

A majority (99%) agreed with the importance of early detection of alcohol misuse and judged the emergency department as an appropriate place to use the PAT (Paddington Alcohol Test). Most (97%) thought treatment could be successful, and that PAT was good for early detection (87%). Although 90% thought that drinking alcohol was a cultural activity (90%), only 50% approved the statement 'we all drink a lot'. The authors state that this implies a tranche of society for whom alcohol is not perceived to be a problem.

Just over a quarter of junior doctors felt that PAT was over-inclusive of PAT-possible conditions, and 22% thought that the number of units specified were too low to test for misuse. Only 15% felt it was neglectful not to perform PAT on patients that present with one of the 'top ten' complaints. Lack of time was a limiting factor to usage; 81% stated that they could not always remember to apply the PAT and 68% only applied Pat if they had sufficient time. Self-assessment of misuse showed that 63% reported such behaviour at least once a month and 30% at least once a week. Overall, 39% reported achieving the minimum standard of screening (at least half of the PAT-possible patients they see). This was not associated with self-reported misuse.

The authors conclude that the high proportion of emergency junior doctors that consider screening to be important contrasts with the ambivalence shown in primary care. However, despite positive attitudes, most failed to screen at least 50% of potential patients, perhaps because of clinical inertia. This could be due to a perceived lack of time or a belief that doctor's judgement may be more reliable than a questionnaire. Selective screening is more acceptable where referrals are made to designated alcohol workers rather than having to

provide brief intervention, as in primary care. Perceived importance of screening is confounded by the high rate of misuse self-reported by junior doctors.

Johansson *et al.* (2005) (Survey +) Sweden

The aim of this survey (Johansson *et al.*, 2005) was to explore, using a postal questionnaire, the extent to which 250 patients in each of 39 primary care centres (total of 4862 subjects) in Sweden expect and receive received it, with males and those in poor health predicted to receive most advice.

Kaner *et al.* (1999) (Survey ++) UK

Kaner *et al.* (1999a) assessed 430 GPs in a piloted postal UK survey for their recognition of, attitudes towards, and intervention activity for alcohol misuse. Most of the 279 respondents (76%) were males. There was a low rate of activity reported compared to the extent of heavy drinking (1-6 patients assessed in one year, when 20% of patients were drinking heavily). GPs reported that they were too busy with current concerns of patients, as well as feeling that they were not sufficiently trained. Acceptability might be improved with more readily available support for GPs, and evidence that brief intervention is effective. They would also be more motivated to assist patients who asked for their advice.

Kaner *et al.* (2001) (Survey ++) UK

This survey (Kaner *et al.* 2001) examined the distribution of screening and brief intervention in the North of England through 12,814 completed AUDIT questionnaires at 84 GP practices. The screening tool identified 4080 risky drinkers of whom only 50% received brief intervention. Males (58%) and unemployed individuals (61%) were most likely to receive the intervention, with students (38%) and university educated individuals (46%) least likely. Longer consultations and experience of relevant training were also associated with GPs delivering more interventions.

Lock *et al.* (2004) (Survey ++) UK

Patient and nurse characteristics, as well as practice factors that might affect brief intervention provision were assessed in this UK survey (Lock *et al.*, 2004). A total of 5541 patients (27% risk drinkers) were screened by 108 nurses in primary care. Nurses provided intervention for 62% of risky drinkers, with 18% not receiving appropriate management. Again, it was found that males were more likely to receive intervention.

McManus *et al.*, (2003) (Evaluation of intervention +) UK

McManus *et al.* (2003) evaluated the feasibility of training of nurses to deliver a single brief intervention to patients on a UK general medical ward. Group and one-to-one training was used to increase nurse understanding of screening and responding to patients with alcohol problems. Data was collected at base-line and six-months follow-up. Some nurses were found to be sceptical and some found it difficult to discuss drinking with patients. However, patients in this setting were seen to be more likely to contemplate behaviour change than a comparable group in the general population. It was useful that the trainer was herself a nurse, as this increased her acceptability. Also helpful was support from senior nursing staff, and the general attitude that alcohol work is important. Asking patients about drinking as a routine admission procedure allowed the topic to be raised in a noon-threatening way, thereby lessening the apprehension of nurses in this endeavour.

Miller *et al*. (2006) (Survey, part of RCT +) USA

Miller *et al.* (2006) assessed the attitudes of 162 patients' attitudes toward screening and the demographic variables associated with these attitudes. The study was carried out in the US. The mean age of patients was 39.4, with 72% males. The majority (66%) were black, with black people and older people more positive toward screening. In addition, it was reported that patients who drank more were apparently less embarrassed about discussing alcohol.

Mukamal (2007) (Survey +) USA

A telephone survey Mukamal (2007) was carried out to provide data for 15,498 patients over the age of 18 in the US. Two thirds were female and the majority (12,447) were white or non-Hispanic. A total of 13% had received alcohol counselling in the past 3 years, 10% in past year. The prevalence of heavy drinking in the sample was 21%. Findings showed that problem drinking was higher (23% compared with 16% white, 12% black) in Hispanic people. However, Hispanic people were more than twice as likely to be counselled (OR 2.17) than white people. It might be assumed from these figures that GPs are applying screening unsystematically.

Schermer *et al.*, (2002) (Survey +; 2003, USA Survey +) USA

Schermer and colleagues received completed surveys from 114 patients in the US (Schermer et al. 2003) and 315 trauma surgeons to assess the acceptability of screening and brief intervention in this setting. Most patients (94% of a sub-sample of 50) thought that patients ought to be asked about their drinking. Mean scores from the whole sample for being asked by a doctor, or a nurse / social worker were 'OK'. There was a slight ethnic difference in that Native Americans had lower overall scores, but were still in the 'OK' range. Women found

brief intervention and reading materials more acceptable than men, (p=0.006) though again, both had mean scores of 'OK' or above. Patient barriers to participating in screening in this study were language and severity of injury.

Most surgeons (83%) agreed that a trauma centre is an appropriate setting in which to discuss drinking with patients, 88% supported screening, with 25% already using AUDIT or CAGE screening as routine practice, 55% using screening in total. Most trauma surgeons were supportive of brief intervention (72%); supporters were also seven times less likely to consider costs as prohibitive. However, only 49% reported understanding the concept of brief intervention. Brief intervention was being used by 37% of physicians.
Screening was carried out by researchers in this study, and therefore does not fully reflect real practice.

Williams *et al.* (2005) (Evaluation, ++) UK
Data was collected on all ED patients that accepted an appointment to see an alcohol health worker (AHW) between January 1998 – 31 December 2001 (Williams *et al.*, 2005). All, the patients were identified as 'high risk' by staff, though not all potential high-risk patients were identified. The proportion of patients screening positive varied between 3% and 15% of the total number screened. Between 8% and 18% of screened patients accept the alcohol health worker (AHW) appointment depending on audit phase.

A total of 1792 patients booked appointments; overall attendance was 34.7%. Factors that affected the rate of attendance include delay between the offer of appointment and appointment date (33% less attendance with a delay); whether the patient had requested a delayed appointment (mediates the delayed appointment effect); and frequency of clinics (a 6% drop in attendance when clinics fall in frequency from 5 to 3 mornings).

The authors conclude that those patients requesting a delayed appointment (23%) were more likely to attend than those who do not. The rate of attendance declines steadily in the group that accept the next available appointment as the delay increases from 0 days to 5 days (77% of all appointments made). There is a 'half-life' of attendance at 2 days whereby the rate has dropped by half (from 65% on same day to 28% on day 2). Hence, there is an important 'same-day' or teachable moment aspect to the availability of AHWs to high risk patients, and delays are better kept to a minimum.

Evidence from qualitative studies

Aalto *et al.* (2003) (Focus Groups +) Finland

The authors of this study (Aalto *et al.,* 2003) carried out 6 focus groups with 18 GPs and 19 nurses in Finland to explore potential obstacles to carrying out effective screening and brief intervention. The study findings did not distinguish particular professional types, instead grouping potential issues for GPs and nurses together. They identified misunderstandings about the content of early phase heavy drinking, doubts about their own abilities to help patients, and extra workload demands as major potential barriers to successful implementation. Discussing alcohol felt more justified if the patient presented with alcohol-related symptoms.

Aira *et al.* (2003) (Interviews +) Finland

Aira *et al.* (2003) carried out 35 semi-structured interviews in Finnish practices to explore factors that affected GP discussion of drinking behaviour with patients. Brief interventions were the topic of discussion, although no specific intervention was discussed in the paper. Some GPs felt that drinking was a sensitive issue that had to be approached carefully since its association with health may not be shared with patients, and initiation of discussion could be seen as intrusion into the patient's privacy. Discussion was more likely to occur if the patient mentioned drinking concerns, or health problems were identified that might feasibly be connected to alcohol consumption, such as insomnia, or hypertension. Other clues might be repeated accidents or sick leave, lack of attention to personal appearance, or more explicitly, the GP may be informed of an individual's drinking problems by a third person. In the absence of external clues or positive laboratory test results, the topic might not be addressed. When GPs were aware of a problem they might not feel adequately trained to proceed with brief intervention. When an intervention was carried out, GPs had no evidence of effectiveness as follow-up was unlikely for patients that had no other health concerns. In addition to interpersonal issues, GPs considered they lacked the necessary time in the consultation to cover discussions about drinking.

Beich *et al.* (2002) (Focus Groups / Interviews) Denmark

Focus groups and interviews were utilised by Beich *et al.* (2002) in their exploration of 35 Danish GP experiences of screening and brief intervention implementation. Intervention was limited by the practitioners' concerns that they may be intruding into the private lives of their patients. In particular, young people were seen as being outside the realm of GP responsibility, in terms of identifying hazardous drinking. Some patients were uneasy with discussing drinking behaviour, and may not participate in a truthful or productive manner. The patient–practitioner relationship was also a factor, in that drinking discussions were

viewed as interrupting the flow of communication. In addition, the screening tool was seen as insensitive and practitioner's own counselling skills as often lacking in this area. Workload was an issue, as the time taken to carry out screening and interventions several times a day was not insignificant, and the time and resources required needed to be averted away from other work.

Best *et al.* (2002) (Interviews and Survey -)

One UK-based qualitative study by Best *et al.* (2002) was retrieved that examined the possibility of implementation of brief intervention in British custody suites. The reporting of the study methods is limited, making quality of the actual research difficult to assess. 14 Forensic Medical Examiners were interviewed and a further 11 FMEs and 15 police officers were surveyed. The majority of FMEs work as GPs, with FME work taking up an average of 116 hours per month. Professional views gave the impression that custody suites were a potential opportunity to engage with at-risk heavy drinkers at a crucial point. Professionals were in contact with individuals that were harming others through their drinking, and therefore could provide a means of communication that might result in behaviour change. However, barriers to such assistance included lack of knowledge, time, and training to be effective in alcohol work. In addition, assessed individuals are often under the influence of drink to the point where receptiveness to advice would be minimal, and even if this were not so, detainees are unlikely to be followed up in relation to their drinking after they are released.

Brooker *et al.*, (1998) (Interviews) UK

Interviews with 17 Emergency care nurses were carried out in the UK subsequent to the abandonment of an RCT to compare CAGE screening and health education versus health education only (Brooker *et al.*, 1999). Nurses were asked for their views on implementation; attitudes were mixed regarding the appropriateness of carrying out screening for alcohol misuse in the ED. For some, holistic care was important, and drinking was addressed as part of the care package. For others, injury care was priority, with alcohol screening creating extra workload. The setting was regarded as stressful for patients and perhaps not suitable for addressing sensitive topics – half of the nurses found it difficult and seemingly judgemental to ask about drinking. In addition, this particular study took place at a time when staff morale was generally low due to organisational factors as well as a series of upsetting cases in a short period of time. Training was inadequate due to staffing constraints and there was a feeling that resources were stretched beyond normal funding levels, and that research funding should contribute towards this. However, half of nurses were convinced of the ease of screening once the process had begun.

De Guzman *et al.* (2006) (Interviews +) USA

A US-based qualitative study by De Guzman *et al.* (2006) aimed to understand the elements and context of a particular intervention that are most or less effective in engaging 25 mothers with, or at risk of HIV/AIDS in a programme of change for drinking behaviour (Family First). Reported barriers to attending the programme were substance use, housing and financial problems, and child-care responsibilities. The authors also identified a number of facilitators to attendance, highlighting some principles of interventions that might be theoretically transferable to other settings. For example, a strong therapeutic alliance was an important factor in maintaining attendance, with specific facilitator characteristics such as compassion, honesty, helpfulness, a non-judgemental manner, and 'meeting clients where they are'. More specific to this population perhaps was the high value placed on the opportunity to share experiences, and to learn to deal with day-to-day stresses.

Desy *et al.*, (2008) (Process Evaluation +) (2007) USA

Desy *et al.* (2008) evaluated a US-based programme for training Emergency Care nurses in implementation of Screening, Brief Intervention, and Referral to treatment (SBIRT) in five sites across four states. Satisfaction with training differed substantially across sites, due to delays in organisation. Dissatisfaction with training was associated with lower implementation of screening and brief intervention within the study period of 6 months. Across the sites, a total of 3265 patients were screened, with 678 (21%) identified as hazardous drinkers. Of these, 393 (58%) received brief intervention. Nurse co-ordinators were asked for their views regarding barriers and enablers to implementation of screening and BI by nurses. Organisational barriers included a lack of administrative support, and limited access to alcohol treatment services in hospital or surrounding community deterred referrals. Some staff thought it unethical to begin a process that cannot be followed through. Competing priorities affected time available to carry out SBIRT, and some staff lacked motivation, and / or the conviction that psycho-social intervention is efficacious, or that it is the responsibility of ED staff. In addition, inappropriate perceptions of the drinking habits of certain patients inhibited objective implementation. Emergency Departments are also busy, with lack of space to provide privacy for discussion, particularly with drinking being perceived as a sensitive topic. Attendances are usually short, and patients may have family members present, limiting the opportunity for frank discussion. There were refusals, and the consideration of patients who were in acute pain. Patients complained to staff of language barriers, costs, and lack of counselling facilities associated with interventions. It was speculated by staff that the creative use of technology might assist both training requirements as well as efficient and more immediate screening; results could then be acted upon without undue delay.

Hutchings *et al.* (2006) (Focus Groups ++) UK

Focus groups (Hutchings *et al.*, 2006) were carried out with members from 4 UK primary care teams to explore and compare the views of patients and health professionals regarding screening and brief intervention. A major barrier to implementation for professionals was a lack of resources such as time, staff, and space. Nurses felt that they were already overloaded with work. Specific training was seen by nurses as an incentive to carry out alcohol work. There was agreement from professionals and patients that the context in which screening and intervention takes place is important. Nurses were already discussing lifestyle issues with patients in clinics and new patient registration sessions, therefore this seemed to be an appropriate environment in which to approach the topic of drinking. Professionals were concerned about offending patients by discussing drinking, and a good rapport between patient and professional was seen as important.

Johansson *et al.* (2005) (Focus Groups -) Sweden

A Swedish study by Johansson *et al.* (2005) examined through focus groups with 26 nurses the circumstances that encourage or discourage engagement in alcohol prevention. Barriers reported in this short communication included nurse time and inconvenience, especially in respect to addressing the issue of alcohol with all relevant patients. Nurses were also reluctant to disturb the relationship they have with patients in terms of being perceived as prying into the private sphere. Some nurses felt that their patients might not necessarily benefit from the intervention due to their own or the patient's lack of self-efficacy in addressing the issue in practice. Drinking was seen as a sensitive topic that required skills and confidence to address appropriately. A factor that nurses felt might enhance involvement is attendance at specific training courses that increase awareness of patient presentation at early stages of drinking.

Kaner *et al.* (2006) (Interviews +) UK

Kaner *et al.* (2006), in their interviews with 29 GPs, found that UK-based physicians felt limited by their own behaviour and health beliefs in relation to drinking behaviour. Drinking was viewed as difficult to discuss if GPs could relate their own drinking to that of the patient. One way of dealing with this is distancing from the topic. However, this coping mechanism is counter-productive in health promotion work. Some GPs felt guilty or hypocritical addressing a behaviour that they themselves were involved in. However, individuals might be assisted in their drinking behaviour management when practitioners are empathetic to patients. Drinking is a behaviour shared by both physician and patient and, although this can be a potential barrier, if handled sensitively, it can facilitate productive health promotion. This is also enhanced by confidence and directness in discussions around drinking behaviour, which could possibly be addressed in training curricula.

Lock *et al.* (2002) (Interviews ++) UK

Lock *et al.* (2002) interviewed 24 nurses from 20 UK primary care practices that had previously been invited to take part in a trial of brief intervention. This in itself could introduce bias, and the authors are keen to acknowledge this. Ideally, comparison with nurses with a range of experience in this area would be carried out in order to elicit views that are not influenced by extended involvement in training and implementation. The authors have developed a typology of potential barriers and facilitators that influence individual practitioners and patients. Actual interactions then result from numerous combinations of factors. These are listed in terms of patients' negative reactions to raising the topic of alcohol in a consultation, and nurse responses to raising it, given their past and present experiences in this situation.

The authors also found that nurses had a tendency to 'gloss over' the issue of alcohol, recording only consumption figures in the patient notes. Drinking was seen as an emotive issue which occasionally provoked aggressive or abusive behaviour, and was therefore avoided in an attempt to avoid upset. In addition, motivation to address the issue with patients was quelled by the feeling that patients might be concealing the truth about their drinking.

Other barriers included ambiguities around current guidance and appropriate advice relating to drinking behaviours, with confusion surrounding benefits and harms of alcohol consumption and the amounts of differing strengths of beverages required to achieve either of these. Such confusion may restrict the motivation of nurses to initiate discussion, and the ability of patients to understand advice. In addition, some groups of patients may be given more attention than others in a mistaken attempt to target the most likely high consumers, with middle-class or married people being perceived as low-risk. The study findings would suggest that nurses require an ability to be flexible in their advice to particular individuals to optimise the effectiveness of interventions, and this may require specific training.

Lock *et al.* (2004) (Focus Groups ++) UK

Lock *et al.* (2004) found in their focus groups with 31 patients from 8 UK practices that context was important in terms of framing questions; drinking was a more acceptable topic for discussion if it was embedded within talk of other lifestyle behaviours, and within routine assessments carried out in clinics and new registration sessions rather than patient-driven consultations for specific health concerns that may have no connection with drinking. This supports the work described earlier and mirrors the views of providers. In addition, preferences are evident regarding the type of practitioner that users are willing to talk with

about their drinking. Young women prefer to discuss their drinking behaviour with a practice nurse, whilst some patients perceive the nurse as less well trained and serious about the topic than the GP. To some patients, talking to alcohol workers and counsellors, though they are regarded as well trained, represented the potential for stigmatisation, particularly if consultations with these professionals were planned to take place in the practice setting – visible to other patients living nearby. This view contrasts some provider views that experienced alcohol workers might be more appropriate for counselling. Patients feel more comfortable discussing their drinking within a strong practitioner-patient relationship.

Rapley *et al.* (2006) (Interviews and Focus Groups ++) UK

Rapley *et al*. (2006) carried out interviews with 29 GPs, and focus groups with 7 physicians, one practice nurse, one health visitor, a counsellor and 2 practice managers in the UK in order to explore the work of GPs in relation to alcohol issues. Practitioners reported that patients sometimes reacted badly to being asked about their drinking, creating discomfort for GPs who resisted asking questions out of context. There was a preference, as in the Delphi study described above (by Heather *et al.*), for raising the issue of alcohol in a context that was non-threatening, such as during discussions of lifestyle. This is described as an 'auspicious environment'. Another barrier was the lack of role legitimacy in supervising the lifestyle of others. In addition, GPs found difficulty identifying individuals that were early phase drinkers. It was not seen as appropriate or feasible to ask all patients about their drinking. Difficulty was also related to what Rapley *et al.* describe as 'multiple definitions of problematic drinking', or confused messages around recommended limits.

Rush *et al.* (1995) (Focus Groups and interviews ++) Canada

Rush *et al.* (1995) carried out interviews with 12 GPs, and focus groups with 12 GPs. They report that GPs in Canada felt as if they were missing 'at-risk' individuals. Physicians did not find it appropriate to address drinking with all patients, as recommended in their training. Imposing discussions of drinking into consultations for other purposes was seen as a concern, particularly within time constraints. Ambiguous health–related messages around drinking could create uncertainty about how to manage drinking in practice. The authors found however, that assisting patients with their drinking behaviour was facilitated by a strong patient-practitioner relationship. The patient needed to be aware that the screening was being carried out in their best interests, that their health and well-being was the key concern. The practitioner needed to believe that counselling is an important part of work with patients. In support of survey work described above (Aalto *et al.*), there was a reported increased motivation in patients who could be described as middle aged or elderly.

5.4.3.2.1 Overall narrative synthesis of review findings by theme

There is evidence of under-activity in the area of screening and brief intervention for alcohol misuse in primary care as well as emergency care settings (Kaner *et al.,* 1999; Anderson *et al.,* 2001; Aalto *et al.,* 2002). Potential barriers that may contribute to a lack of standardised practice, and facilitators that could improve the situation are presented by theme:

Organisational Factors

Under-activity in screening and brief intervention is in part associated with organisational barriers such as lack of financial incentives or managerial support (Babor *et al.,* 2005); Adams *et al.,* 1997) as well as workloads that limit the extent to which practitioners are able or willing to take on extra responsibilities (Hutchings *et al.,* 2006; Beich *et al.,* 2002; Rush *et al.,* 1995; Aira *et al.,* 2003; Johansson *et al.,* 2005).

Evidence is emerging that training increases the implementation rate of brief intervention (Adams *et al*., 1997; Kaner *et al*., 1999), particularly in the appropriate detection and management of individuals at risk of heavy drinking (Berner *et al.,* 2007). However, there is also some evidence that even after training, some professionals might not always carry out interventions appropriately (Kaner *et al.,* 1999). Professionals need to be receptive to the aims of training and committed to the alcohol programme for training to be effective (Anderson *et al.,* 2004).

Several studies have explored the impact of receptionist assistance in carrying out screening in general practice. Delegating work such as handing out questionnaires can save time (Babor *et al.,* 2005), though receptionists have not been found to have as positive an attitude to becoming involved in this type of work without adequate re-imbursement (Lock *et al*., 2000) or to changing their role (Babor *et al.,* 2005) as clinicians. Despite organisational barriers to implementation, providers report apparent positivity toward the inclusion of health promotion programmes into primary care, with nurses often involved in implementing screening and brief intervention, albeit with reservations about their knowledge in this area. As Lock *et al*., (2000) suggest, implementation may be made more successful by involving all relevant staff in discussions from the planning stage onwards.

Suggestions have been made in the literature by patients and professionals that screening and brief intervention might be best carried out in clinics or registration sessions as lifestyle issues are addressed in these environments. This would provide a natural environment in which to speak about lifestyle issues, and nurses could be involved in screening and/or intervention

(Hutchings *et al.,* 2006; Lock *et al.,* 2002; Rapley *et al.,* 2006). In terms of alcohol health promotion delivery, patients are wary about the visibility of their consultations, preferring to see the GP or practice nurse rather than a specialist. Practice nurses are regarded as having more time for discussion, whilst GPs are regarded as more knowledgeable.

Provider Factors

Barriers to optimum implementation of screening and brief intervention are evident at the level of the provider in terms of knowledge, skills, attitudes and behaviours. There is evidence that practitioners are often confused by, or unaware of current guidelines, particularly in view of the multiple definitions relating to alcohol measures and strengths (Aalto, 2003). Nurses are anxious not to misdirect advice (Kaner *et al.,* 2003), and practitioners can find drinking a difficult topic to raise (Lock *et al.,* 2002) and are concerned about upsetting patients. Whilst service user aggression is rare, providers may remember such incidents and attempt to avoid a re-occurrence (Lock *et al.*, 2002; Beich *et al*., 2002).

Advice on drinking behaviour is provided less often than for other lifestyle behaviours, such as exercise, diet, and smoking, and less often than service users expect. Discussion about drinking typically lasts less than four minutes (Aalto *et al.,* 2004) and detection rates for 'at risk' drinkers can be as low as one in three (Berner *et al.,* 2007), possibly due to reluctance to ask users about their drinking unless they saw clear signs of risky drinking behaviour. Detecting 'at-risk' individuals (Rapley *et al.,* 2006) accurately requires a specific knowledge base that takes into account actual levels and patterns of consumption for different groups within society without stereotyping particular groups.

There is suggestion from experts (Heather 2004) that brief intervention might be personalised to meet the needs of patients rather than standardised across all groups. There is also evidence from patient and professional views that a good rapport between patient and professional is helpful in discussing sensitive topics such as drinking behaviour (Lock *et al.,* 2005; Hutchings 2006). A GPs' own drinking behaviour can evoke feelings of guilt and hypocrisy - potential barriers to open discussion, or facilitators to empathy (Kaner *et al.,* 2006), though Aalto *et al.* (2006) found no association between own drinking and implementation of brief intervention.

Service User Factors

Particular service user characteristics have been associated with either a lower or higher likelihood of being approached by practitioners to discuss drinking behaviour. In particular, those who are most likely to be approached are males (Lock *et al.,* 2004; Johansson *et al.*, 2005; Berner *et al.,* 2007; Aalto *et al.,* 2002), and people of Black or Hispanic ethnic origin

(Mukamal, 2007), and unemployed (Kaner *et al.*, 2001); although one systematic review found no association between SES and implementation of brief intervention (Littlejohn., 2006). Beich *et al.,* (2002) found that GPs were reluctant to bring up the topic of drinking with young people as they felt that they would be likely to grow out of the habit of hazardous drinking. These findings show that practitioners may not implement screening and brief intervention in a standardised way across groups; whilst it is important to be aware of epidemiological evidence regarding those groups that drink most heavily, there is a risk of missing individuals that are most at need. In any event, recent surveys show that both males and females in higher managerial employment are indulging in the most frequent and heavy drinking in the UK, whilst those without employment are drinking least often and least heavy (NHS 2008).

In terms of participation, the majority of service users are positive toward screening (Miller *et al.,* 2006; Hutchings *et al.,* 2006) and toward discussing drinking (Aalto *et al.,* 2002). However, some professionals had encountered negative reactions from users in terms of embarrassment and unease, with some patients having changed to another GP practice (Lock *et al.,* 2002; Beich *et al.,* 2002).

5.4.3.2.2 Narrative synthesis of review findings presented by subgroup

Setting of delivery:

Primary Care

The majority of the research reviewed has been carried out in primary care settings, therefore evidence is based on this setting, with potential transferability of some aspects of the findings to other settings. The following is an overview of the evidence that applies particularly to primary care.

Views and experiences of patients

Patients in primary care appear to be generally positive about alcohol screening. They decline to see specialist alcohol workers, perhaps because of perceived stigma. Patients are however, according to the evidence, being under-screened for alcohol misuse. Patient preference in terms of delivery of brief interventions appears to be in favour of clinics and registration sessions.

Views and experiences of professionals

Professionals also appear positive about the ethos of screening and brief intervention. From a practical point of view, however, implementation can be problematic due to lack of access to

training, lack of staff, and lack of time due to already demanding workloads. Some studies have examined how extended roles for receptionists and nurses in primary care impacts upon implementation, as well as the views of those involved. In order to decrease the time taken up in screening and intervention, patients can be offered screening tools in the waiting room. There is evidence that although this increases overall efficiency and optimal use of space, extending roles can be problematic unless staff are involved in the planning and decision making processes. In terms of where screening and intervention are carried out, professionals agree that clinics and registration sessions are appropriate contexts for the discussion of drinking.

Emergency Care

Implementation of alcohol screening and brief intervention in emergency care settings is not as consistent as in primary care. The setting differs from primary care in terms of patient population and types of presenting cases, and as such, will need to take into account barriers and facilitators to implementation specific to emergency care organisation, patients and staff. Patients seen in emergency care settings are more likely to have misused alcohol prior to their visit than those in primary care; indeed, alcohol may have played a part in the incident leading up to the need for care. In addition, patients attending emergency departments are often acutely ill or severely traumatised, possibly unconscious, thus making staff decisions about the appropriateness of screening and discussing alcohol more problematic. Traumatised patients will also be less able psychologically to engage in health promotion activity, and therefore referral procedures will need to be negotiated, rather than opportunistic interventions whilst the patient is within the department. In addition, there are differences in activity between Emergency Units; for example, Minor Injury Units are community based, and tend to serve less severely injured patients.

In addition to these considerations, there has been a lack of research activity in this setting, leading to limited evidence on which to base practice. The following reflects this shortfall of evidence, highlighting a need for exploration of this setting as a potential opportunity to address alcohol misuse. However, it should be borne in mind that the emergency department offers an excellent opportunity for discussion and reflection by the patient on their alcohol-related attendance, Furthermore, contact with ‘hard to reach’ populations (such as young males and patients not registered with a GP) can be made in emergency care and patients can be offered access to screening and brief intervention where appropriate

Views and experiences of patients

Schermer and colleagues (2002, USA, Survey +) received completed surveys from 114 patients to assess the acceptability of screening and brie intervention in this setting. Most patients (94% of a sub-sample of 50) thought that patients ought to be asked about their drinking. Mean scores from the whole sample for being asked by a doctor, or a nurse / social worker were 'OK'. There was a slight ethnic difference in that Native Americans had lower overall scores, but were still in the 'OK' range. Women found brief intervention and reading materials more acceptable than men, (p=0.006) though again, both had mean scores of 'OK' or above. Patient barriers to participating in screening in this study were language and severity of injury.

Views and experiences of professionals

Brooker *et al.* (1998 UK +) interviewed 17 emergency care nurses who had attempted to implement an RCT of CAGE screening with adult patients. Recruitment to the trial was insufficient and therefore had to be abandoned. Attitudes of nurses varied regarding the appropriateness of alcohol screening in ED. In addition, contextual factors such as lack of funding, staff low morale, and patient stress were seen as barriers to implementation. Training in this study was reported by staff interviewed as inadequate and support from clinical management was inconsistent.

In the Desy *et al.* (2008) (US +) evaluation of a training programme for Emergency Care nurses, organisational factors influenced satisfaction with training across sites. Dissatisfaction with training was associated with lower implementation of screening and brief intervention, pointing to a chain of events that can create barriers at implementation. Barriers to implementation of SBIRT by nurses included a lack of administrative support, and limited access to specialist centres for referrals. Competing priorities and lack of motivation combined with a sense that the efficacy of such intervention was unproven and inappropriate in the Emergency Department limited the implementation process. The setting itself is hectic, with short attendances and acute conditions to consider, so that both patients and nurses lack the required time and privacy for discussion. Language barriers, costs, and lack of counselling facilities were issues that patients brought up as inhibiters. Staff put forward ways of reducing barriers through creative use of technology in nurse training as well as patient screening to increase efficiency.

In a postal survey (Anderson, 2001) (++) of nurses and medical staff in all Scottish accident and emergency units and Minor Injury Units, it was found that no screening was taking place at 42% of the units, and recording of alcohol use was not occurring in 38% of units. Lack of

nurse confidence in dealing with alcohol-related attendances points to a need for training in this area. Nurses were more concerned (90%) about patient adverse reactions to discussing their drinking habits than were medical staff (56%). It was suggested that patients in accident and emergency might not be ready psychologically to receive advice at the time of their attendance. In addition, patients may not be sufficiently motivated at this time to change their drinking behaviour. Many patients that are 'at risk' attend out-of-hours when staffing levels are stretched, and therefore carrying out extra work may be difficult to achieve, particularly in the limited time that patients are in the department. Staff may not be adequately trained for this service or motivated to carry out brief interventions, and may not be able to access support. There were differences between attitudes in full accident and emergency departments and MIUs in that MIU staff regarded their setting as more appropriate for alcohol work than staff in full emergency departments. However, 42% of staff reported that they did routinely ask about alcohol use if they suspected a problem, and 69% recorded details on drinking if they observed signs of drinking. Staff in full accident and emergency departments were more likely to refer on to specialist services and to hand out written information to patients. There was an overall positive attitude to the aims of preventive work, with only a minority of staff feeling that nothing can be done to help change behaviour.

Schermer *et al.* (2002) (+) found that most of the 315 trauma surgeons surveyed in their study (83%) agreed that a trauma centre is an appropriate setting in which to discuss drinking with patients, with 88% supporting screening, and 55% using screening in routine practice. Most trauma surgeons were supportive of brief intervention (72%); supporters were also seven times less likely to consider costs as prohibitive. However, only 49% reported understanding the concept of brief intervention. Brief intervention was being used by 37% of physicians.

Graham *et al.* (2002) (-) consulted 569 Emergency Care physicians to assess attitudes toward implementation of brief interventions in their clinical practice. Despite 51% of physicians supporting brief intervention, the majority of physicians (91.6%) reported that they lacked sufficient time to carry them out. Barriers to implementation that were found statistically significant were that practitioners felt brief interventions would not be effective in the Emergency Department, that the department was not an appropriate site for BI implementation, and that there was no patient demand for the service.

These findings highlight the need to take the context of individual settings into account when developing new interventions, and to provide adequate funding for training and implementation. Staff attitudes need to be positively oriented toward the intervention and its importance to patient well-being if implementation is to be successful.

Probationary services

Views and experiences of detainees

No literature was sourced that addressed the views and experiences of service users in Probationary settings.

Views and experiences of professionals

Best *et al.* (2002) (-) examined the possibility of implementation of brief intervention in British custody suites. Forensic Medical Examiners (FMEs) were interviewed and a further 11 FMEs and 15 police officers were surveyed. Professionals viewed custody suites as a potential opportunity to engage with at-risk drinkers at a crucial point. Professionals here could provide a means of communication that might result in behaviour change, as some detainees are harming others through their drinking. However, barriers to such assistance included a lack of required knowledge, time, and training to be effective. In addition, assessed individuals are often under the influence of drink to the point where receptiveness to advice would be minimal, and even if this were not so, detainees are unlikely to be followed up in relation to their drinking after they are released.

Gender

Some of the above studies have examined gender differences in terms of patient expectations and acceptability of alcohol-related intervention as well as practitioner behaviour that may result in inconsistent delivery.

Johansson *et al.* (2005) explored the extent to which patients expect and receive advice about their drinking. The majority of respondents (62%) were male. More than half of patients expecting advice received it, with males and those in poor health receiving most advice. Similarly, Lock *et al.* (2004) (++), and Kaner *et al.* (2001) (++) in their primary care survey of patient and nurse characteristics, also found that males were more likely to receive intervention**.** In a survey by Berner *et al*. (2007) (++), patients were assessed to determine the proportion of correctly referred patients and the patient / practitioner characteristics that predict detection and correct referral. 56.3% were female. GPs were reported to be most likely to overlook females and younger people in their alcohol work, although detection rates improved significantly for GPs with a qualification in addiction medicine.

Despite evidence that males are more likely to receive intervention than females, Schermer *et al.* (2002) found that brief intervention and reading materials were more acceptable to women in a US trauma centre setting than to men. More evidence is required to tease out the possible

reasons why inconsistencies occur; it is speculated that practitioners can be somewhat subjective about particular patients and assume drinking to be more of a problem in some groups than others. It may be that women are deemed less likely to be 'at risk', and therefore are not approached as frequently as are men. The finding that a qualification in addiction medicine improves accurate detection points to the importance of raising practitioner awareness of triggers and signs of addiction and ways to approach potentially at risk individuals.

Age

Miller *et al.,* (2006) (+) assessed the attitudes of patients' attitudes toward screening and the demographic variables associated with these attitudes. The majority (66%) were black, with black people and older people more positive toward screening. In addition, it was reported that patients who drank more were apparently less embarrassed about discussing alcohol. Berner *et al.* (2007) (++), assessed patients to determine the proportion of correctly referred patients and the patient / practitioner characteristics that predict detection and correct referral. GPs were reported to be most likely to overlook younger people in their alcohol work, although detection rates improved significantly for GPs with a qualification in addiction medicine. Aalto *et al.* (2000) (+) assessed compliance rates and associated factors in heavy drinkers that were willing or unwilling to participate in brief intervention. Individuals in the 40-60 year age range were 1.8 times more likely to have carried out advice than women and younger people.

Rush *et al*. (1995) (++) carried out interviews with 12 GPs, and focus groups with 12 GPs. They report that GPs felt as if they were missing some 'at-risk' individuals. In support of RCT and survey work described above, professionals observed increased motivation toward behaviour change in patients who could be described as middle aged or elderly. Aalto *et al.* (2000) (+) assessed compliance rates and associated factors in heavy drinkers that were willing or unwilling to participate in brief intervention. The majority of respondents were male, with a fairly even age range. Men, heavy drinkers, and individuals in the 40-60 year age range were 1.8 times more likely to carry out advice than women and younger people.

Ethnicity

Evidence that relates ethnicity to alcohol consumption and associated intervention is scarce; research within ethnic communities is problematic due to, for example access, language barriers, and definitions of cultural variations. However, it can be assumed that religious and cultural beliefs have an effect on behaviour such as alcohol consumption, which may affect

not only the prevalence of alcohol misuse, but also attitudes toward help-seeking and health promotion activity.

In the UK, A small (n= 174) community survey was carried out by Heim *et al.* (2004) (+) in the Glasgow area to identify prevalence of alcohol consumption and views of alcohol services in three ethnic groups (Indian, Pakistani, Chinese). This study does not focus directly on screening or brief intervention but is UK -relevant, and relatively recent. Chinese respondents drank less, and were fairly satisfied with the way that mainstream services related to their community. In contrast, Pakistani respondents were largely influenced by their Muslim prohibition on alcohol consumption. Alcohol was mainly reported as not consumed at all, with fear of reprisal. Problems were therefore regarded as hidden or ignored within the community. In addition, some (13%) Indian respondents reported that the Indian community was seen as less than understanding in terms of potential drinking problems. Combined with a general lack of awareness regarding specialist alcohol services, there appears to be a need for trusted, culture-specific support.

In the US, Miller *et al.* (2006) (+) assessed the attitudes of 162 patients' attitudes toward screening and the demographic variables associated with these attitudes. The majority (66%) were black, with black people more positive toward screening. Further exploration is required to assess why these differences occur.

The US differs from the UK in respect to ethnicity in that there is a large Hispanic community; therefore applicability to the UK is limited. However, specific findings on practitioner behaviour relating to ethnicity might be considered as a principle that can be generalised to other areas, at least as an issue for increased awareness. For example, a telephone survey was carried out with 15,498 patients over the age of 18 (Mukamal & Mukamal 2007), of whom 12,447 were white or non-Hispanic. Prevalence of heavy drinking in the sample was 21%, with problem drinking higher (23% compared with 16% white, 12% black) in Hispanic people. However, counselling received was even higher than these figures would suggest, with Hispanic people more likely to be counselled (OR 2.17). It might be assumed from these figures that GPs are applying screening unsystematically.

From these studies it is not only evident that more research, though problematic, is necessary, but also that cultural differences may affect health promotion initiatives that attempt to access whole communities. Not only do differences in religious belief affect behaviour, but practitioners may hold stereotypical views about certain groups that affect the consistency of intervention delivery.

Socioeconomic status (SES)

Very little evidence has been sourced in relation to SES influences on intervention delivery and uptake. In the UK, Kaner *et al.* (2001) (++) carried out a survey of primary care delivered screening of patients for alcohol use and subsequent delivery of brief intervention. They found that unemployed individuals were more likely to receive brief intervention than people in employment. The reasons for whether patient or practitioner characteristics are influencing delivery are not apparent.

Littlejohn (2006) (+) systematically reviewed 18 papers to evaluate the potential effects of socio-economic status on patients' willingness to participate in brief intervention during research. No conclusive evidence was found for the effect of SES on implementation or outcome.

Again, results may point to inconsistencies in intervention targeting, or possibly a higher rate of drinking and/or GP attendance in unemployed individuals.

5.4.4 Discussion

A wide range of studies were identified as relevant for this review, which explored barriers and facilitators to the implementation of screening and brief intervention for alcohol misuse. Whilst the review of effectiveness identified sufficient evidence that brief intervention and screening can be effective, there was also evidence of under-activity in practice. Most of the studies reviewed in this section were carried out in primary care, where implementation of research and practice is more advanced. There was evidence that other potential areas that might implement interventions for alcohol misuse such as emergency care, secondary care and probation centres require more research to establish feasibility and acceptability, given the specific issues relating to the service user populations and work practices in these settings.

Given available evidence, successful implementation was related to organisational, provider and service user factors. Organisational factors included adequate conceptual and financial support at all levels, with a specific focus on providing appropriate training, and resources to cover the extra time required for implementation. In addition, appropriate contexts in which to deliver interventions were important factors in maximising efficiency and acceptability for both staff and users. Adequate training and support were identified as potential methods of improving staff confidence to implement interventions without fear of upsetting users, as well as increasing awareness of current issues and guidelines related to alcohol misuse. However, there was mixed evidence regarding the effects of training on delivering interventions to

appropriate groups. The Royal College of Physicians (2001) emphasised the importance of patient access to staff with the appropriate skills, recommending that every acute hospital should have a minimum of one trained alcohol health worker, and that liaison psychiatry services can play an important role in the management of alcohol misuse.

A tendency among practitioners to target certain groups of the population for screening and / or intervention points to a requirement to ensure that all users have equitable access to services, without undue emphasis upon those deemed stereotypically to be more 'at risk'. There was evidence of a positive attitude toward the general aim of carrying out heath promotion work, particularly in primary care. The point that domestic violence may also be a potential issue affecting some women with alcohol misuse has also been emphasised and should be considered appropriately in the provision of integrated services (Galvani & Humphreys, 2007; Dolev *et al.,* 2008). The needs of individuals with a dual diagnosis of mental health and substance abuse must also be considered in the provision of appropriate services for alcohol misuse. Whilst no evidence was identified for inclusion in the review, the discussion of the impact of an individual's alcohol consumption on family members and friends may present a mechanism by which reluctance to undertake brief intervention may be overcome.

The timepoint at which each study was conducted should be borne in mind when applying this evidence to the current context for public health practitioners.

5.4.5 Evidence statements

Organisational factors

Evidence statement 7.1 Evidence was identified that organisational factors such as adequate support and resources can influence the acceptability and implementation of screening and brief intervention for alcohol misuse.

Implementation of screening and brief intervention is influenced by factors other than effectiveness. Positive support from the Government, management and involvement of non-clinical members of staff are more likely to result in successful implementation.

There is also evidence from a range of studies in primary care settings that adequate practitioner training and support in alcohol misuse screening and use of brief intervention materials facilitates or would facilitate effective implementation as well as rates and appropriate detection of 'at risk' drinkers. Evidence suggests that the extent of training and support available to practitioners is variable.

One RCT (++)[1] showed more successful implementation of screening and brief intervention where there was prior experience of this type of work, management stability and positive support in terms of co-ordination of programmes. Financial incentives and successful management of staff changes as well as assistance from receptionists were also important. However, barriers to success included competing priorities and lack of time. The importance of financial and other incentives for GPs, readily available materials and availability of training was also found in one survey (+)[2].

Evidence from RCTs (++)[1], (+)[3], (+)[4] suggests that the extent to which brief intervention is implemented, though not necessarily the appropriateness of implementation, is increased with use of a training and support intervention for GPs and nurses. One cross-sectional study (++)[6] provides evidence that GPs holding a qualification in addiction medicine are more likely to detect problem drinkers, although a cross-national survey (++)[7] found that training did not improve baseline role insecurity for GPs.

One cross-sectional study (+)[8] and one qualitative study (++)[9] found that practitioner training rates and ratings of their own familiarity with screening tools and knowledge of brief intervention content was low. The importance of training to practitioners in this survey was evident, as were practitioner views that they lacked training to carry out counselling (++)[10]. The latter point was also evidenced in one cross-sectional study (++).[11] A Delphi survey (++)[12] provides evidence in the form of expert opinion that practitioner training should help raise awareness of risk factors and typical presentations of individuals with potential drinking problems. Evidence from qualitative studies show that some nurses in the UK (++)[13] see training as an incentive to carrying out alcohol-related work; a sample of GPs in Finland perceive that they lack training in identifying early stages of alcohol misuse; and GPs in a Danish focus group study (+)[14] felt they lacked training in counselling skills.

In a probationary setting, Forensic Medical Examiners in a UK qualitative study set in custody suites (-)[15] felt they lacked the required training to carry out assessments of drinking behaviour.

[1] Babor *et al.*, 2005 (RCT++) US

[2] Adams *et al.*, 1997 (Cross-sectional +) NZ

[3] Adams *et al.*, 1998 (RCT +) US

[4] Kaner *et al.*, 1999 (RCT +) UK

[5] Kaner *et al.*, 2003 (RCT++) UK

[6] Berner *et al.*, 2007 (Cross-sectional ++) Germany

[7]Anderson *et al.,* 2004 (Cross-sectional ++) Cross-national

[8]Aalto et al., 2000 (Cross-sectional +) Finland

[9]Aira *et al.,* 2003 (Qualitative ++) Finland

[10] Kaner *et al.,* 1999 (Cross-sectional ++) UK

[11] Deehan *et al.,*1998 (Cross-sectional ++) UK

[12] Heather *et al.,* 2004 (Cross-sectional ++) UK

[13] Hutchings *et al.,* 2006 (Qualitative ++) UK

[14] Beich *et al.,* 2002 (Qualitative +) Denmark

[15] Best *et al.,* 2002 (Qualitative -) UK

Applicability: The majority of these studies were carried out in the UK, therefore evidence regarding training and support is applicable to the UK. The remaining studies were carried out in US (2), New Zealand (1), Finland (2), Denmark (1) and Germany (1), where access to training may differ, and these studies are therefore less applicable.

Evidence Statement 7.2 Evidence has been found that extending current practitioner workload is a potential barrier to implementing screening and brief intervention on a large scale, particularly if all young people and adults are screened as routine practice.

The extra time that implementation demands can be a barrier to acceptability and therefore willingness to deliver such a programme. Implementation of routine screening and brief intervention programmes requires team-working between physicians, nurses and non-clinical personnel, with consideration required regarding the extent of involvement and specific roles of team members.

Evidence from one systematic review (++)[1] challenges the model of universal screening. The study concludes that implementation of universal screening does not benefit sufficient numbers of individuals to warrant the extra workload required. Nurses in one qualitative study (++)[2] felt 'overloaded' with preventative work generally, with resources such as space, staff and sufficient time in short supply. In another qualitative study (+)[3], the additional workload of screening and brief intervention was found to be creating stress among practitioners in primary care. In terms of time available, a Canadian qualitative study (++)[4] found that time was constrained in terms of assessing each patient. A qualitative study of Finnish GPs (++)[5] showed they felt they lacked time to carry out drinking assessment in the context of other consultation demands, and weak evidence (-)[6] was found that nurses in Sweden regarded time constraints as a barrier to their willingness to engage in alcohol prevention. There is mixed evidence from one RCT (++)[7] for the utilisation of non-clinical staff in implementation in

order to delegate work and thus decrease the workload of clinicians. Another RCT (++)[8] found that receptionists did not have a particularly positive attitude to being involved in this type of work without adequate re-imbursement, or to changing their perceived role (++)[7].

In an emergency care setting, one cross-sectional study (-)[9] provides weak evidence in terms of reporting from a survey of physicians that, despite support for brief interventions in theory, lack of time is a barrier to implementation. A further UK-based study set in an emergency department also reported that lack of time was viewed as a limiting factor in delivering screening (++)[10].

In a briefly reported UK qualitative study set in custody suites (-)[11], Forensic Medical Examiners felt they lacked the required time to carry out assessments of drinking behaviour.

[1]Beich *et al.,* 2003 (Review +) Denmark

[2]Hutchings *et al.*, 2006 (Qualitative ++) UK

[3]Beich *et al.*, 2002 (Qualitative +) Denmark

[4]Rush *et al.,* 1995 (Qualitative ++) Canada

[5]Aira *et al.,* 2003 (Qualitative ++) Finland

[6]Johansson *et al.,* 2005 (Qualitative -) Sweden

[7]Babor et al., 2005 (Cluster RCT++) US

[8]Lock et al., 2000 (RCT++) UK

[9]Graham *et al.,* 2000 (Cross-sectional -) US

[10] Huntley *et al.,* 2004 (Cross-sectional study, ++) UK

[11]Best *et al.*, 2002 (Qualitative -) UK

Applicability: Four of these studies were carried out in the UK, one in a forensic setting. Quality of the study reporting was poor and therefore findings may not be applicable beyond the specific setting. The remaining studies were conducted in Denmark (2), Canada (1), Sweden (1), Finland (1) and US (1), and so findings here might be less applicable in the UK. However, issues of time and workload may be transferable if similar systems are in place.

Evidence Statement 7.3 There is evidence that implementation of screening and brief intervention would be facilitated by use of environments where alcohol can discussed in a non-threatening way. Integrating screening and advice into general lifestyle discussions might increase the acceptability of screening and brief intervention for users.

In a range of studies, providers and experts emphasise the importance of appropriate contexts for discussion of alcohol use with users in order to increase acceptability.

There is evidence that clinical consultations for non-alcohol-related medical problems can be inappropriate for discussing alcohol use, given that users are focussed on the condition for which they are seeking advice. Instead, sessions such as new patient registrations and well-person clinics, where health promotion is often discussed, are seen to be less threatening arenas in which to discuss drinking, embedded in general discussion around lifestyle issues such as diet, exercise and smoking.

Evidence was found from a cross-sectional study (+)[1] that primary care users attending for scheduled appointments are more likely to be asked about their drinking behaviour, which suggests that practitioners deem certain contexts as more appropriate or more convenient in some way for carrying out screening and intervention. A Delphi survey (++)[2] also provides expert view evidence that clinics and new registration sessions are an appropriate context for assessing drinking behaviour in terms of sensitivity to user acceptability. This study also suggests that interventions might be more acceptable to users if they are tailor-made to the individual rather than global in design. There is further evidence from five UK qualitative studies (++)[3]; (++)[4]; (++)[5]; (++)[6]; (+)[7] that practitioners and users regard clinics, registration sessions and routine consultations as opportunities for discussions in a less-threatening environment and context. This provides an opportunity to discuss drinking in a context that is related to the purpose of the visit (i.e. lifestyle assessment or chronic condition monitoring).

Emergency care and probation settings are regarded as a potential opportunity to carry out alcohol screening and advice; however there is scarce evidence available. One survey of Scottish emergency care units (++)[8] and one qualitative study (-)[9] set in custody suites found that staff thought the location unsuitable for alcohol screening and intervention. However, two surveys from the US (+)[10], (+)[11] reported that both patients and surgeons found the emergency care setting acceptable and appropriate. One US evaluation (+)[12] provided evidence that emergency care staff may not feel adequately supported either by management or financially, with training and workload particular concerns. One UK survey (+)[13] provided mixed views with some nurses preferring a holistic approach, and others prioritising care of injuries over health promotion. A further UK-based study found that the majority of consulted professionals judged the emergency department to be an appropriate place to perform alcohol screening but that implementation rates were low, potentially due to clinical inertia (++)[14]. The importance of having resources in place to facilitate rapid referral of positively screening patients from the emergency department to brief intervention was emphasised, with a 'half-life of attendance' described at 2 days following referral, whereby the rate of attendance for brief intervention dropped off markedly (++)[15]. Implementation of alcohol screening and brief intervention in emergency care settings is not as consistent as in primary care. The

setting differs from primary care in terms of patient population and types of presenting cases and, as such, account needs to be taken of barriers and facilitators to implementation specific to emergency care organisation, where attendance is brief and often traumatic, with patients who are more likely to be injured, traumatised, or intoxicated, and staff who may feel less prepared to give advice.

[1]Johansson *et al.*, 2005 (Cross-sectional +) Sweden

[2]Heather *et al.*, 2004 (Cross-sectional ++) UK

[3]Hutchings *et al.*, 2006 (Qualitative ++) UK

[4]Lock *et al.*, 2004 (Qualitative ++) UK

[5]Lock *et al.*, 2002 (Qualitative ++) UK

[6]Rapley *et al.*, 2006 (Qualitative ++) UK

[7]McManus *et al.*, 2003 (Evaluation +) UK

[8] Anderson *et al.*, 2001 (Cross-section ++) UK

[9]Best *et al.*, 2002 (Qualitative -) UK

[10]Schermer *et al.*, 2002 (Cross-section +) US

[11]Schermer *et al.*, 2002 (Cross-section +) US

[12]Desy *et al.*, 2008 (Evaluation +) US

[13]Brooker *et al.*, 1998 (Qualitative +) UK

[14] Huntley *et al.*, 2004 (Cross-sectional study, ++) UK

[15] Williams *et al.*, 2005 (Evaluation, ++) UK

Applicability: Eleven of these studies were conducted in the UK, therefore there is relatively high applicability.

Evidence Statement 7.4 There is evidence that service users have preferences regarding the status of the person dealing with their alcohol issues.

Although experts consider alcohol and counselling specialists to be better qualified to carry out interventions, service users might feel stigmatised or rejected should their needs be referred on to such practitioners.

Evidence from one RCT (+)[1] carried out in a general medicine setting showed that service users are no more likely to attend for counselling with an alcohol specialist than with a physician or nurse. In addition, qualitative evidence from the UK (++)[2] focusing on user views shows that counselling with alcohol specialists can sometimes be perceived as stigmatising. These views contrast with expert views (++)[3] that alcohol workers and counsellors might be best placed to deliver brief intervention. There is evidence of some mixed views from three studies (++)[4]; (++)[5]; (++)[6] in that professionals and some users

perceive the nurse as having more time for discussing drinking with users, whereas other users report that they are more likely to discuss alcohol-related issues with their GP.

[1] Goldberg *et al.,* 1991 (RCT +) US

[2]Lock *et al.,* 2004 (Qualitative ++) UK

[3]Heather *et al.,* 2004 (Cross-sectional ++) UK

[4]Hutchings *et al.,* 2006 (Qualitative ++) UK

[5]Lock *et al.,* 2004 (Qualitative ++) UK

[6]Lock *et al.,* 2002 (Qualitative ++) UK

Applicability: Five of these studies were conducted in the UK. The RCT however was carried out in the USA, therefore the findings may be less applicable to the UK.

Provider Factors

Evidence Statement 7.5 There is some evidence that service users are generally positive about screening and intervention. There is also evidence for general under-activity in discussing drinking with service users.

However, practitioners' experiences of negative service user behaviour, such as aggression at being asked about their drinking, whilst rare, may serve as deterrents to approaching the topic of drinking with users. Actual drunkenness at consultations limits the likelihood that users will appreciate or remember the advice given. Practitioners may benefit from training in dealing with such situations, and in approaching the topic with individuals that they perceive as 'low risk' in appropriate contexts.

Two studies (+)[1]; (++)[2] provide evidence that the majority of service users are positive toward screening, and another (+)[3]toward discussing drinking. However, two qualitative studies [4] (++)[4]; (+)[5] found that some professionals had encountered negative reactions from users in terms of embarrassment and unease, and changing their GP practice.

Evidence from two UK cross-sectional studies (++)[6], (++)[7] shows under-activity in terms of practitioner management of hazardous drinking, with a majority of GPs in the first study only intervening in between one and six cases per year. Even in cases of heavy drinking, service users are not being asked about their consumption (+)[8]. Another cross-sectional study (+)[9] found that advice on drinking behaviour is provided less often than for other lifestyle behaviours, such as exercise, diet, and smoking, and less often than service users expect. One cross-sectional study (++)[10] found that the time being spent on asking users about their drinking was typically less than four minutes, and another recent cross-sectional study (+)[11]

found that detection rates of problem drinkers are low, at one in three. Possible reasons are found in a Finnish qualitative study (++)[12] of GPs, who reported their reluctance to ask users about their drinking unless they saw clear signs of risky drinking behaviour.

[1] Miller *et al.,* 2006 (Cross-sectional +) US

[2]Hutchings *et al.,* 2006 (Qualitative ++) UK

[3] Aalto *et al.,* 2002 (Cross-sectional +) Finland

[4] Lock *et al.,* 2002 (Qualitative ++) UK

[5] Beich *et al.,* 2002 (Qualitative +) Denmark

[6] Kaner *et al.,*1999 (Cross-sectional ++) UK

[7]Anderson *et al.,* 2001 (Cross-sectional ++) UK

[8]Aalto *et al.,* 2002 (Cross-sectional +) Finland

[9]Johansson *et al.,* 2005 (Cross-sectional +) Sweden

[10]Aalto *et al.,* 2004 (Cross-sectional +) Finland

[11]Berner *et al.,* 2007 (Cross-sectional ++) Germany

[12]Aira *et al.,* 2003 (Qualitative ++) Finland

Applicability: Four studies of good quality were conducted in the UK, providing applicable evidence. Four studies were conducted in Finland, and one each in US, Denmark, Sweden and Germany.

Evidence Statement 7.6 Evidence was found that provider attitudes, knowledge, skills and behaviour can influence the implementation of screening and brief intervention for alcohol misuse.

There is evidence from primary care practitioner views of a short-fall in perceived knowledge in terms of detecting 'at-risk' individuals. There is also evidence of confusion regarding current guidelines around drinking behaviour, and the known benefits of drinking in moderation. This can affect practitioner confidence in and motivation towards implementing screening and brief intervention programmes effectively. In addition, the practitioner's own drinking behaviour and the user-practitioner relationship may affect the way that alcohol-related interventions are implemented.

One UK qualitative study (++)[1] provides evidence that GPs found difficulty in identifying early stage heavy drinkers. The study also reports difficulty working with multiple definitions of problematic drinking. One qualitative study (+)[2] found that GPs and nurses saw lack of clear guidance as a barrier to carrying out brief intervention. Utilising the skills of receptionists can be useful but there is evidence from one RCT (++)[3] that receptionist

attitudes toward the work may be less positive than that of clinicians, and that this might have an impact upon implementation.

There is weak evidence (-)[4] that Forensic Medical Examiners perceive that they lack the knowledge to carry out assessment in custody suites in the UK.

Two UK qualitative studies (++)[5], (+)[6] found that nurses saw alcohol as a difficult and emotive topic to broach with users. In addition, nurses reported confusion for themselves and service users around the issue of standard drink units, and the potential benefits of alcohol that create ambiguity in discussing drinking from a health promotion perspective. Other studies (+)[7], (+)[8] found that GPs relationship with alcohol could affect their behaviour in terms of addressing service user drinking, with feelings of guilt and hypocrisy potential barriers to open discussion, or facilitators to empathy. There is qualitative evidence from three studies focussing on user views (++)[9]; (++)[10]; (+)[11] that discussing drinking is facilitated by a good relationship with the health professional. In addition, there is evidence (+)[12] that practitioners are concerned not to offend users in relation to discussing alcohol for fear of disturbing the therapeutic relationship.

[1]Rapley *et al.,* 2006 (Qualitative ++) UK

[2]Aalto *et al.,* 2003 (Qualitative +) Finland

[3] Lock *et al.,* 2000 (RCT++) UK

[4]Best *et al.,* 2002 (Qualitative -) UK

[5]Lock *et al.,* 2002 (Qualitative ++) UK

[6]McManus *et al.,* 2003 (Evaluation +) UK

[7]Kaner *et al.,* 2006 Qualitative +) UK

[8]Aalto *et al.,* 2006 (Cross-sectional +) Finland

[9]Lock *et al.,* 2004 (Qualitative ++) UK

[10]Hutchings *et al.,* 2006 (Qualitative ++) UK

[11]de Guzman, 2006 (Qualitative +) US

[12] Beich *et al.,* 2002 (Qualitative +) Denmark

Applicability: Eight of these studies were conducted in the UK, therefore are transferable. Two of the remaining studies were carried out Finland, and one each in Denmark and US, making these studies less applicable, particularly as attitudes to discussing alcohol in Scandinavian countries may differ from those in the UK.

Service User Factors

Evidence Statement 7.7 There is evidence that the consistency of provider implementation of screening and brief intervention for alcohol misuse can be influenced by particular aspects of the service user population.

Evidence was identified that shows disparities in implementing screening and brief intervention for alcohol misuse in terms of certain groups within the population. Whilst certain groups such as males and high earners are more 'at-risk' than others from alcohol misuse, individuals from groups that are 'low-risk' such as females, younger and older people may be missed. Conversely, over-targeting can also occur due to misperceptions of the populations most at-risk of alcohol misuse.

One systematic review (+)[1] provides inconclusive evidence that socioeconomic status affects the uptake of brief interventions. However, one cross-sectional study (++)[2] found that unemployed individuals were more likely to receive brief intervention than those in employment. In terms of ethnicity, there is evidence from one cross-sectional study (+)[3] that individuals of ethnic background, in this instance Black and particularly Hispanic people, were more likely to be approached by practitioners regarding their alcohol consumption. Four cross-sectional studies, one from the UK, (++)[4]; (+)[5]; (++)[6];(+)[7] provide evidence that primary care users most likely to be given advice on drinking are males, and another cross-sectional study (+)[7] suggests that males, as well as heavy drinkers, are also more likely to adhere to the advice provided in brief intervention. One qualitative study (+)[9] found that GPs were reluctant to address drinking with young people as they felt that they would be likely to grow out of the habit of hazardous drinking.

[1]Littlejohn *et al.,* 2006 (Review +) UK (includes studies from outside the UK)

[2]Kaner *et al.,* 2001 (Cross-sectional ++) UK

[3]Mukamal *et al.,* 2007 (Cross-sectional +) US

[4]Lock *et al.,* 2004 (Cross-sectional ++) UK

[5]Johansson *et al.,* 2005 (Cross-sectional +) Sweden

[6]Berner *et al.,* 2007 (Cross-sectional ++) Germany

[7]Aalto *et al.,* 2002 (Cross-sectional +) Finland

[8]Aalto *et al.,* 2000 (Cross-sectional +) Finland

[9]Beich *et al.,* 2002 (Qualitative +) Denmark

Applicability: Two of these studies were carried out in the UK; the systematic review included studies from outside the UK. The remainder were conducted in Finland (3), US (1),

Germany (1), Sweden (1) and Denmark (1). It is possible that these findings are transferable but given the differences between populations, this cannot be assumed.

6. DISCUSSION

A considerable body of evidence of a relatively high standard of quality has been identified relating to patterns of alcohol consumption, the clinical and cost-effectiveness of screening and brief interventions for alcohol misuse and barriers and facilitators to their implementation. An overarching synthesis has been performed, in order to combine findings for interpretation.

Equality and diversity

Evidence review criteria were inclusive, with all relevant inequalities data (relating to eg. age, sex, sexual orientation, disability, ethnicity, religion, place of residence, occupation, socioeconomic position and social capital) included, extracted and presented in the evidence reviews and evidence statements where available. Further searches were undertaken to identify additional evidence for the effectiveness of brief interventions for alcohol misuse among young people and also ethnic minority groups in the UK. Evidence was identified for screening and brief interventions for alcohol misuse according to age, gender, ethnicity (for screening), geographical country of residence, occupation and socioeconomic position. No evidence was identified regarding screening and brief interventions regarding the influence of sexual orientation, disability, religion or social capital.

Cross-review Synthesis of Effectiveness Evidence (Reviews 4, 5, 6, 7)

Population Characteristics

Review 4 was undertaken to provide contextual information on the patterns of alcohol consumption and potential groups at-risk of alcohol misuse in England. Survey data presented within the review showed that more women and children and young people were consuming greater amounts of alcohol. The differential between alcohol consumption in young males and females was also smaller. Alcohol consumption among men had decreased slightly over time, with the caveat that males continued to consume twice the amount of alcohol than women. Men were more likely to report binge drinking, as were high earners in full-time employment.

Evidence was identified in the review of barriers and facilitators to the implementation of screening and brief interventions that disparities existed in implementation of these strategies within certain subgroups within the population. Variation was observed according to gender, age, ethnicity and socioeconomic status.

Despite evidence identified in Review 4 for the increasing consumption of alcohol by women over time and within Review 6 that brief interventions were effective among both men and women, four studies in Review 7 (Lock *et al.,* 2004; Johansson *et al.,* 2005; Berner *et al.,*

2007; Aalto *et al.*, 2002) demonstrated that, in primary care, males were more likely than females to be given advice on alcohol consumption and that males were more likely to adhere to the advice delivered in the intervention.

The majority of the systematic reviews in Review 6 included primary studies in which the study sample consisted of adult populations of mixed age, ranging from 12 to 70 years of age. Evidence relating specifically to the effectiveness of screening and brief interventions among young people was relatively limited and inconclusive. Review 4 indicated increased alcohol consumption among young people. Yet, Beich *et al.* (2002) described reluctance among GPs to discuss drinking with young people, perceiving alcohol misuse to be a behaviour that would self-resolve over time in this group. There is therefore a requirement for further research to demonstrate the effectiveness of screening and brief intervention among young people and for professional engagement with this group as appropriate.

Ethnicity of included study samples was poorly reported in included systematic reviews in the review of brief interventions (Review 6). Where it was reported, the majority of included studies were biased towards Caucasian populations. The effectiveness of screening questionnaires for the identification of alcohol misuse appeared to vary according to ethnicity, but this evidence was inconclusive and largely specific to ethnic minority groups in the USA (Review 5). No review or primary evidence was identified that focused solely on ethnic minority groups in the UK. In Review 7, evidence relating ethnicity to alcohol consumption and associated intervention was scarce. However, consideration of religious and cultural beliefs in relation to alcohol consumption and attitudes towards help-seeking is important. A small UK-based study (Heim *et al.*, 2004) showed that there was a risk that alcohol-related issues were regarded as hidden within some communities, highlighting the need for culturally-appropriate support.

Kaner *et al*. (2001) (Review 7) reported that unemployed individuals were more likely to receive brief intervention than those in employment. However, high earning individuals in full time employment were indicated in Review 4 as being more likely to report binge drinking and therefore represent a subgroup requiring consideration and access to screening and brief interventions for alcohol misuse.

Setting and mode of delivery of screening and brief interventions

Several systematic reviews included in Review 6 described the effectiveness of brief interventions delivered in primary care.

The majority of the research reviewed in Review 7 on the barriers and facilitators to the delivery of screening and brief interventions for alcohol misuse was undertaken in primary care settings. Patients in primary care were generally positive about alcohol screening. However, some patients associated care delivered by specialist alcohol workers with perceived stigma. Patient preference was towards the delivery of brief interventions for alcohol at clinics and registration sessions. Professionals were also positive towards screening and brief intervention for alcohol problems. However, barriers to implementation were expressed, including lack of access to training and lack of staff capacity. Professionals also perceived clinics and registration sessions to be appropriate settings for alcohol-related discussions with patients.

Three systematic reviews by D'Onofrio & Degutis (2002), Nilsen *et al.* (2008) and Havard *et al.* (2008) reported in Review 6 presented limited evidence that brief interventions were effective when delivered in emergency care. However, the findings of Review 7 demonstrated that the implementation of alcohol screening and brief intervention in emergency care settings was not as consistent as in primary care. Patients attending emergency care may also be more acutely ill than those in primary care, posing a clear obstacle to health promotion activities in this setting. Some professionals reported positive views towards screening and brief interventions in emergency care, such as in a trauma centre setting (Schermer *et al.*, 2002), whilst other professionals were less positive, feeling that the emergency department was not an appropriate site for implementation of brief interventions (Graham *et al.*, 2000). Factors such as lack of funding, inadequate training and managerial support, staff low morale, lack of privacy for discussion, language barriers and patient stress were viewed by staff across emergency care settings as barriers to implementation. However, the development of the ten 'trigger conditions' highlighted as red flags for implementation of screening using the Paddington Alcohol Test in emergency departments may serve to effectively filter appropriate patient populations for screening in this relatively hectic and time-pressured environment. Evidence relating to emergency care was rather limited, reflecting the requirement for further research in this area.

Best *et al.* (2002) viewed custody suites as being an opportunistic setting for engagement of individuals misusing alcohol. However, cited barriers included a lack of required knowledge and training and the degree of intoxication of detained individuals. Primary evidence for the effectiveness of screening and brief interventions in this setting was limited.

A range of professionals delivered screening and brief interventions in the evidence identified in these reviews. For Review 5, screening was typically self-administered or delivered by research staff, clinicians, nurses or psychologists. In Review 6, brief interventions were administered by GPs, nurses, psychologists, clinicians, emergency department staff, research staff, health promotion workers, nursing and social work staff and therapists. The evidence identified in Review 7 relating to the barriers and facilitators to the implementation of screening and brief interventions uncovered views from patients and professionals on appropriate interveners. One study showed that service users were no more likely to attend counselling with an alcohol specialist than with a nurse or physician. Indeed, evidence from the UK showed that counselling with alcohol specialists was sometimes perceived by service users as stigmatising. Views from professionals favoured delivery of brief interventions by alcohol workers and counsellors. However, the evidence base was mixed, with some professionals and users promoting the delivery of screening and brief intervention by nurses, whilst other users stated they may be more likely to discuss alcohol-related issues with a GP. Therefore, the evidence indicates that screening and brief interventions are effectively delivered by a range of professionals, with no conclusive findings on the most appropriate professional to deliver these.

A common barrier to the implementation of screening and brief interventions was described by professionals in Review 7 as being an actual or perceived lack of time in which to deliver these components of care and impact on workload. However, the review of effectiveness of alcohol screening measures identified a number of alcohol screening questionnaires with good screening properties, which could be delivered in a relatively short period of time. These included the Paddington Alcohol Test, FAST and AUDIT (suggesting the short forms of AUDIT to be even briefer to complete, although no direct measurements were reported in terms of completion time). Therefore, the use of effective and brief screening instruments may serve to relieve professional workload and facilitate screening and brief intervention to a greater potential population. Furthermore, the limited evidence identified in Review 6 was indicative that even very brief interventions may be effective in reducing alcohol-related negative outcomes, with inconclusive evidence for an additional positive effect resulting from increased exposure.

Cross-review Synthesis of Clinical and Cost Effectiveness Evidence

Existing economic evidence was identified relating to the delivery of screening and brief interventions for alcohol misuse in primary care, emergency care and hospital inpatient settings.

In both the clinical and cost effectiveness reviews, the majority of the evidence identified related to the delivery of screening and brief interventions in primary care. The clinical effectiveness review highlighted the effectiveness of screening and brief interventions for alcohol misuse in this setting. Alcohol screening questionnaires were found to be more useful screening tools than biochemical markers or clinical indicators, with a range of questionnaires, including AUDIT and shorter variants, being shown to be effective in the identification of alcohol misuse. The UK-specific work by Coulton *et al.* (2006) demonstrated that AUDIT was a more cost-effective screening measure than GGT, aspartate aminotransferase, CDT, and MCV, since AUDIT was both cheaper and more effective. However, the study did not include all the screening instruments assessed in the clinical effectiveness review and, therefore, ranking of the cost-effectiveness of all screening measures (including for example AUDIT vs. AUDIT-C) was not possible.

The clinical effectiveness review presented findings for the performance of screening tools, including the Paddington Alcohol Test, FAST and AUDIT, and brief interventions in emergency care. Cost effectiveness evidence for screening and brief interventions in emergency care was described as limited and inconclusive with regards to long-term cost-effectiveness (Gentilello *et al.*, 2005; Barrett *et al.*, 2006). However, the evidence indicated that interventions in emergency care may be cost effective in the UK.

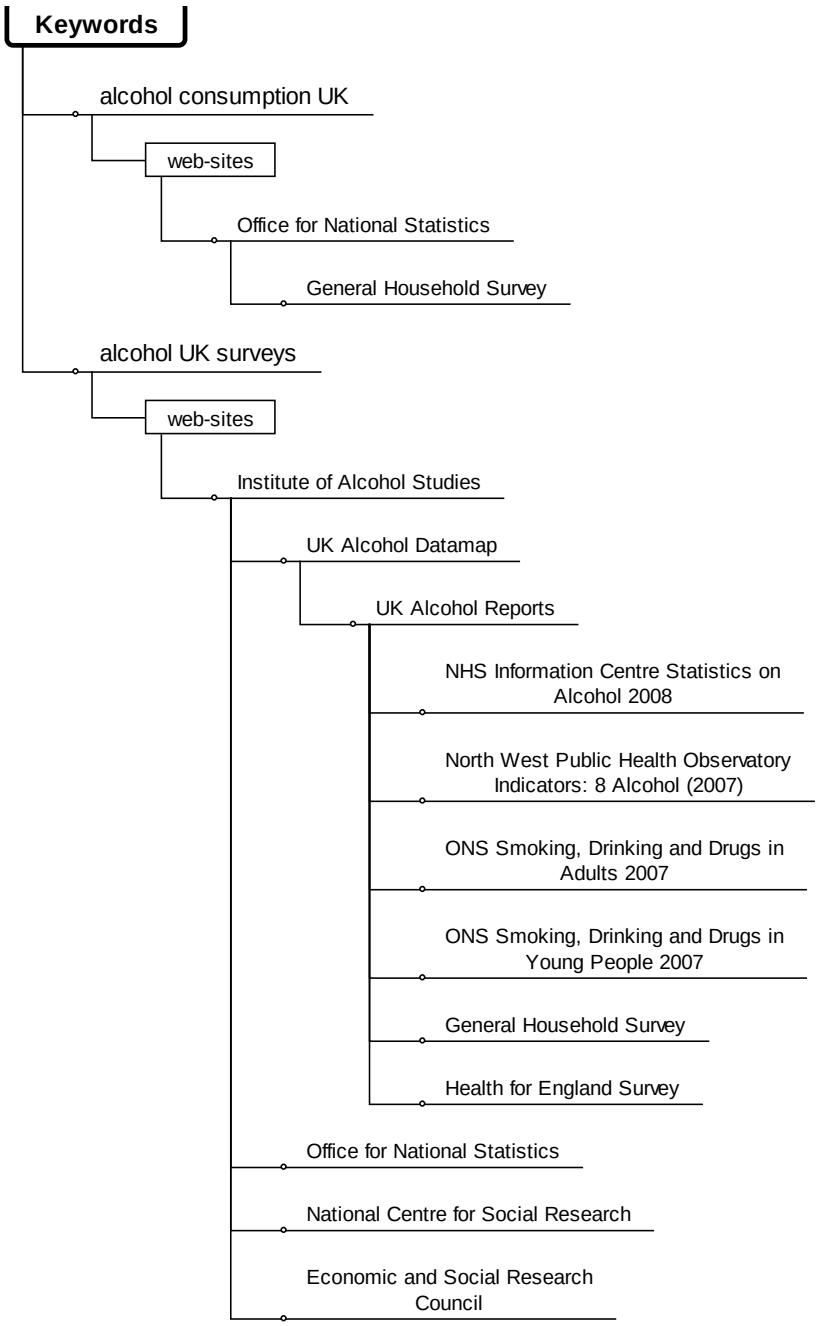
Three studies were identified in the cost-effectiveness review concerning the cost-effectiveness of screening and/or brief interventions for alcohol misuse in a hospital setting (Ryder, 2000; Tolley & Rowland, 1991; Holder *et al.*, 1991). The available evidence did not allow conclusions regarding the cost effectiveness of these interventions in a UK setting to be made. UK-specific evidence was found for screening by doctors and nurses in a general hospital setting (Tolley & Rowland, 1991), but did not allow a conclusion to be reached regarding the most cost effective screening method.

The long-term impact of brief intervention is a key factor in the estimation of cost-effectiveness. The clinical effectiveness review did not allow firm conclusions regarding the duration of effect or optimal delivery of booster sessions to be made. Similarly, the considerable variation in the types of brief interventions included within the clinical effectiveness review was reflected within the cost-effectiveness review, where such variation makes it difficult to assess the relative cost-effectiveness of the different brief interventions. However, even when considering a very brief intervention, the cost effectiveness results appeared encouraging. Regarding the intensity of brief intervention, the clinical effectiveness

review concluded that even very brief interventions may be effective in reducing alcohol-related negative outcomes, with inconclusive evidence of an additional positive impact resulting from increased dose. Therefore, the most brief intervention is likely to be the most cost effective. Further analysis is required in order to determine whether screening and brief interventions are cost-saving or cost-effective in a UK context.

7. APPENDICES

APPENDIX 1: On-line search strategy (Review 4)



APPENDIX 2: Additional data and definitions (Review 4)

Definitions of drinking behaviour

Levels of drinking

Average alcohol consumption

The reports identify average alcohol consumption for specific groups of the population.

Drinking quantity (hazardous, harmful, bingeing)

Three descriptions are used to describe levels of drinking. The definitions of these levels used in the surveys match those that are used for this NICE review (pp. 4-8); that is, the WHO definitions described in Raistrick *et al*. 2006. Therefore, it can be assumed that the information within the surveys is directly relevant to the effectiveness review in terms of identifying those groups that might benefit more or less from interventions.

Recommended UK drinking guidelines

Guidelines from the UK Government set advice on the amount of alcohol that may be consumed on a weekly or daily basis without serious adverse consequences. The guidelines recommend that men should not regularly drink more than 3 to 4 units per day, or 21 units per week, and women should not regularly drink more than 2 to 3 units per day or 14 units per week. These guidelines are commonly referred to as 'sensible drinking guidelines' (British Medical Association Board of Science 2008).

Hazardous drinking

An individual who is drinking over the recommended weekly or daily limits without experiencing alcohol-related problems is engaging in hazardous drinking behaviour. Hazardous drinking is a pattern of drinking behaviour that increases the risk of harmful consequences to the individual. Hazardous drinking is of public health significance despite absence of a current disorder in the individual user.

Harmful Drinking

This drinking pattern is manifested in drinking over the recommended levels (and likely to be more than the levels consumed by hazardous drinkers). In contrast to hazardous drinkers, harmful drinkers experience alcohol-related problems. There may be damage to physical

and/or mental health, as well as potentially adverse social consequences. Social consequences alone are not sufficient to justify the diagnosis of harmful use.

Bingeing (heavy drinking)

Bingeing, or heavy drinking, in the UK is defined as consuming eight or more units for men and six or more units for women on at least one day in the week (British Medical Association Board of Science 2008).

Population Groupings used in the included surveys

Ethnic Groups

White
- British
- Other

Mixed
- White and black Caribbean
- White and Black African
- White and Asian
- Other Mixed

Asian or Asian British
- Indian
- Pakistani
- Bangladeshi
- Other Asian

Black or Black British
- Caribbean
- African
- Other Black

Chinese or other ethnic group
- Chinese
- Other

Socio-Economic Status (SES)

The GHS survey uses the following definitions to stratify findings by SES:

Socio-economic classification (the current or last job of the household reference person):

- Managerial and professional
- Intermediate
- Routine and Manual

Economic activity:

- Total working (PT/FT)
- Unemployed
- Economically inactive (e.g. looking after a home / retired)

Usual gross weekly household income:

- Up to £200.00
- £200.01 - £400.00
- £400.01 -600.00
- £600.01 - £800.00
- £800.01 - £1000.00
- £1000.01 or more

APPENDIX 3: Alcohol consumption evidence included in major National Surveys (England)

	ONS General Household Survey (GHS) Reported in: i)NW Public Health Observatory Indications 8: Alcohol (NWPHO 2007) ii)Information Centre Statistics on Alcohol 2008 (NHS 2008)	**Health Survey for England (HSE)** Reported in: NW Public Health Observatory Indications 8: Alcohol (NWPHO 2007)	**Information Centre: Smoking, Drinking and drug Use in Young People in England in 2007 (SDD)** Also reported in: ii)Information Centre Statistics on Alcohol 2008 (NHS 2008)	**School Health and Education Unit (SHEU)** Reported in: NW Public Health Observatory Indications 8: Alcohol (NWPHO 2007)
Years covered	2000-2005/ 6	2000-2002	1988-2006 /7	2002-2006
Patterns covered	Alcohol consumption by units per week Binge drinking Hazardous and harmful drinking (units consumed)	Frequency of alcohol consumption Binge drinking Hazardous and harmful drinking (units consumed) Self-reported drinking status	Proportion of pupils who drink Mean alcohol consumption Usual drinking frequency Type of alcohol drunk. Where alcohol obtained. Who pupils	Percentage of pupils consuming 7 or more units in the last 7 days:

			drink with. Attitudes to drinking.	
Definitions	Drinking behaviour: WHO (1993); see above Government Recommendations: BMA (2008); see appendix 1	Drinking behaviour: WHO (1993); see above Government Recommendations: BMA (2008); see appendix 1		
Change over time	1998 to 2006 proportion of men and women drinking, by amount and age	Comparisons of bingeing, hazardous and harmful drinking from 2000 – 2002 and 2005 by region and gender.	1988-2006 drinking in last week proportions of pupils and units per week by age (11-15) and gender	
• **Adults**	Stratified by 16-24; 25-44; 45-64 and over 65			
• **Children**			11-15 years	Year 8-10 pupils
Gender	Drinking frequency and patterns	Most common frequency of drinking	Mean alcohol consumption (in units)	
Ethnicity	Adults drinking more than recommended levels; Drank on 5 or more days in last week		Odds ratio of having drunk alcohol in last week.	

Region	Government Office Regions	Government Office Regions		
SES	Current or last job of household reference person Economic activity status; Usual gross weekly income			

APPENDIX 4: Search Audit Table

Review 5 – Screening

#	Search terms	Database	Hits
S1	(alcohol and screening).ti.	Medline In Process and Medline 1950-2008 via OVID SP	482
S2	(drink$ and screening not water).ti	Medline In Process and Medline 1950-2008 via OVID SP	114
S3	CAGE and (alcohol or drink$).ti	Medline In Process and Medline 1950-2008 via OVID SP	90
S4	((AUDIT or AUDIT C or AUDIT PC) and (alcohol or drink$)).ti.	Medline In Process and Medline 1950-2008 via OVID SP	108
S5	(FAST and (alcohol or drink$)).ti.	Medline In Process and Medline 1950-2008 via OVID SP	38
S6	(paddington alcohol test.ti.) OR (PAT and (alcohol or drink$)).ti.	Medline In Process and Medline 1950-2008 via OVID SP	3
S7	(Michigan alcohol screening test.ti.) OR (MAST and (alcohol or drink$)).ti.	Medline In Process and Medline 1950-2008 via OVID SP	28
S8	(5 shot or 5shot or fiveshot or five shot).mp.	Medline In Process and Medline 1950-2008 via OVID SP	10
S9	((gamma-Glutamyltransferase OR GGT OR Gamma GT).ti AND (alcohol.ti.))	Medline In Process and Medline 1950-2008 via OVID SP	87
S10	((carbohydrate-deficient transferrin OR CDT.ti).AND (alcohol.ti))	Medline In Process and Medline 1950-2008 via OVID SP	157
S11	((mean corpuscular volume OR MCV.ti) AND (alcohol.ti))	Medline In Process and Medline 1950-2008 via OVID SP	21
S12	((biochemical indicator$ or biochemical marker$) AND alcohol$.ti	Medline In Process and Medline 1950-2008 via OVID SP	22
S13	((state marker.ti AND trait marker.ti) and (alcohol$.ti))	Medline In Process and Medline 1950-2008 via OVID SP	19
S14	(alcohol and screening).ti.	NHS EED via Cochrane Library	5
S15	(babor t or babor te or babor tf).au.	Medline In Process and Medline 1950-2008 via OVID SP	158
S16	(cherpitel c or cherpitel cj).au.	Medline In Process and Medline 1950-2008 via OVID SP	124
S17	SASSI.mp.	Medline In Process and	25

		Medline 1950-2008 via OVID SP	
S18	SASQ.mp.	Medline and Medline in Process 1950-2008 via OVID SP	4
S19	SASSI AND Alcohol in Topic	Science Citation Index via Web of Knowledge	34
S20	SASQ in Topic	Science Citation Index via Web of Knowledge	5
S21	((tweak or taste) and ((alcohol or drink$) and (screening or questionnaire))).mp.	Medline and Medline in Process 1950-2008 via OVID SP	109
S22	((tweak or taste) and ((alcohol or drink$) and (screening or questionnaire))).mp.	Science Citation Index via Web of Knowledge	178
S24	((indicator* OR sign* OR correlate*) and alcohol).ti. LIMIT to humans	Medline and Medline In Process 1950-2008 via OVID SP	280
S25	((alcohol or (drink* not water)).ti.) AND (review* or systematic or meta or synthesis or analysis).ti.	Medline and Medline In Process 1950-2008 via OVID SP	1
S26	Cited reference search of Saunders and Conigrave (1990) as cited in Raistrick	Web of Science Cited Reference Search	44
S27	T-ACE.ti,ab.	Medline and Medline In Process 1950-2008 via OVID SP	35
S28	ASSIST and alcohol.ti	Medline and Medline In Process 1950-2008 via OVID SP	6
S29	T-ACE.ti.ab	Embase via OVID SP	28
S30	ASSIST and alcohol.ti	Embase via OVID SP	2
S31	(alcohol and screening) in Title	Social Science Citation Index via Web of Knowledge	306
S32	(drink* and screening not water) in Title	Social Science Citation Index via Web of Knowledge	80
S33	CAGE and (alcohol or drink$) in Title	Social Science Citation Index via Web of Knowledge	67
S34	((AUDIT or AUDIT C or AUDIT PC) and (alcohol or drink$)) in title	Social Science Citation Index via Web of Knowledge	73
S35	(FAST and (alcohol or drink* not food)) in title	Social Science Citation Index via Web of Knowledge	8
S36	((paddington alcohol test OR PAT) and (alcohol or drink*)) in	Social Science Citation Index via Web of	0

	Title	Knowledge	
S37	((michigan alcohol screening test OR MAST) and (alcohol or drink*))	Social Science Citation Index via Web of Knowledge	22
S38	((5 shot or 5shot or fiveshot or five shot) and (alcohol or drink*)) in Title	Social Science Citation Index via Web of Knowledge	1
S39	((gamma-Glutamyltransferase OR GGT OR Gamma GT) AND (alcohol)) in Title	Social Science Citation Index via Web of Knowledge	19
S40	((carbohydrate-deficient transferrin OR CDT).AND (alcohol)) in Title	Social Science Citation Index via Web of Knowledge	41
S41	((mean corpuscular volume OR MCV) AND (alcohol)) in Title	Social Science Citation Index via Web of Knowledge	12
S42	((biochemical indicator* or biochemical marker*) AND (alcohol*)) in Title	Social Science Citation Index via Web of Knowledge	15
S43	((state marker.ti AND trait marker.ti) and (alcohol$.ti))	Social Science Citation Index via Web of Knowledge	1
S44	T-ACE in Topic	Social Science Citation Index via Web of Knowledge	24
S45	ASSIST and alcohol	Social Science Citation Index via Web of Knowledge	7

Review 6 – Brief Interventions

#	Search terms	Database	Hits
B2	(kaner e or kaner ea or kaner ef).au AND alcohol.ti	Medline and Medline in Process 1950-2008 via OVID SP	18
B3	Early intervention$.ti AND alcohol.ti	Medline and Medline in Process 1950	20
B4	Minimal intervention$.ti AND alcohol.ti	Medline and Medline in Process 1950	2
B5	(Hazardous drinking.ti OR harmful drinking.ti) AND (intervention.ti)	Medline and Medline in Process 1950	10
B6	(counselling.ti OR counseling.ti) AND alcohol.ti	Medline and Medline in Process 1950	63
B7	(Excessive drinking.ti OR alcohol dependency.ti) AND brief intervention.ti	Medline and Medline in Process 1950	6
B8	Download references included in Kaner Cochrane	N/A	32
B11	Download references	Medline and Medline in	24

	excluded from Kaner	Process 1950-2008 via OVID SP	
B12	Download references excluded from Kaner	EMBASE via OVID SP	2
B14	Brief.ti AND intervention.ti AND alcohol.ti	Medline and Medline in Process 1950-2008 via OVID SP	203
B15	Brief.ti AND intervention$.ti AND drink$.ti	Medline and Medline in Process 1950-2008 via OVID SP	108
B16	(systematic review and alcohol and intervention$).ti.	Medline and Medline in Process 1950-2008 via OVID SP	10
	Alcohol and “brief advice”.ti	Medline and Medline in Process 1950-2008 via OVID SP	4
B17	("problem drinking" and intervention$).ti.	Medline and Medline in Process 1950-2008 via OVID SP	22
B18	(Brief and intervention$ and alcohol).ti.	Embase via OVID SP	163
B19	(Brief and intervention$ and drink$).ti.	Embase via OVID SP	87
B20	(Brief and intervention$ and alcohol).ti.	Science Citation Index and Social Science Citation Index via Web of Knowledge	218
B21	(Brief and intervention$ and drink$).ti.	Science Citation Index and Social Science Citation Index via Web of Knowledge	106
B22	Searched Brief Interventions Database for economic studies	Reference Manager Database	103
B22a	Brief intervention and alcohol in title and abstract	NHS EED via Cochrane Library	9
B25	McCambridge J and alcohol. Ti	Medline and Medline in Process 1950-2008 via OVID SP	8
B26	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	PsycINFO via OVID SP	206
B27	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	Cochrane Database of Systematic Reviews via Cochrane Library	3
B28	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	Cochrane – DARE via Cochrane Library	9
B29	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	Cochrane – Central via Cochrane Library	117
B30	((Brief and intervention$).ti.	Cochrane Methodology	1

	AND (alcohol$ or drink$).ti.)	Register via Cochrane Library	
B31	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	Cochrane – HTA via Cochrane Library	2
B32	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	NHS EED via Cochrane Library	7
B33	((Brief and intervention$).ti. AND (alcohol$ or drink$).ti.)	ASSIA via CSA	104
N/A	Cited reference search on the 19 systematic reviews included in the report for PDG 1. This retrieved 889 references. Created Cited References Database	WOK Cited Reference Search	100
B36	Motivational interview* in TITLE	Cited References Database	32
B37	{review} OR {reviews} OR {systematic} OR {meta} in TITLE	Cited References Database	37
B39	Papers retrieved from the DH Alcohol "Alcohol Reviews" ref man database	DH Reviews Database	2

Review 7 – Barriers and Facilitators

#	Search terms	Database	Hits
BF1	((practitioner or professional or doctor) and intervention and alcohol).ti.	Medline and Medline in Process 1950-2008 via OVID SP	5
BF 2	(training and brief and intervention).ti.	Medline and Medline in Process 1950-2008 via OVID SP	14
BF 3	((patient or client) and alcohol and intervention).ti.	Medline and Medline in Process 1950-2008 via OVID SP	4
BF 4	((patient or client) and alcohol and screening).ti.	Medline and Medline in Process 1950-2008 via OVID SP	6
BF 5	(accept* and alcohol).ti.	Medline and Medline in Process 1950-2008 via OVID SP	43
BF 6	(manage* and drinking).ti.	Medline and Medline in Process 1950-2008 via OVID SP	50
BF 7	(manage* and (drinking not water)).ti.	Medline and Medline in Process 1950-2008 via OVID SP	23
BF 8	(cop* and (drinking not water)).ti.	Medline and Medline in Process 1950-2008 via OVID	62

		SP	
BF 9	(drinking behav* and alcohol).ti.	Medline and Medline in Process 1950-2008 via OVID SP	136
N/A	(treat* and drinking behaviour).ti.	Medline and Medline in Process 1950-2008 via OVID SP	3
BF 10	((practitioner or professional or doctor) and (patient or client)).mp. and alcohol.ti.	Medline and Medline in Process 1950-2008 via OVID SP	157
BF 11	((practitioner or professional or doctor) and (patient or client)).mp. and alcohol.ti.	CINAHL via OVID SP	74
BF 12	((practitioner or professional or doctor) and (patient or client)).mp. and alcohol.ti.	PsycINFO via OVID SP	66
BF13	((practitioner or professional or doctor) and (patient or client)).kw. and alcohol.kw.	ASSIA via CSA	24
BF14	TOPIC=((practitioner or professional or doctor) and TITLE=(patient or client)) and TITLE=alcohol	Science Citation Index and Social Science Citation Index via Web of Knowledge	24
BF15	(((brief intervention) OR (minimal intervention) OR (alcohol intervention))) AND Title=(patient*) AND Topic=(alcohol)	Science Citation Index and Social Science Citation Index via Web of Knowledge	84
BF16	(((alcohol or drink*) and patient*)) AND Title=((qualitative or interview))	Science Citation Index and Social Science Citation Index via Web of Knowledge	15

APPENDIX 5: Review 5 generic data extraction form (adapted from NICE public health methods guide, 2006)

DATA EXTRACTION	
STUDY DETAILS	
Author, year	
Reference ID	
Publication type (ie full report or abstract)	
Country of corresponding author	
Language of publication	
Sources of funding	
Study design **(Systematic review, randomised controlled trial (individual/cluster), controlled non-randomised trial, controlled before and after, interrupted time series, before and after study, cross sectional, audit/evaluation, economic analysis, case study, local practice report, qualitative study, other)**	
Authors' objective(s)	
METHODOLOGICAL CHARACTERISTICS	
REVIEW PARAMETERS (IF APPLICABLE)	
Methods for identification of primary studies (e.g. electronic searches, reference lists, journal hand-searching etc) **with description of methods** (eg search strategy, years covered etc)	
Language restrictions	
Inclusion/exclusion criteria	
Study design of included primary studies	
Publication status of included primary studies	
Method of data synthesis (i.e. meta-analysis, non-quantitative review, unclear)	
Pooling method(s)	
Heterogeneity testing	
Method of quality assessment	
Methods used to address incomplete/missing data	

OTHER STUDY PARAMETERS	
Unit of allocation/recruitment **(individual, group, organisation, community/environment, policy/socio-political)**	
Method of recruitment and response rate	
Method of allocation to intervention **(was allocation concealed?)**	
Inclusion/exclusion criteria	
Time to follow-up	
How many participants completed intervention?	
Analysis methods used (was a power calculation presented and was the study sufficiently powered to detect an effect?)	
CLINICAL ISSUES	
Target population	
Intervention/s evaluated (objectives(s), content, mode/method of delivery, intervener, duration/intensity, follow-up, adherence, acceptability, timing of administration) (Index test) **Definition of a positive index test result**	
Comparators (Reference standard) **Definition of a positive reference test result**	
Definition of outcomes	
RESULTS	
Date of study	
Number of patients	
Setting (Geographical (country), social (eg. school), resources	
Inclusion/exclusion criteria	
Number of patients excluded or not eligible	
Loss to follow-up	
Participants' baseline characteristics (age, gender, ethnicity, co-morbidities, previous drinking levels, socioeconomic data)	
Definition of excessive drinking	

Duration of studies (mean, range)	
Result for main outcomes (evidence of effect in children and young people, older people, gender, ethnic minority groups, lower socioeconomic status?) **Sensitivity, specificity and other characteristics**	
Costs/economic outcomes	
Secondary outcomes	
Authors' comments on strengths/weaknesses of study	
SUMMARY	
Authors' overall conclusions	
Quality assessment	
Generalisability to UK	
Reviewer's comments	

APPENDIX 6: Quality assessment tool for diagnostic accuracy studies

Criterion	Response
Were demographics provided?	
Was comorbidity described?	
Were eligibility criteria and participation rate provided?	
Criterion standard evaluation of all screened subjects?	
Blinding?	
Analysis of pertinent subgroups?	

APPENDIX 7: Systematic review/meta-analysis data extraction form (used for Review 6)

DATA EXTRACTION	
REVIEW DETAILS	
Author, year	
Reference ID	
Publication type (i.e full report or abstract)	
Country of corresponding author	
Language of publication	
Sources of funding	
Study design	
Authors' objective(s) of review	
METHODOLOGICAL CHARACTERISTICS	
Methods for identification of primary studies (e.g. electronic searches, reference lists, journal hand-searching etc) **with description of methods** (eg search strategy, years covered etc)	
Language restrictions	
Inclusion/exclusion criteria	
Study design of included primary studies	
Publication status of included primary studies	
Method of data synthesis (i.e. meta-analysis, non-quantitative review, unclear)	
Pooling method(s)	
Heterogeneity testing	
Method of quality assessment	
Methods used to address incomplete/missing data	
CLINICAL ISSUES	
Target population	
Intervention/s evaluated (objectives(s), content, mode/method of delivery, intervener, duration/intensity, follow-up, adherence, acceptability)	
Comparators	
Definition of outcomes	
RESULTS	

Number of included primary studies	
Range of years of publication of included primary studies	
Total number of patients	
Setting	
Inclusion/exclusion criteria of included primary studies	
Participants' baseline characteristics (age, gender, ethnicity, co-morbidities, previous drinking levels)	
Duration of studies (mean, range)	
Primary outcome: change in alcohol consumption/individuals misusing alcohol	
Costs/economic outcomes	
Secondary outcomes	
Authors' assessment of methodological quality of included studies	
Authors' comments on strengths/weaknesses of review	
SUMMARY	
Authors' overall conclusions	
Quality assessment of review	
Generalisability to UK	
Reviewer's comments	

APPENDIX 8: Systematic review quality assessment tool (used for Review 6)

Criterion	Decision
Did the review ask a clearly focused question?	
Did the review incorporate primary studies of appropriate study design?	
Were the search methods used to find evidence on the primary research question stated?	
Was the search for evidence reasonably comprehensive?	
Were the criteria used for deciding which studies to include reported?	
Was bias in the selection of studies avoided? (e.g. language restrictions not applied, unpublished trials included)	
Was there duplicate study selection and data extraction?	
Were the criteria used for assessing the validity of the included studies reported?	
Was the validity of all studies referred to in the text assessed using appropriate criteria?	
Were the characteristics of the included studies provided?	
Were the methods used to combine the findings of the relevant studies reported?	
Were the findings of the relevant studies combined appropriately relative to the primary question of the overview?	
Were the conclusions made by the author(s) supported by the data and/or analysis reported in the overview?	
Can the results be applied to the UK population/population group?	
Additional comments	
Y – item addressed; N – no; P – partially; U – not enough information or not clear; NA – not applicable	

APPENDIX 9: Studies excluded from Reviews 6 and 7 (following close scrutiny of full text)

Studies excluded from review of effectiveness of brief interventions following close scrutiny

Ref ID	Author, year	Reason for exclusion
136	Anderson *et al.*, 2004	No relevant outcomes
183	Williams *et al*., 2007	Drink-driving intervention
409	Foster *et al.*, 2005	Not systematic review
452	Fleming, 2003	Not systematic review
471	Fleming & Graham, 2001	Not systematic review
508	Heather, 1996	Not systematic review
861	Bertholet *et al.*, 2004	Abstract. Review findings presented in full in Bertholet *et al*, 2004. No additional information in abstract..
955	Bewick *et al*., 2008	Web-based interventions (classed as self-help)
961	Barnett & Read, 2005	Longer duration of intervention (1.5 to 8 hrs)
980	Dinh-Zarr *et al*., 1999	Not specific to use of brief interventions
1198	Beich, 2004	Not systematic review. Erratum to original report
1220	Modesto-Lowe & Boornazian, 2000	Not systematic review
1475	Mattick & Jarvis, 1994	Insufficient systematic review methods reported
1480	McQueen *et al*., 2008	Protocol of Cochrane review. No outcomes reported
1482	Anderson *et al*., 2008	Protocol of Cochrane review. No outcomes reported
1621	Coulton *et al*., 2008	Protocol of RCT. No outcomes reported
1739	Solberg *et al*., 2008	Costs only. No outcomes reported
2919	Anderson, 1993	Not systematic review
2920	Lapham, 2004	Not systematic review
2921	Roche & Freeman	Not systematic review
2922	Parker *et al*., 2008	Not systematic review
3875	Agosti, 1995	Not specific to use of brief interventions
3876	Department of Health, 1992	No relevant outcomes
3878	Noonan & Moyers, 1997	No systematic review methods reported
3879	Effective Health Care Team, 1993	No systematic review methods reported
3979	Britt *et al.*, 2004	Not systematic review
3982	Dunn *et al.*, 2001	No alcohol-specific data synthesis
3983	Erickson *el al.*, 2005	Not systematic review
3985	Graeber *et al.*, 2003	Not systematic review
4001	Monti *et al.*, 2001	Not systematic review
4008	Apodaca *et al.*, 2003	Bibliotherapy/self help only
4010	Berglund, 2005	Insufficient information on brief interventions or systematic review methods
4012	Bewick *et al.*, 2008	Web-based interventions only (vs focus on face-

		to-face individual contact with a professional)
4023	Dutra *et al.*, 2008	Not related to alcohol
4034	Nilson *et al.*, 2006	No relevant outcomes
4042	Watson, 1999	Not systematic review
4047	Freemantle *et al.* 1993	No systematic review methods reported

Studies excluded from review of barriers and facilitators to implementation of brief interventions following close scrutiny

Ref ID	Author, year	Reason for exclusion
453	Aalto *et al.*, 2003	Measured practitioner activity over implementation time
153	Arthur D (2001)	Evaluates nurse education package
557	Collins *et al.*, (2005)	Assessment of reaction to postal information and feedback
578	Faris (2003)	Use of group intervention
1232	Gentilello (2005)	US Insurance context (too local specific for UK use?)
226	Gloria (1996)	US Hispanic specific (including language; is this relevant in UK context?)
500	Gomel 1998	Cost-effectiveness analysis (not Q7)
611	Hansen (1999)	Seems to have been reported elsewhere
206	Helmus 2003	'Program therapists' who work in MH delivered the BI (experts?)
225	Miner (1996)	Population: pregnant women
378	Stahlbrandt (2007)	Group therapies trialled
192	Tough (2005)	Population: pregnant women

APPENDIX 10:

Data Extraction Form for RCTs (Used for Review 7)

Ref. ID:	**Authors:**	
	Year:	
Title:		
Data Extracted by:		**Date:**
Language:	**Country of Research Setting:**	
Research Setting:		
Funder:		
Sample: **Number:** **Ages (Mean age):** **Gender:** **Ethnicity:** **Educational Level / Relevant experience:** **Other characteristics:**		
Aims of study:		
Research Question:		
Theoretical Framework / Concept / Interventions: **Comparitor(s):** **Comments:**		
Inclusion / Exclusion Criteria: **Inclusions**: **Exclusions:**		
Methods: **Randomisation:** **Stratification:** **Data Collection:** **Analysis:** **Other:**		
Main Findings: **Participation:** **Main Results:** **Costs:** **Barriers:** **Facilitators:**		
Quality:		
Comments:		

APPENDIX 11:

Cross-sectional study data extraction form (Used for Review 7)

<table>
<tr><td>Ref. ID:</td><td colspan="2">Authors:</td></tr>
<tr><td></td><td colspan="2">Year:</td></tr>
<tr><td colspan="3">Title:</td></tr>
<tr><td colspan="2">Data Extracted by:</td><td>Date:</td></tr>
<tr><td>Language:</td><td colspan="2">Country of Research Setting:</td></tr>
<tr><td colspan="3">Research Setting:</td></tr>
<tr><td colspan="3">Funder:</td></tr>
<tr><td colspan="3">Sample:
Number:
Ages (Mean age):
Gender:
Ethnicity:
Educational Level:
Other characteristics:</td></tr>
<tr><td colspan="3">Aims of study / Research Question:</td></tr>
<tr><td colspan="3">Interventions:
Survey instruments:
Power Calculations:
Comments:</td></tr>
<tr><td colspan="3">Inclusion / Exclusion Criteria:
Inclusions:
Exclusions:</td></tr>
<tr><td colspan="3">Methods:
Data Collection:
Analysis:
Other:</td></tr>
<tr><td colspan="3">Main Findings:
Participation:
Main Results:
Costs:
Barriers:
Facilitators:</td></tr>
<tr><td colspan="3">Quality:</td></tr>
<tr><td colspan="3">Comments:</td></tr>
</table>

APPENDIX 12:

Qualitative Data Extraction Form (Used for Review 7)

<table>
<tr><td>Ref. ID:</td><td colspan="2">Authors:</td></tr>
<tr><td></td><td colspan="2">Year:</td></tr>
<tr><td colspan="3">Title:</td></tr>
<tr><td colspan="2">Data Extracted by:</td><td>Date:</td></tr>
<tr><td>Language:</td><td colspan="2">Country of Research Setting:</td></tr>
<tr><td colspan="3">Research Setting:</td></tr>
<tr><td colspan="3">Funder:</td></tr>
<tr><td colspan="3">Sample:
Number:
Ages: (Mean age):
Gender:
Ethnicity:
Educational Level / Experience:
Other characteristics:</td></tr>
<tr><td colspan="3">Aims of study / Research Question:</td></tr>
<tr><td colspan="3">Theoretical Framework / Concept / Interventions:
Comments:</td></tr>
<tr><td colspan="3">Inclusion / Exclusion Criteria:</td></tr>
<tr><td colspan="3">Methods:
Data Collection:
Analysis:
Other:</td></tr>
<tr><td colspan="3">Main Findings:
Barriers:
Facilitators:</td></tr>
<tr><td colspan="3">Quality:</td></tr>
<tr><td colspan="3">Comments:</td></tr>
</table>

APPENDIX 13: Characteristics and main findings from studies included in the review of effectiveness of screening measures for the identification of alcohol misuse

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
WHO ASSIST Working Group, 2002 International	Evaluation and qualitative study, ++	To evaluate the performance of ASSIST in primary care patients.	(i) The international study was based in primary care, general medical, community settings and specialised alcohol and drug treatment services, primarily residential settings in Australia, Brazil, India, Ireland, Israel, UK, Zimbabwe, the Palestinian Territories and Puerto Rico. (ii) At least 2 interviewers at each of these collaborating sites were selected to become trained and administer ASSIST. Interviewers were selected on the basis of their familiarity with drug abuse. 71% were female and the average age was 32 yrs. Interviewers had approximately 15 years of education; 14% with Masters degrees, 29% with PhDs and 5% with MDs. One quarter were employed as researchers, a third in the alcohol and drug treatment field, and the rest in medical, psychiatric or other facilities. Of the patient sample	ASSIST	Mean time for administering ASSIST = 16 min. Participants recruited from alcohol and drug treatment facilities took significantly longer to complete the interview (17.88 minutes $p < 0.001$; retest time 19.70 minutes $p<0.001$). Average time between test and retest = 2.16 days (range 1.32 in Sao Paulo to 3.28 in Harare). Debriefing interviews: 96% of participants enjoyed being interviewed; 81% thought that the length was 'just right'; 78% indicated that none of the questions were difficult to understand, and 98% thought that the questions were not offensive. Participants believed that 'most people' would be more comfortable answering questions about tobacco and alcohol (4 and 3.27 respectively on a scale of 1-5; 1=very uncomfortable, 5= very comfortable) than about cocaine and opiods. No gender differences observed, but participants from alcohol and drug treatment facilities had significantly higher honesty ratings than those recruited from primary care ($p<0.05$). Participants rated that it is important for health providers to know about all substance use (alcohol 4.62 out of 5). Interviewers thought that participants were interested in the interview (97%), were not offended by the questions (100%), and were not responding in the negative to shorten the interview (95%). None of the interviewers perceived that interviewees were withholding information. Two items 'preoccupied with thoughts about using' and 'using more than intended' were identified as confusing. 77% of interviewers indicated that the interview was 'easy' or 'very easy' to administer. Only 3% reported difficulties.	Sites included Australia, Brazil, India, Ireland, Israel, UK, Zimbabwe, the Palestinian Territories and Puerto Rico

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
			(n=236), the mean age was 34 yrs, 54% were male, 61% were unemployed, with a mean education duration of 10 yrs. 60% were recruited from alcohol and drug abuse treatment facilities. The remaining 40% were recruited from general medical settings and psychiatric facilities.			
Humeniuk *et al.*, 2008 Australia	Cross-sectional diagnostic evaluation, ++	To evaluate the validity of the ASSIST questionnaire across a number of international sites.	(i) Primary care and specialised settings (ii) Participants were aged between 18 and 45 yrs (mean age of 30.4 yrs, SD=82) (total n=1047; 697 from primary care and 350 from specialised settings).	ASSIST includes the following domains: specific substance abuse involvement score for each substance; total substance involvement score; current frequency of substance use; dependence; abuse	ASSIST = average of 8.7 (SD=4.6) min to complete. Significant positive correlations between current frequency of use for alcohol, cannabis, cocaine, amphetamines, sedatives, and opioids ($p<0.001$ n=1047). Significant differences between 'use' and 'abuse' groups ($p<0.001$) and ASSIST scores for alcohol ($p<0.001$) (AuROC =0.87, sensitivity 83%, specificity 79% at cut-off of 5.5), and 'abuse' and 'dependence' for alcohol ($p<0.001$) (AuROC = 0.70, sensitivity 67%, specificity 60%), Optimal cut-off scores for alcohol = 5.5 for use/abuse and 10.5 for abuse/dependence.	International sites
Newcombe *et al.* 2005 Australia	Cross-sectional diagnostic evaluation, +	To assess the performance of ASSIST in an Australian sample	(i) Sample recruited from drug treatment and primary care settings (ii) Study sample n=150. The mean age of the sample was 31.3 yrs (SD=8.4), with equal numbers of male and female subjects in the sample. 61% of subjects were unemployed.	ASSIST	For use/abuse, the AuROC value = 0.76, with 71% sensitivity and 63% specificity at an ASSIST cut-off score of 4.5 ($p\leq0.001$). For abuse/dependence, the AuROC = 0.83, with 86% sensitivity and 77% specificity at a cut-off score of 10.5 ($p\leq0.001$).	Australia

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
Aalto *et al*. 2006 Finland	Cross-sectional diagnostic evaluation, +	To evaluate the performance of abbreviated versions of AUDIT compared with the full version of AUDIT when screening for heavy drinking among middle-aged women	(i) Primary care (ii) 40 year old females	AUDIT and short versions	Mean (SD) score on AUDIT = 3.6 (SD=3.2, range 0 to 28). Corresponding values (with SD and range reported) as follows: AUDIT-C = 3.0 (1.8, 0 to 10), Five-shot = 1.4 (0.9, 0 to 6.5), AUDIT-PC = 2.5 (1.7, 0 to 15), AUDIT-3 = 0.6 (0.8, 0 to 3), AUDIT-QF = 2.3 (1.2, 0 to 7) and CAGE = 0.4 (0.8, 0 to 4). Optimal combinations of sensitivity and specificity: AUDIT using a cut-off score of≥6, for AUDIT -C with cut-off of≥5, for Five -shot using a cut-off of≥2, for AUDIT -PC with a cut-off of≥4 and for AUDIT -QF using a cut-off of≥4. U sing these cut-offs, sensitivities of the tools ranged from 84% to 93%, whilst specificities were in the range of 83% to 90%. AuROC values were similarly high for AUDIT, AUDIT-C, 5-shot, AUDIT-PC and AUDIT-QF. Values were lower for AUDIT-3 and for CAGE.	Finland
Aertgeerts *et al*. 2001 Belgium	Cross-sectional diagnostic evaluation, ++	To assess the performance of CAGE and AUDIT questionnaires, their derivatives and laboratory tests in the identification of alcohol abuse or dependence in a primary care population in Belgium	(i) General practice (ii) Patients (n=1992) aged over 18 years. The mean ages of male and female patients were 54 yrs and 48 yrs respectively.	CAGE and AUDIT questionnaires, their derivatives and laboratory tests	Past year prevalence of alcohol abuse or dependence = 8.9% (178/1992) (138 male and 45 female). Among male patients, all questionnaires had relatively good sensitivities between 68% and 93% and at lower cutoff points than recommended. Only sensitivity of CAGE (even at lowest cutoff of 1) was lower (62%). In female patients, sensitivities were lower, but odds ratios were higher for different questionnaires. ROC curves did not differ between questionnaires. Laboratory tests had lower diagnostic accuracy with areas under ROC curves between 0.60 and 0.67 for female patients and 0.57 and 0.65 for male patients.	Belgium
Aertgeerts *et al*. 2002 Belgium	Cross-sectional diagnostic evaluation, ++	To compare the performance of CAGE, AUDIT and derivatives and laboratory tests in screening for alcohol abuse or dependence in a male hospital population.	(i) General hospital and university hospital (ii) All male patients older than 18 yrs admitted to three general hospitals and one university hospital during a period of 6 weeks were consecutively entered into the study (n=233).	CAGE, AUDIT and derivatives and laboratory tests. Screening tools were compared with a reference standard of alcohol abuse or dependence diagnosed according to DSM-	Current diagnosis of alcohol abuse or dependence in 29 inpatients (12.4%) (95%CI 8.6 to 17.5). Ten (4.2%) satisfied criteria for alcohol abuse and 19 (8.2%) for alcohol dependence (as reported). AuROC values for AUDIT were 0.86 (95%CI 0.81 to 0.90) for AUDIT, 0.84 (95%CI 0.78 to 0.88) for AUDIT-C, 0.86 (95%CI 0.81 to 0.90) for AUDIT-PC, 0.80 (95%CI 0.74 to 0.85) for CAGE, and 0.86 (95%CI 0.81 to 0.90) for Five-shot. Laboratory tests: AuROCs between 0.68 (95%CI 0.54 to 0.80) for %CDT and 0.57 (95%CI 0.51 to 0.64) for MCV.	Belgium

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				III-R criteria.		
Berks & McCormick, 2008	Systematic review, ++	To investigate screening for alcohol misuse in elderly primary care patients.	(i) Primary care (ii) Studies testing screening in patients aged over 60 yrs were included.	AUDIT, AUDIT-C, CAGE, Michigan Alcohol Screening Test (MAST), SMAST, MAST-G, the Alcohol-Related Problems Screen (ARPS) and a shortened version of ARPS (shARPS) were covered. For the detection of hazardous and harmful drinking, careful questioning about alcohol consumption was used as the reference standard. For the identification of dependence or abuse, the reference standard was interviewing and use of clinical diagnostic criteria (eg. DSM-IV).	Conventional screens adapted for use in the elderly were found to have performances similar to screens in the younger primary care population. 3 of the 8 studies evaluated CAGE in detecting alcohol abuse and dependence (Buchsbaum 1992, Jones 1993 and Morton 1996). ROCs from Buchsbaum and Jones indicated cutoff of 1 and over as most effective. At cutoff of 1, sensitivity ranged from 79.1% to 88% and specificity from 55.8% to 88%. 3 studies evaluated CAGE in detection of hazardous or excessive drinking (Adams 1996, Bersci 1993, Gomez 1996). Adams and Berci used cutoff of 1 and over. At this cutoff, sensitivity ranged from 31% to 60% and specificity from 92% to 100%. At cutoff of 2 (used in 2 studies, by Adams and Gomez), sensitivity was 14 to 38.9% and specificity 97 to 97.1%. 4 of the 8 studies tested MAST or variation of MAST in identifying alcohol abuse and dependence (Hirata 2001, Jones 1993, MacNeil 1994, Morton 1996). ROCs from Hirata and Jones suggested use of 4 and over as cutoff, and was shown by Hirata to give sensitivity of 91.4% and specificity of 83.9%. At cutoff of 3, sensitivity ranged from 64% to 97.1% and specificity from 66.7% to 79% in Hirata and Jones studies. MacNeil and Morton studies used MAST-G to screen for dependence and abuse. Using cutoff of 5 (suggested by Morton ROC to be most efficient), sensitivity ranged from 69.8% to 91% and specificity from 80.5% to 84% in these 2 studies. Two papers tested MAST and CAGE head-to-head in identification of dependence and abuse (Jones 1993, Morton 1996). Morton found 2 tests to perform very similarly, with MAST slightly more effective, whilst Jones was more in favour of CAGE. 1 paper (Bersci 1993) evaluated SMAST in detecting heavy drinking (defined in this study as 3 ore more drinkers per day or twice a day drinking). SMAST performed poorly at cutoff of 2 with sensitivity of 48% and specificity of 100%.2 of the 8 studies tested AUDIT (Gomez 2006 and Morton 1996). Morton tested performance in identification of abuse and dependence at cutoff of 8 and gave sensitivity of 33.3% and specificity of 90.7%. Gomez tested both AUDIT and AUDIT-C in detection of hazardous drinking. AUDIT at a cutoff of 8 gave a sensitivity of 66.7% and a specificity of 95.3%, whilst	International

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					AUDIT-C at cutoff of 3 and over had sensitivity of 100% and specificity of 80.7%. 1 paper covered ARPS and shortened-ARPS in detection of hazardous and harmful drinking, compared to AUDIT and SMAST-G (Moore, 2002). Not clear what ARPS and shAPRS cutoffs were but found good sensitivity 93% and 92% vs 28% for AUDIT (cutoff of 8) and 52% for SMAST-G (cutoff of 2). Specificity was poorer at 63% and 51% for ARPS and shAPRS vs 100% and 96% for AUDIT and SMAST-G. Fink 2002b found ARPS to be more sensitive than CAGE and SMAST in elderly, but without gold standard. Using traditional definitions of hazardous and harmful drinking, AUDIT and AUDIT-C were superior to CAGE and various forms of MAST. From limited data, AUDIT-C seemed as good if not better than full AUDIT.	
Berner *et al.*, 2007	Systematic review, ++	To review the performance of the full AUDIT in the detection of at-risk drinking across a range of settings.	(i) Range of settings (ii) Twenty three studies were included in the review, with 19 used in the meta-analysis. The majority of patients were adults, however one study included patients as young as 15 yrs.	AUDIT Quantity/frequency of alcohol consumption and/or heavy episodic drinking were used as the reference standard in the evaluation of AUDIT.	At cut-off of 8 points, sensitivity ranged from 31% to 89% and specificity from 83% to 96% across the 8 primary care-based studies (and therefore pooling was not considered appropriate). Largest study was described as having a sensitivity of 76% and a specificity of 92% at a cut-off of 8 (Gordon *et al.*, 2001, n=13,438 USA patients, 69.7% aged under 61 yrs, 53% male). One trial in general hospital inpatients reported a sensitivity of 93% and specificity of 94% (MacKenzie *et al.*, 1996, n=240 UK patients, mean age 54 yrs, 53% male), a further trial in an emergency department gave a sensitivity of 75% and a specificity of 84% for men and 59% and 95% for women (Neumann *et al.*, 2004, n=1927 patients in Germany, median age 32 yrs for both genders), whilst a study based on University students presented a sensitivity of 82% and specificity of 78% (n=302 USA students, mean age 20.3 yrs, 39% male). Three studies in elderly patients reported sensitivities between 55% and 83% and gave a pooled specificity of 96%. One study in drug-dependent patients from an inpatient substance use rehabilitation programme in the USA (Skipsey *et al.*, 1997) (age range 18 to 52 yrs, 38% male) presented a sensitivity of 97% and specificity of 69% at a cut-off of 8.	The majority of the studies were performed in the USA, with others from Europe, Australia and Japan.

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Beullens & Aertgeerts, 2004	Systematic review, +	To systematically review the use of screening tools for alcohol abuse and dependence in older people in clinical settings	(i) Range of settings (ii) Six studies were based in a hospital setting (subjects aged 60 yrs and over) and 1 study was based in a nursing home (subjects aged 50 yrs and over). The setting of the studies by country was unclear.	A number of screening instruments were evaluated: two questions of Cyr and Wartman, MAST, Brief MAST (BMAST), Short MAST (SMAST), MAST-Geriatric version, CAGE and AUDIT. Included studies used DSM diagnostic criteria as reference standards	7 research reports identified. MAST-G and particularly CAGE are appropriate. The 2 questions of Cyr and Wartman, AUDIT and MAST do not appear appropriate in screening for alcohol abuse and dependence in older people in clinical setting. 6 research reports were identified meeting inclusion criteria. All these involved hospital patients. However, important clinical setting for older people is nursing home. By lowering inclusion age to 50, 1 research report was identified covering nursing home patients and was therefore included. 2 questions of Cyr and Wartman were not very sensitive. In nursing home patients, sensitivity was 65%, specificity was 92% and PPV 89% (Johnson, 1995). In male ambulatory hospital patients with cutoff of 8 or more, AUDIT had sensitivity of only 33%, specificity of 91% and AuROC of 56%. With decrease in cutoff to 4 or more, sensitivity was still only 59% and specificity lowered to 41% (Morton, 1996). Original MAST had been used in 3 studies in older people. With score of 5 as cutoff in male alcoholism and medical patients (Willenbring, 1987), sensitivity was 100% and specificity was 83% (authors suggest high value may be overestimation caused by high number of alcohol patients in sample). Using recommended cutoffs of 5, 6 and 3 respectively, UMAST had sensitivity of 93%, BMAST of 82% and SMAST of 89% with specificities above 95%. However, if cutoffs are lower (3, 4 and 2 respectively), sensitivity increases to 96% for UMAS, 91% for BMAST and 98% for SMAST and specificities are still above 70% (Willenbring, 1987). Screening power of MAST still appears to be retained if no weight or shorter version is used. In hospital patients, sensitivity was 52% with score of 5 or more as cutoff (and AuROC of only 61% but specificity 91%). Using cutoff of 3 or more, sensitivity was 64% and specificity was 79% (Jones, 1993). Sensitivity of 91% and specificity of 84% (AuROC 95%) was found in male ambulatory hospital patients with cutoff of 5 or more on Mast. Lowering cutoff to 4 gave sensitivity of 97% and specificity 67% (Hirata, 2001). Curtis (1989) found that older patients, compared with young or middle aged patients, were significantly less likely to give positive answer to the 4 questions of SMAST. 2 of these questions are in BMAST and all 4 in MAST and	International

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					UMAST. Decreasing cutoff or using geriatric version should overcome inappropriateness. With score of 5 or more as cutoff, MAST-G had sensitivity of 70% with hospital patients and sensitivity of 93% in nursing home patients (specificities of 81% and 65%). By lowering cutoff to 3, sensitivity increased to 86% and 98% but specificity dropped to 61% and 50% (Joseph 1995, Morton 1996). Luttrell 1997 found in hospital patients with cutoff of 5, sensitivity of only 50%, and specificity of 93% but sensitivity with lower cutoff not reported by Luttrell. MAST-G is therefore sensitive for alcoholism in older people in clinical setting, but may yield false positives. CAGE used in 4 studies in older people. If recommended score of 2 was used, sensitivity varied between 48% and 70% in hospital patients (specificity between 82% and 99%) and was 82% in nursing home patients (specificity of 90%) (Buchsbaum 1992, Jones 1993, Joseph 1995, Morton 1996). Compared with young and middle-aged patients, older people were significantly less likely to answer positively to 'have people annoyed you by criticising your drinking' (Curtis, 1989). By lowering cutoff to 1 positive answer, sensitivity increased to 79 to 88% in hospital patients and 98% in nursing home patients but specificity decreased to 56% to 88% and 75% (Buchsbaum 1992, Jones 1993, Joseph 1995, Morton 1996). As for MAST-G, Luttrell (1997) found CAGE had low sensitivity (13%) with cutoff of 2 (and specificity of 98%) but do not mention effect of lower cutoff. CAGE therefore useful in screening older people. In comparative studies, CAGE was more sensitive than Cyr and Wartman, AUDIT and MAST and similar to MAST-G (Jones, 1993, Joseph 1995, Morton 1996).	
Bradley *et al.* 1998 USA	Systematic review, ++)	To systematically review the evidence relating to the performance of alcohol screening questionnaires in female patients.	(i) Clinical settings (ii) US female clinical populations	AUDIT, CAGE, TWEAK, T-ACE, NET, Trauma Scale, a 6-item quantity-frequency screen and BMAST.	Research in an emergency department suggested that sensitivities were higher for TWEAK and CAGE than for AUDIT. However, the high specificity of AUDIT at a cut-off of 7 (95%), is supportive of the use of lower cut-offs. AUDIT and TWEAK questionnaires displayed high AoROC values (0.87 to 0.93) for past year alcohol abuse or dependence in Black or White women, showing good accuracy, but sensitivities were below 80% at typical cut-off scores. CAGE questionnaire: AuROC values ranging from 0.84 to 0.92 for alcohol abuse and dependence in largely Black populations of women. Using cut-off score of≥2, low sensitivities (38% to 50%) in predominantly White female populations.	USA

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					CAGE performed appropriately in mainly Black populations of women, but only showed a sensitivity of 50% for past year alcohol abuse and dependence in White female emergency department patients using the typical cut-off. Sensitivity of CAGE for a lifetime diagnosis of abuse or dependence was only 38% in a primary care study in a largely White population of women. For heavy drinking, AUDIT AuROC = at least 0.87 in female primary care patients. TWEAK and T-ACE had higher AuROC values (0.84 to 0.87) than CAGE (0.76 to 0.78) for detecting heavy drinking before pregnancy in black obstetric patients. One study assessing the screening for identification of heavy drinking in non-pregnant women found AUDIT to be effective.	
Bradley *et al*. 2007 USA	Cross-sectional diagnostic evaluation, ++)	To assess the effectiveness of AUDIT and related questionnaires in screening for alcohol misuse in primary care.	(i) Primary care (ii) Outpatients aged over 18 yrs of White, African American or Hispanic origin attending a primary care academic practice in Texas, USA participated in the study (n=1319; 392 male and 927 female). Mean ages of the sample were 46 yrs for men and 42 yrs for women. Patients were approximately equally distributed between the 3 ethnic groups under study	AUDIT, AUDIT-C, AUDIT question 3 and an augmented version of the CAGE were compared with a reference standard of alcohol misuse diagnosed according to DSM-IV and/or drinking above recommended limits in the past year.	AuROC curve for AUDIT-C over 0.90 for both men and women (p=0.04). Based on AuROC curves AUDIT-C performed as well as the full AUDIT and significantly better than self-reported risky drinking, AUDIT Q3, or augmented CAGE questionnaire (p values all <0.001), particularly in women. AUDIT-C threshold for optimal sensitivity (86%) and specificity (89%) for identifying past yr alcohol misuse in men = 4 and over, and 2 or over (89%, 78%) or 3 or over (73%, 91%) for women. Optimal cutoff for full AUDIT = 4 and over (91%, 80%) or 5 and over (81%, 90%) for men and 3 or over (79%, 87%) for women. AUDIT-C AuROC curve for DSM-IV alcohol use disorders alone was 0.89 in men and 0.91 in women.	USA
Coulton *et al*. 2006 UK	Cross-sectional diagnostic evaluation, ++	To evaluate the effectiveness of a range of screening methods for the identification of alcohol use disorders in an opportunistic screening programme	(i) Primary care (ii) 1794 male general practice patients aged 18 years and over attending 6 general practices in South Wales	AUDIT, GGT, aspartate aminotranferase, %CDT, and erythrocyte mean cell volume	Significant correlation between alcohol consumption and score on AUDIT (Pearson's correlation coefficient r=0.74) and measures of GGT (r=0.20) and %CDT (r=0.36) but not aspartate aminotranferase (r=0.08) or erythrocyte mean cell volume (r=0.02). AUDIT higher sensitivity, specificity and positive predictive value than all of biochemical markers for hazardous consumption (69%, 98% and 95%), weekly binge consumption (75%, 90% and 71%), monthly binge consumption (66%, 97% and 91%) and alcohol dependence (84%, 83% and 41%).	UK

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		in primary care within the UK.				
Fiellin *et al*. 2000	Systematic review, ++	To systematically review the evidence for screening methods for alcohol problems in primary care.	(i, ii) Patients in primary care	Range of screening methods evaluated. Number of studies that assessed each instrument as follows: AUDIT or variation (n=9), CAGE or variation (n=15), MAST or variation (n=8), 2 question screen proposed by Cyr and Wartman (n=3), mental or general health screens (n=4), quantity-frequency questions (n=6) and clinical indicators (eg. clinicians recognition or laboratory tests) (n=7).	*Summary:* Alcohol Use Disorders Identification Test (AUDIT) was most effective in identification of subjects with at-risk, hazardous or harmful drinking (sensitivity 51% to 97%, specificity 78% to 96%). CAGE was more effective in identification of alcohol abuse and dependence (sensitivity 43% to 94%, specificity 70% to 97%). These 2 tools performed better than other methods, including quantity-frequency questions. *At-risk, heavy and harmful drinking* 11 studies in screening for above categories were performed in variety of primary care settings. 5 of the studies were performed outside of the USA. Mean age of subjects when reported ranged from 35 to 47 yrs. 1 study only included subjects aged 60 yrs or older. Between 30% and 100% of subjects were male. Prevalence of alcohol problems ranged from 1% to 44% and varied by sex and disorder. In all studies, either the screens were self-administered or screening was conducted by the research staff. AUDIT: 6 studies. AUDIT had sensitivity of 97% and specificity of 78% for hazardous use and a sensitivity of 95% and specificity of 85% for harmful use when cutoff of 8 or more was used (Saunders et al., 1993). Using same cutoff but different criterion standards, others have reported sensitivities between 51% and 59% and specificities of 91% to 96% for identification of at-risk drinking or heavy drinking (Volk *et al.*, 1997, Bush *et al.*, 1998, Bradley *et al.*, 1998a, 1998b. When cut-off of 5 used, sensitivity of 84% and specificity of 90% for combined hazardous, harmful or dependent drinking (Piccinelli *et al.*, 1997). Brief version of AUDIT (using only first 3 consumption questions) had sensitivity of 54% to 98% and specificity of 57% to 93% for various definitions of heavy drinking (Bush *et al.*, 1998, Bradley *et al.*, 1998a , 1998b). CAGE: 4 studies. King (1986) assessed use of CAGE to identify at-risk drinkers (consuming 64g of alcohol or more per day) and found	International

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					sensitivity of 84% and specificity of 95% when using cutoff of 2 or more. However, using same cutoff, Adams et al., 1996 found sensitivity of 14% and specificity of 97% for detecting at-risk drinkers among patients older than 60 yrs. Additional work (Aithal *et al.*, 1998, Bradley *et al.*, 1998b) found sensitivity between 49% and 69% and specificity between 75% and 95% for detection of heavy drinking. Augmented CAGE questionnaire (4 CAGE questions, first 2 quantity and frequency questions of AUDIT and question relating to history of drinking problems) had sensitivity of 65% and specificity of 74% (Bradley et al., 1998b). Other screening methods: Single item screen ('on any occasion during the last 3 months have you had more than 5 drinks containing alcohol?') had sensitivity of 62% and 93% for identification of problem drinkers (Taj *et al.*, 1998). CDT had sensitivity of 39% to 69% and specificity of 29% to 81% for heavy drinking (Aithal *et al.*, 1998, Sillanaukee *et al.*, 1998). MCV, aspartate aminotranferase, alanine aminotranferase and GGT had limited use as screening tests (Aithal *et al.*, 1998, Sillanaukee *et al.*, 1998), although 1 group found sensitivity of 77% and specificity of 81% for GGT (Aithal *et al.*, 1998). *Alcohol abuse and dependence* 27 studies conducted in a range of primary care settings. 4 studies were performed outside the USA. Mean age of subjects were reported ranged from 36 to 72 yrs. Males made up between 19% and 100% of the subjects. Prevalence of alcohol problems in population ranged from 2% to 41%, depending on diagnosis and whether lifetime or current criteria were used. In majority of studies (66%), screening performed by research staff, otherwise self-administered (15%) or clinician-administered (19%). AUDIT: 5 studies. Operating characteristics varied with cutoff used to determine positive results and whether one is interested in detecting lifetime or current diagnosis. In 1 study (Barry and Fleming, 1993), sensitivity was 61% and specificity of 90% for current alcohol use disorder using cutoff of 8. Increasing cutoff score to greater than 11 resulted in expected decrease in sensitivity to 40%) and an increase in specificity (to 96%). Performance characteristics altered considerably when investigators considered lifetime alcohol use disorders. In this	

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					context, AUDIT had sensitivity of 46% and 30% with a specificity of 90% and 97% with the use of cutoff scores of 8 and 11 respectively (Barry and Fleming, 1993). Other research found AUDIT had sensitivity of 63% and 93% and specificity of 96% and 96% for lifetime or current diagnosis respectively of alcohol abuse or dependence (Isaacson *et al.*, 1994). AUDIT did not perform as effectively as a screening test in study by Schmidt *et al* 1995, where AUDIT had sensitivity of 38% and specificity of 95% for lifetime diagnosis of alcohol abuse or dependence. Results similar to those achieved by Morton *et al*, 1996, with cutoff of 8 in population older than 65 yrs, where AUDIT had sensitivity of 33% and specificity of 91%. AUDIT noted to have different performance characteristics in different ethnic and sex populations (Steinbauer *et al.*, 1998). In 1 study, AUDIT (with cutoff of 8) had sensitivity between 70% and 92% and specificity of 73% to 94% with variation based on sex and ethnic background (Steinbauer *et al.*, 1998). CAGE: 10 studies. Sensitivities between 21% and 94% and specificities of 77% to 97% found using cutoff of 2 or more (Cleary *et al.*, 1998, Buchsbaum *et al.*, 1991, Chan, 1994, Brown and Rounds 1995, Fleming and Barry 1991, Cherpitel, 1998). Lowering cutoff to 1 gave sensitivity of 60% to 71% and specificity of 84% to 88% (Brown and Rounds 1995, Fleming and Barry 1991). In older primary care populations, sensitivities were 63% to 70% and specificities from 82% to 91% with scores of 2 or more (Morton *et al.*, 1996, Buchsbaum *et al.*, 1992). CAGE had sensitivity of 53% and specificity of 93% with combined target of identification of alcohol abuse, dependence and harmful drinking was goal of screening (Rumpf *et al.*, 1997). In 1 study (Volk *et al.*, 1997), proportion of subjects giving positive answer to CAGE questions varied by race, sex and item. Question 'Have you ever felt need to cut down on your drinking' had sensitivity of 63% and specificity of 84%, whilst question 'Have you ever had an eye-opener in the morning' gave sensitivity of 21% and specificity of 95%. MAST: 7 studies. Unweighted scoring of Short-MAST with cutoff of 2 or more had sensitivity of 82% and 100% and specificity of 96% and 85% for detection of subjects with lifetime and current diagnoses respectively (43). Further study using same cutoff found SMAST had sensitivity of 48% and specificity of 95%, but no distinction between current or lifetime disorder (28). Weighted scoring of SMAST typically	

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					uses cutoff of 5 or more, with sensitivity of 57% and 66%, with specificity of 80% and 80% for current and lifetime alcohol use disorders respectively (30). Other studies have found sensitivities of 38% to 80% and specificities of 79% to 97% with use of various SMAST cutoff scores (39, 42, 44). Geriatric version of MAST had sensitivity of 70% and specificity of 80% with cutoff of 5 or more in a geriatric (>65 yrs) primary care population (33). Shortened, 9-item self-administered Alcoholism Screening Test had sensitivity of between 13% and 69%, with specificity of between 67% and 95% in different ethnic and sex groups in primary care (34). Other instruments: Cyr and Wartman found combination of positive response to question 'have you ever had a drinking problem' and/or 'when was your last drink?' (within 24 hrs a positive response) had sensitivity of 91% and specificity of 90% when MAST scores were criterion standard. Other studies found sensitivities between 48% and 53% and specificities between 76% and 93% (Schorling *et al.,* 1995, Moran *et al.,* 1990). Permutations of 'have you ever had a drinking problem' had sensitivity of 40% to 70% and specificity between 93% and 99% (Cyr and Wartman, 1988, Fleming and Barry, 1991, Fleming and Barry 1991, Schorling *et al.,* 1995, Moran *et al.,* 1990). TWEAK (combination from CAGE and MAST developed for prenatal use) had sensitivity of 75% and specificity of 90% (Cherpitel, 1998). Quantity-frequency Questions: 1 study found sensitivity of 47% and specificity of 96% using MAST scores as standard and quantity cutoff of 4 or more drinks per day (Cyr and Wartman, 1988). Fleming and Barry reported sensitivities of 50% and 20% and specificities of 87% and 97% with use of cutoff of 7 and 30 drinks per week, respectively. In 1 study, there was a gradual decrease in sensitivity (100% to 21%) and increase in specificity (43% to 97%) as number of drinks consumed over week increased from 0 to 24 or more (Buchsbaum et al., 1995). Clinical indicators: 6 studies examined clinical judgement and/or laboratory values. More formal assessments have found that physicians' judgement had sensitivity of 18% to 44% with specificity of 96% to 99% for diagnosis of alcohol abuse and dependence (Rydon *et al.,* 1992, Isaacson *et al.,* 1994). Alcohol Clinical Index generated to formalise use of clinical indicators (Escobar *et al.,* 1995) and use of diagnostic grid that combined use of CAGE with features of history and physical	

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					examination (Gabrynowicz and Watts, 1981). Alcohol Clinical Index had sensitivity of 28% and specificity of 86% for alcohol dependence. Grid had sensitivity of 99% and specificity of 96% for alcohol dependence; however, same physician provided criterion standard diagnosis and completed grid. Lab methods were reported to perform poorly as screening tools (Escobar *et al.*, 1995, Cleary *et al.*, 1988). In receiver operating characteristic ROC analysis, SMAST consistently outperformed physician judgement and lab tests (Cleary et al., 1988). In a further study, Escobar *et al* found that use of MCV, elevated GGT or aspartate aminotransferase-alanine aminotransferase ratio of 2 or more had sensitivities that ranged from 13% to 63% and specificities from 48% to 94%. Mental and general health screening: 2 studies. Screening using alcohol items in Symptom-Driven Diagnostic System for Primary Care had sensitivity of 38% to 75% and specificity of 97% to 99% for current diagnosis of alcohol dependence (Broadhead *et al.*, 1995, Leon *et al.*, 1996). Health Screening Survey had sensitivity of 78% and specificity of 71% (Fleming and Barry, 1991). Spare Time Activity Questionnaire had sensitivity of 100% and specificity of 72% when compared with psychiatrist assessment of addiction to alcohol (Hore *et al.*, 1977).	
Forsberg *et al*. 2002 Sweden	Cross-sectional diagnostic evaluation, ++	To compare measures for screening of binge drinking among patients on an emergency surgical ward.	(i) Hospital setting (ii) One hundred and forty nine emergency surgical patients aged 16 to 73 yrs participated in the study undertaken at Danderyd Hospital, Stockholm, Sweden. The intake diagnoses of patients were grouped in 11 categories as follows: appendicitis (32.2%), abdominal observation (19.5%), trauma (12.1%), diverticulitis (7.4%), ulcus/vomiting (6.0%), bile/icterus (5.4%), GI bleeding (5.4%),	Subjects completed 3 questionnaires: the Malmö modification of the brief Mast (Mm-MAST), CAGE and Trauma Scale. In addition, CDT and GGT were measured.	For men aged 30-73 yrs, Mm-MAST sensitivity = 92%. High sensitivities for both CAGE (75%) and CDT (75%), and when combined (83%). No combinations further improved the high sensitivity of Mm-MAST. Trauma Scale and GGT low sensitivities (42% and 17%), and not improved when combined with other tools. For men aged 16-29 yrs, CAGE sensitivity = 27% and Trauma Scale = 37%. When combined with Mm-MAST, the 3 questionnaires obtained higher sensitivity (82%). CDT and GGT had sensitivities of only 9% in this group. For women, no tools or combinations were found that had a sensitivity to binge drinking of 70% or above.	Sweden

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			pancreatitis (2.7%), ileus/subileus (2.7%), anal (2.0%) and a rest category (4.7%).			
Frank *et al*. 2008 USA	Cross-sectional diagnostic evaluation, ++	To evaluate the validity of the AUDIT-C questionnaire among White, African American and Hispanic adult primary care patients in the USA.	(i) Primary care (ii) Outpatients aged 18 yrs and above (n=1292) attending a family practice clinic in Texas, USA participated in the study. The study sample had a mean age of 43 yrs and was 70% female.	AUDIT-C and CAGE were evaluated. The main comparison standard was for alcohol misuse (risky drinking, alcohol abuse) defined as meeting criteria for either DSM-IV alcohol use disorder or risky drinking defined as drinking above recommended limits according to the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Risky drinking was defined as drinking greater than 7 drinks a week or 4 or more drinks on any single occasion (women) and greater than 14 drinks a week or 5 or more drinks in any single	AuROCS above 0.85 in all 3 groups, andno significant differences across racial/ethnic groups in men (P=0.43) or women (P=0.12). In women, sensitivity was higher in Hispanic (85%) than in African American (67%, P=0.03) or White (70%, P=0.04). In men, sensitivity was higher in White (95%) than African-American men (76%, P=0.01), with no significant difference from Hispanic men (85%, P=0.11). *Screening for risky drinking and alcohol use disorders (alcohol misuse)* Sensitivity of AUDIT-C at recommended cutoffs (3 and over for women and 4 and over for men) for detecting alcohol misuse differed significantly in 3 groups. Differences not consistent in women and men, except that AUDIT-C had lowest sensitivity and highest specificity in African Americans. In women, AUDIT-C sensitivity significantly higher in Hispanic (85%) than African American (67%, P=0.03) or White (70%, P=0.04) women. In men, AUDIT-C sensitivity significantly higher in White (95%) than African American (76%, P=0.01) men but not significantly higher in Hispanic males (85%, P=0.11). No significant differences in specificities between 3 groups in men or women. Negative likelihood ratios were lowest in Hispanic women and White men, reflecting higher sensitivities. Positive likelihood ratios were highest in African American women and men, reflecting highest specificity in African Americans. In each of the 3 groups, AuROCs for alcohol misuse were greater than 0.90 in men and greater than 0.85 in women. *Screening for alcohol use disorders* AUDIT-C sensitivity varied across groups. Sensitivity of AUDIT-C for alcohol use disorders lower in African American men (0.65) than in White (0.96) (p=0.008) or Hispanic (1.00) (P=0.003) men but did not differ significantly across groups of women (AA 0.88, H 0.91, W 0.87) (P>0.70 for all comparisons). Specificity higher in African American men (0.83) than White men (0.70) (P=0.02) but not compared to Hispanic men (0.72) (P=0.07). For women, AUDIT-C specificity was	USA

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				occasion (men).	significantly higher in African American women (0.89) compared to Hispanic women (0.77) (P=0.001) but not compared to White women (0.86) (P=0.27). No significant differences in AUDIT-C AuROCs for detecting alcohol use disorders across groups in men (P=0.43) or women (P=0.12) (range 0.87 to 0.94). In each ethnic group, AUDIT-C had a higher AuROC than CAGE (range 0.67 to 0.88) for detecting alcohol use disorders (P<0.05 for each comparison, bar Hispanic women (P=0.07)). CAGE had relatively low sensitivity for alcohol use disorders (23% to 72%), with lowest sensitivity in Hispanic women and highest among White men. CAGE specificity was observed to be higher than AUDIT-C in African American women, Hispanic women, White women, Hispanic men and White men.	
Gordon *et al*. 2006	Literature review	To review the evidence for screening for alcohol misuse in primary care.	(i ii) Patients in primary care	Screening tools for alcohol misuse in primary care	Clinical signs and laboratory tests hadlow sensitivity to the detection of alcohol misuse. AUDIT having positive attributes such as the capability of detecting less severe forms of alcohol misuse, being relatively short and having been validated internationally. AUDIT-C performed comparably with the full AUDIT and quicker to use. CAGE useful in detecting more severe alcohol misuse. Shortened versions of MAST effective in detecting alcohol use disorders and being more practical to use.	International
Kelly *et al*. 2002 USA	Cross-sectional diagnostic evaluation, +	To examine the appropriateness of adult-validated alcohol screening tools among adolescents and young adults	(i) Emergency department settings (ii) 103 (55 males, 48 females) patients presenting to emergency department settings in the USA were the focus of the study. The mean age of the sample was 17.5 yrs (SD=2.1, range 12.2 to 20.9 yrs). The sample was 79.5% Caucasian, 14.5% African American, 5% Asian American and 1% Hispanic.	Participants completed the following 3 screening questionnaires: AUDIT, CAGE and a modified version of TWEAK.	Mean score for AUDIT = 7.74 (SD=7.14). Mean score on TWEAK = 2.74, Mean score on CAGE = 0.71 (SD=1.03). Construct validity of these instruments for assessing problem alcohol use in adolescents would be supported to the degree that 'known group' differences are found for each. For expected differences by age, groups differed in the expected direction for TWEAK (younger group mean = 2.23 (SD=1.5) vs older group 3.10 (1.8), P<0.04) and on AUDIT (younger group mean=5.02 (4.9) vs older=10.39 (8.0), P<0.001). Groups did not differ significantly on CAGE (younger group mean=0.60 (0.85) vs older mean=0.84 (1.17), P=0.22). For expected gender differences, males and females did not differ on the AUDIT or CAGE, but differed significantly on TWEAK (male mean=3.9 (1.5), female mean=2.1 (1.8), P<0.009). Caucasian adolescents compared with African American adolescents on each measure. Findings for the two ethnic groups differed	USA

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					significantly only on AUDIT (Caucasian mean=8.56 (7.6) vs African American mean=5.07 (3.9), P<0.02). All 3 screening instruments were able to significantly discriminate between potentially hazardous and non-hazardous drinkers (P<0.05 in all cases).	
Kelly *et al*. 2004 USA	Cross-sectional diagnostic evaluation, ++	To evaluate the use of AUDIT, CAGE, CRAFFT and a modified RAPS-QF in screening for alcohol abuse or dependence among older adolescents in the emergency department setting.	(i) Emergency department settings (ii) Adolescents attending an emergency department setting in the USA participated in the study. 93 were included at follow-up analysis. The sample for analysis was limited to 18-20 year olds. The sample was 55% male, 81% White, with a median age of 19 yrs (SD=0.9).	AUDIT, CAGE, CRAFFT and a modified RAPS-QF	AUDIT and CRAFFT performed significantly better than the CAGE (p<0.01 and p<0.05 respectively); whilst AUDIT performed significantly better than the RAPS-QF (p<0.01). Optimal cut-off scores were identified as follows: AUDIT≥(10), CAGE (≥1), CRAFFT (≥3) and RAPS-QF (≥3). Screening properties: AUDIT ≥10) sensitivity 82%, specificity 78% (85% and 53% for alcohol-positive respondents); CAGE (≥1) sensitivity 66%, specificity 58% (70% and 35% for alcohol-positive respondents); CRAFFT ≥3) sensitivity 82%, specificity 67% (85% and 53% for alcohol-positive respondents); RAPS-QF ≥3) sensitivity 82%, specificity 54% (80% and 41% for alcohol-positive respondents).	USA
Knight *et al.* 2003 USA	Cross-sectional diagnostic evaluation, ++	To compare the validity of AUDIT, CAGE, POSIT and CRAFFT in screening among adolescents	(i, ii) Participants aged 14 to 18 yrs were recruited at a hospital-based adolescent clinic in the USA	AUDIT, CAGE, POSIT and CRAFFT	Screening properties for the detection of 'any problem': AUDIT 89% sensitivity, 94% specificity; POSIT 85% sensitivity, 92% specificity; CAGE 61% sensitivity, 72% specificity; CRAFFT 85% sensitivity, 92% specificity. For the identification of 'any disorder': AUDIT 87% sensitivity, 95% specificity; POSIT 89% sensitivity, 96% specificity; CAGE 67% sensitivity, 86% specificity; CRAFFT 83% sensitivity, 93% specificity. Finally, for the detection of 'dependence': AUDIT 91% sensitivity, 99% specificity; POSIT 91% sensitivity, 98% specificity, CAGE 74% sensitivity, 99% specificity; CRAFFT 83% sensitivity, 95% specificity. Optimal thresholds identified for the use of the tools where there was 'any problem' were 3 for AUDIT, 2 for POSIT, 1 for CAGE and 2 for CRAFFT.	USA

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Kriston *et al*. 2008	Systematic review, ++	To perform a systematic review and meta-analysis to asses the use of AUDIT and AUDIT-C in the identification of alcohol misuse in adults.	(i, ii) Fourteen studies were identified, which were conducted in Europe (8 studies), the USA (5 studies), and China (1 study), with sample sizes ranging from 112 to 13,438 patients (median 609 subjects). Sex and age distributions were described as showing variation. Research was performed in primary care (8 studies), inpatient populations (2 studies) and general population samples (4 studies).	AUDIT and AUDIT-C in conjunction with a valid reference standard. The standardised threshold for the definition of risky drinking varied between 196 to 280 g of ethanol per week for men and between 98 and 169 g for women; heavy binge drinking ranged from 4 to 6 drinks per occasion for men and from 3 to 4 drinks for women. In all cases with only one exception, trained interviewers were used to perform reference standard interview procedures to determine quantity and frequency of alcohol consumption to determine risky drinking. Seven of the nine studies examining alcohol use disorders used	Five studies including a total of 8679 patients examined the use of AUDIT and AUDIT-C in detecting risky drinking in primary care. Threshold scores ranged from 4 to 8 for AUDIT and 3 to 5 for AUDIT-C. Five studies with a total of 4572 patients investigated the use of AUDIT and AUDIT-C in the identification of any alcohol use disorder, with threshold scores between 2 and 8 for AUDIT and 2 and 5 for AUDIT-C. Four studies with a total of 2580 patients focused on unhealthy alcohol use (risky drinking or any alcohol use disorder). Threshold scores recommended in the included primary studies were higher for men (AUDIT 5 to 8; AUDIT-C 3 to 6) than women (AUDIT 2 to 6; AUDIT-C 2 to 5), which increased as the severity of the target alcohol condition increased. Two studies presented data for older people (with one study having a sample with a mean age above 65 yrs, and another stratified for age), using thresholds of 5 to 8 for AUDIT and 2 for AUDIT-C. Age did not affect the comparison of AUDIT and AUDIT-C.	Fourteen studies were identified, which were conducted in Europe (8 studies), the USA (5 studies), and China (1 study),

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				the criteria of the DSM (3rd revised or 4th edition). Two studies were based on ICD diagnoses.		
McCambridge & Thomas 2009 UK	Cross-sectional diagnostic evaluation, ++	To examine the performance of short forms of AUDIT in a web-based study of young drinkers.	AUDIT and shorter versions	The study population was 70% female, 86% White, with a mean age of 20.3 yrs (SD=2.2 yrs).	Mean AUDIT score for males = 11.7 (SD=7.7) vs 9.1 (SD=5.5) for females. 62% of the population (103/167) were identified as being hazardous drinkers at a threshold of≥8. Items 3, 4, 5 and 8 were found to be predictive of the majority of variance in total AUDIT scores.	UK
McCusker *et al*. 2002 UK	Cross-sectional diagnostic evaluation, +	To compare the effectiveness of CAGE and AUDIT questionnaires in screening general medical admissions for hazardous and harmful alcohol consumption.	(i, ii) General medical admissions. 103 patients were included, with an equal proportion of male (n=52) and female (n=51) subjects and a median age of 56 yrs (SD=23.9). The study sample was mainly White (90%, 93/103). Of the remaining 10 participants, 4 (4%) were Afro-Caribbean, 1 (1%) was Black/UK, 1 (1%) was Chinese, 1 (1%) was Bangladeshi/UK and 1 (1%) was Pakistani.	AUDIT and CAGE	Of the 103 included patients, 36% were identified by AUDIT as drinking hazardously or harmfully, and 22% were identified by CAGE. All CAGE cases were also AUDIT cases. AUDIT cases (hazardous or harmful drinkers) made up 36% (37/103) of participants. 48% of males were cases, vs 24% of females, yielding a male to female ratio of 2:1 (P=0.013). The mean age of cases was 57 yrs (SD=22.7). Cases were not younger than non-cases (mean age 56 yrs, SD=24.8). AUDIT cases were more likely to be White than other ethnic groups (n=35 vs n=1, P=0.052). Twenty two percent of participants were identified as CAGE cases. CAGE cases were younger than non-cases (mean age 48 (SD=20.0) vs 58 (SD=24.7 yrs) (P=0.046)). Significantly fewer cases were identified using CAGE than AUDIT (22% and 36% respectively, P<0.0001). As would be expected, all CAGE cases were also AUDIT cases. Twenty two (61%) AUDIT cases were also CAGE cases. The authors favoured the use of AUDIT over CAGE in this population.	UK
Miles *et al*. 2001 UK	Cross-sectional diagnostic evaluation, ++	To assess the clinical effectiveness of the 5-item AUDIT in identifying hazardous drinking among young people	(i, ii) The study population comprised 393 young people aged between 16 and 19 yrs at 2 colleges in London, UK. The group was 40% male and had a mean age of 17.0 yrs (range 16 to 19 yrs).	5-item AUDIT	Only 1 in 10 of those individuals who were drinking at 'hazardous' levels recognised their use to be problematic. 5-item AUDIT was found to have predictive validity, reflecting self-reported alcohol consumption, perception of associate health risk and hazardous consequences among young people.	UK

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O'Connell *et al.*, 2004	Systematic review, +	To systematically review evidence for the performance of self-report alcohol screening tools in the elderly	(i, ii) Thirteen studies included the CAGE questionnaire, of which 7 were conducted in community dwelling and outpatient populations, 2 in inpatients, 3 in patients with psychiatric illness, and 1 in a nursing home sample. The ages of the populations ranged from 50 yrs and over to a mean of 80.63 yrs. The majority of studies were from the USA.	CAGE, MAST, AUDIT, ARPS, shARPS	Sensitivity of CAGE low in psychiatric populations (38.9% for problem drinking at a cut-off of 1, Philpot *et al.*, 2003) and emergency admissions to hospital (13% and 98% for alcohol dependence at a cut-off of 2 in emergency admissions to hospital, Luttrell *et al.*, 1997). One study described good screening properties for MAST: sensitivity of 91.4% and specificity of 83.9% in a population with a high prevalence of alcohol abuse and dependence. AUDIT relatively insensitive in a number of studies (33% to 79%), but with good specificity (86% to 100%) for alcohol misuse. AUDIT-5 performed more effectively than AUDIT and CAGE in community dwelling older people referred to a psychiatry service (Philpot *et al.*, 2003). ARPS and shARPS had high sensitivity (93% and 91%) and only moderate specificity (66% for each tool) among internal medicine clinic patients (Moore *et al.*, 2002b).	The majority of studies were from the USA
Reinert & Allen 2007	Literature review	To conduct an informative literature review, in which the research findings on AUDIT were updated.	Range of settings	AUDIT and shorter versions	*Performance of AUDIT in subgroups* An earlier literature review by the same authors indicated that using a cut-off of 8 consistently gave lower sensitivities and higher specificities for women than men. The authors suggested that this cut-off should be lowered among women. Bradley *et al.* (2003) found that among female Veterans Affairs patients, the use of a cut-off as low as 3 gave a sensitivity of 0.77 and specificity of 0.79 for alcohol abuse or alcohol dependence and that using a cut-off of 2 may be more appropriate for the detection of hazardous drinking (sensitivity 0.87, specificity 0.71). Cook *et al.* found AUDIT to perform slightly more effectively among Whites than Black subjects in a population made up of young adults. The performance of AUDIT was similarly weaker among Black subjects in some studies (Cherpitel 1998, Cherpitel 2003, Cherpitel 1995); whilst, in others, AUDIT was equally effective among Black and White patients	International

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					(Cherpitel 1997) or perhaps even slightly more accurate among Black subjects in the identification of harmful use (Cherpitel 1995). In their last review, the authors reported one study of AUDIT in adolescents (Chung, 2000), in which 3 items in AUDIT were modified in order to make the tool more relevant for younger people and found that, at a cut-off of 4, sensitivity was 0.94 and specificity was 0.80. Additional work by Knight *et al.* assessed the use of AUDIT in a sample of 14 to 18 yr old patients in a hospital-based clinic and found a cut-off of 2 to be optimal in detecting any alcohol problem (sensitivity 0.88, specificity 0.81) and that 3 points could be used as a cut-off for detecting abuse or dependence, with resulting sensitivities of 0.88 and 1.00 and specificities of 0.77 and 0.73 respectively. Current evidence supports the use of AUDIT in individuals with severe and persistent psychiatric disorders. Carey *et al* demonstrated that AUDIT distinguished those with a primary diagnosis of alcohol disorder from those with primary psychiatric diagnoses among psychiatric patients in India suffering from severe chronic disorders. Against a criterion of a single-item clinical-rated index of alcohol use disorder, O'Hare reported sensitivity of 71% and a specificity of 81% at a cut-off of ≥8. *Screening for hazardous drinking* Several studies published since with encouraging findings. Nearly all identified studies recommended the use of a cut-off below 8 to screen for alcohol problems of lower intensity than alcohol dependence. Three studies were conducted in primary care or general practice (Dybek *et al.*, Gache *et al.*, Gual *et al.*). Each of these studies determined that the optimal cut-off for use among women for hazardous and harmful alcohol use was ≥5. Sensitivities ranged from 73% to 96% and specificities from 88% to 96%. Recommended cut-offs for the detection of hazardous drinking among men ranged from 5 to 7. In a general population sample, Rumpf *et al.* recommended the use of a cutoff of 5 for identifying at-risk drinkers (sensitivity 77%, specificity 80%). A cut-off of 5 was also found to be optimal for identifying high-risk drinkers among college students in Nigeria (Adewuya *et al.*), with a sensitivity of 94% and specificity of 92%. The slightly higher cutoff of 6 was suggested by Kokotailo *et al.* for identifying high risk drinking in US college students. In a study based in an emergency department (Neumann *et al.*), it was recommended that a cutoff of 8 should be used among men	

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					(sensitivity 75%, specificity 84%) for identifying any alcohol use disorder), but that the cut-off for women should be lowered to 5 (sensitivity 84%, specificity 81%). *Abbreviated versions of AUDIT* AUDIT-PC was found to perform comparably to full AUDIT in detecting hazardous drinkers in primary care (Gomez *et al.*) and among elderly psychiatric inpatients (Philpot *et al.*). In identifying hazardous drinkers, AUDIT-3 had low sensitivity of 51% but specificity of 100% at a cutoff of 1 (Gordon *et al.*). However, Gomez *et al.* found that, in identifying binge drinkers in highly educated employees, AUDIT-3 was more accurate (sensitivity 73%, specificity 93%) than the full AUDIT (sensitivity 67%, specificity 98%) or CAGE (sensitivity 67%, specificity 84%). The sensitivities of AUDIT-C were described as being higher for the detection of dependence than lower intensity problems. The review authors recommended the use of a cut-off of 4 for identifying hazardous drinking among men and that a cut-off of 5 should be used to identify individuals with any alcohol use disorder. Two studies identified by the review authors evaluated the performance of the Fast Alcohol Screening Test (FAST) questionnaire for the identification of alcohol problems (Hodgson *et al.*, 2002; 2003). FAST was described as being a 4-item scale, derived from item 3 (modified for men by increasing number of drinks on one occasion to 8) as well as items 5, 8 and 10 from AUDIT. FAST was found to have a sensitivity of 97% and a specificity of 91% at a cut-off point of ≥1 in males and females in a primary care setting in the UK (Hodgson *et al.*, 2002). FAST used at this same threshold but among males and females in a dental hospital setting in the UK demonstrated a sensitivity of 97% and a specificity of 91% in the detection of alcohol problems. Hodgson *et al.* (2003) observed that FAST also displayed good screening properties in the identification of alcohol problems among males and females presenting to an A&E setting in the UK, with a sensitivity of 93% and a specificity of 88%. In both studies by Hodgson *et al.*, the diagnostic	

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					measure used was a positive result≥(8) for an alcohol problem on the full AUDIT scale, rather than an independent formal diagnosis. Gomez *et al.*, (2005) tested a modified version of FAST (maintaining wording of item 3 for both men and women) and found that it performed less well (having a sensitivity of 80%, specificity of 94% and an AuROC of 0.93) at a cut-off of ≥3) than either AUDIT-C or AUDIT-PC among males and females at a primary care setting in Spain.	
Rist *et al.* 2009	Secondary analysis of cross-sectional data	To conduct secondary analysis of AUDIT data from a cross-section of 6529 patients of 26 general practitioners in an urban area of Germany in order to explore the structure of the questionnaire and function of items	(i, ii) Primary care patients in Germany	AUDIT	The authors concluded that the AUDIT items fall into 3 separate domains: consumption, harmful and dependent use and that there was a potential for loss of information in using shorter versions of AUDIT comprising only the AUDIT consumption items.	Germany
Rodríguez-Martos and Santamarina, 2007 Spain	Cross-sectional diagnostic evaluation, +	To evaluate the performance of AUDIT-C in a trauma emergency department.	(i, ii) 120 traffic casualties (78% male, media age 27 yrs, inter-quartile range 22 to 34) at an urban emergency room in Spain	AUDIT-C The full version of AUDIT was used as a gold standard	36% of screening patients had a positive score n the full AUDIT, with a median value of 5 (inter-quartile range 3 to 9). AUDIT-C mean score was 4.08 (4.65 in males and 2.04 in females), with a median of 4.00. Optimal thresholds were defined as≥ 5 for men (76% sensitivity, 73% specificity, PPV 66%, NPV 82%) and≥4 for women (sensitivity 100%, specificity 95%, PPV 83%, NPV 52%) for the detection of hazardous drinking. AUDIT-C had an AuROC of 0.861 in men and 0.990 in women.	Spain
Seppä *et al.* 1998 Finland	Cross-sectional diagnostic evaluation, +	To test the effectiveness of the Five-shot questionnaire in screening for heavy drinking among middle-aged men	(i, ii) 40 year old men in primary care in Tampere, Finland	Five-shot and CAGE questionnaires	Using CAGE, an acceptable effectiveness could not be obtained in this population. Using a cut-off score of ≥2, specificity was 87% but sensitivity was low at 47%. A combination of high sensitivity and specificity was obtained using a cut-off of≥2.5, giving a sensitivity of 96% and a specificity of 76%. Good properties were also observed at a cut-off of≥3 (sen sitivity of 77% and specificity of 83%). Five-shot therefore appears to be an effective means of identifying heavy drinking in this population group.	Finland

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Soderstrom *et al*. 1997 USA	Cross-sectional diagnostic evaluation, ++	To test the accuracy of questionnaires in screening for lifetime alcohol dependence in trauma centre patients.	(i) Trauma centre (ii) The interviewed sample was 72.1% male (mean age of 35.5 yrs) and 27.9% female (mean age 42.3 yrs).	AUDIT, CAGE and BMAST were evaluated against diagnoses of alcohol abuse and dependence made according to DSM-III-R criteria	CAGE most efficient predictor of lifetime alcohol dependence. CAGE had largest AuROC for identification of lifetime alcohol dependence (93.0, SE=0.9, P<0.003 vs AUDIT) and AUDIT (89.8, SE=1.0) had significantly larger AuROC than B-MAST (84.9, SE=1.5) (P<0.001). Vs AUDIT and B-MAST, CAGE had highest sensitivity (84%), specificity (90%), PPV (0.82) and NPV (0.91) at the standard cut-off point (ie. 2). Optimal threshold for AUDIT = ≥9 (1 more than standard score) (73%, 89%, 0.80, 0.86). Optimal cutoff for B-MAST = 5 (1 unit less than standard score) (80%, 85%, 0.74, 0.89). CAGE most effective test in both men (sensitivity 84%, specificity 87%) and women (80%, 96%).	USA
Tuunanen *et al*. 2007 Finland	Cross-sectional diagnostic evaluation, ++	To evaluate the identification of binge drinking among middle-aged men using AUDIT, AUDIT-C and AUDIT-3 in primary care.	(i, ii) 45 yr old men in primary care, Finland.	AUDIT, AUDIT-C and AUDIT-3	Full version of AUDIT effective in identifying binging drinkers using a threshold of ≥8 or ≥7. Optimal cut-off score for AUDIT-C = ≥6 and ≥2 for AUDIT-3. The AuROC among all risky drinkers (binging moderate and binging heavy and non-binging heavy drinkers) for AUDIT = 0.824 (95%CI 0.789 to 0.859), for AUDIT-C 0.829 (95%CI 0.795 to 0.864), and for AUDIT-3 0.779 (95%CI 0.739 to 0.818). AuROC values among binging moderate drinkers for AUDIT = 0.809 (95%CI 0.769 to 0.848), for AUDIT-C 0.816 (95%CI 0.777 to 0.854) and for AUDIT-3 0.756 (95%CI 0.712 to 0.8000). Use of the AUDIT cut-offs of ≥8 for bingeing moderate drinkers: sensitivity of 60% and specificity 81%; whilst the use of a threshold of ≥7 or more gave a sensitivity of 73% and specificity of 76% in this group. AUDIT-C cut-off ≥6: sensitivity of 70% and specificity of 77%. AUDIT-3 cut-off of≥2 = sensitivity of 70% and specificity of 73%. Among binging heavy drinkers, the AuROC value for AUDIT =0.814 (95%CI 0.770 to 0.859), for AUDIT-C 0.817 (95%CI 0.773 to 0.861) and for AUDIT-3 0.767 (95%CI 0.718 to 0.816). Using the typically recommended AUDIT cut-off of 8 or more = 65% sensitivity and 81% specificity 81%; 7 or more = sensitivity of 72% and specificity of 76%. AUDIT-C threshold of≥6 and over = sensitivity of 72% and specificity of 77%. AUDIT-3 cut-off of≥2 and over = sensitivity of 72% and 73% specificity. Both cutoffs of ≥7 and ≥8 for the full AUDIT were relatively effective in identifying all risky drinkers and binging moderate drinkers and binging heavy drinkers separately. Thus, the short forms of AUDIT were seen to perform effectively in	Finland

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					comparison with the full version of AUDIT.	
Bisson & Milford-Ward 1994 UK	Cross-sectional diagnostic evaluation, ++	To investigate the performance of CAGE, MAST, Severity of Alcohol Dependence Questionnaire and laboratory markers including CDT, GGT and MCV.	(i, ii) The study sample was made up of male soldiers under the age of 30 yrs (n=58) admitted to an alcohol treatment unit in London, UK. All subjects had a primary diagnosis of alcohol misuse or dependence.	CAGE, MAST, Severity of Alcohol Dependence Questionnaire and laboratory markers including CDT, GGT and MCV.	CAGE (97%), MAST (100% sensitivity), and the Severity of Alcohol Dependence Questionnaire (77%) more sensitive than the laboratory markers measured. Using standard thresholds, laboratory markers had low sensitivities. Of the alcohol markers, CDT was most sensitive (31%), followed by MCV (14%) and GGT (11%).	UK
Dhalla & Kopec 2007	Systematic review, +	To systematically review the evidence published in English for the effectiveness of the CAGE questionnaire across different patient populations in the identification of alcohol-related problems	Range of international settings	CAGE. Reference standards used were the use of the Diagnostic Interview Schedule and the Composite International Diagnostic Interview (CIDI). Less commonly, some studies used self-report and the use of another screening questionnaire (eg. MAST) as criterion standard.	CAGE had high test-retest reliability (0.80 to 0.95) and adequate correlations (0.48 to 0.70) with other screening instruments. CAGE was valid tool for the identification of alcohol abuse and dependence in medical and surgical inpatients, ambulatory medical patients and psychiatric inpatients (average sensitivity 71%, specificity 90%). Optimal cut-offs = ≥1 or ≥2. Performance in primary care patients varied, and CAGE did not appear to perform well in white women, prenatal women and college students. CAGE was not an appropriate screening test for less severe forms of drinking.	International

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Wetterling *et al.* 1998 Germany	Cross-sectional diagnostic evaluation, +	To evaluate CAGE and MAST, with the laboratory markers CDT, GGT, alanine aminotransferase, aspartate aminotransferase and MCV.	(i, ii) Patients aged less than 65 yrs (n=204; 74 women (mean age = 43.7 yrs, SD = 15.1), 130 men (mean age = 43.1 yrs, SD = 15.1 yrs) admitted to the internal or surgical departments of a general hospital in Germany	CAGE and MAST, with the laboratory markers CDT, GGT, alanine aminotransferase, aspartate aminotransferase and MCV.	Against self-reported recent harmful alcohol consumption (women >225 g/wk, men >350 g/wk), sensitivities and PPV values relatively low for all screening tools (sensitivity <60% and PPV <50%). Using ICD-10 diagnosis as standard, CAGE and MAST high specificity (>95%) and PPV (>90%). Sensitivities of CAGE, MAST and alcohol markers were relatively low (<60%), both for ICD-10 diagnosis and for harmful alcohol consumption as reference standard. CDT had best PPV of all alcohol markers (60%). Sensitivity of CAGE, MAST and alcohol markers for ICD-10 diagnosis was relatively poor (<60%).	Germany
Huntley *et al.* 2001 UK	Before and after study, ++	To assess the feasibility of use of the Paddington Alcohol Test in A&E.	(i, ii) Patients presenting to A&E department, London, UK	Paddington Alcohol Test	Of 139 PAT-positive patients, 77% (n=107) accounted for by a set of top 10 complaints/groupings. 10 most common PAT positive categories, accounting for 77% of all PAT positive complaints were fall>collapse (including fit, blackout)> head injury (including facial injury) > assault (including domestic violence and other) > non-specific GI problem > 'unwell' > psychiatric (including depression, overdose, confusion) > cardiac (including chest pain, palpitations > self-neglect > repeat attendance.	UK
Patton *et al.* 2002	Short communication	Not stated	(i, ii) Patients presenting to A&E department, London, UK	Paddington Alcohol Test	PAT was a rapid and reliable method for identifying early onset hazardous drinkers (presenting a sensitivity of 70%, and specificity of 85%).	UK
Patton *et al.* 2003	Before and after study, ++	To demonstrate the positive impact of health consequences feedback on the willingness of patients to accept advice relating to their alcohol consumption.	(i, ii) 281 PAT-positive patients aged 18 yrs and over were included in the study at an A&E in London, UK.	Health consequences feedback delivered with PAT	Introduction of health consequences feedback resulted in a 23% increase in the proportion of patients who were willing to accept brief advice. On average, 64% of patients accepted advice during feedback period, compared with 52.1% during the control period ($p<0.05$, 95%CI 0.23 to 23.5). (22.8% increase). Authors estimated that this increase could equate to an additional 350 patients per year in a typical A&E department accepting advice.	UK

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
Patton *et al*. 2004	Short communication	To present PAT in a slightly modified form.	(i, ii) Patients presenting to A&E department, London, UK	Paddington Alcohol Test	PAT concorded fairly well with the AUDIT questionnaire, but could be administered in approximately one fifth of the time taken to complete AUDIT. PAT scoring of units rapid and specific to UK. Time to complete PAT and AUDIT assessed for a sub-sample of 47 participants = 20 seconds for PAT (SD=9.53) and 1 min 13 seconds for AUDIT (SD=27.6).	UK
Smith *et al.* 1996 UK	Before and after study, ++	To develop and effective and practical screening questionnaire for use by A&E staff in the identification of alcohol misuse in adult patients presenting at A&E and to integrate an alcohol health worker into the A&E setting to deliver counselling to positively screened and referred patients	(i, ii) Patients aged 16 yrs and over were included in the evaluation at St Mary's Hospital, London, UK.	Paddington Alcohol Test with referral to alcohol health worker	Development and use of PAT resulted in a referral rate of 1 patient per 158 A&E adult attendees, facilitating counselling rate of 1 patient per 263 A&E adult attendees by the alcohol health worker. This counselling rate was constituted a 10-fold increase on the rate of 1 patient per 2610 adult attendees observed in a study undertaken during 1988-90. PAT was estimated by the majority of A&E doctors (using self-timing) to take approximately 1 minute or less to complete) (excluding CAGE) for more than 50% of completed questionnaires.	UK
Csipke *et al.*, 2007 UK	Cross-sectional study, ++	To assess the use of blood alcohol concentration testing in the emergency department resuscitation room	(i, ii) All patients aged 16 yrs and over cared for in the resuscitation room of the emergency department at St Mary's Hospital, London, UK. Patients admitted to ward were followed up to apply PAT and acceptability questionnaires. Mean age 62 yrs (SD=18.24), 58% male	PAT questionnaire	PAT questionnaire (5 items) positive in men drinking more than 8 units and women drinking more than 6 units in a single session, at least once a week, or anyone who believed their attendance was alcohol-related. Patients grouped into those who had a BAC under or over 80mg/100ml. Level of agreement between positive screening by questionnaire (positive PAT status) and a BAC of >80mg/100ml was low ($\kappa = 0.29$, 95%CI 0.12 to 0.46). Level of agreement between specific question 'is your attendance related to alcohol' and BAC >80mg/100ml was low ($\kappa = 0.30$ (95%CI 0.11 to 0.49). Patients were accepting of the use of BAC tests, but a small minority were concerned over confidentiality.	UK

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
Feldstein *et al*. 2007	Literature review	To conduct a literature review of the evidence relating to the use of the Substance Abuse Subtle Screening Inventory (SASSI) screening instrument	Adults and adolescents	SASSI was evaluated against the DSM-IV-TR	Limited electronic searches were made that identified 36 studies for inclusion. Ethnic minorities were been found to be significantly more likely to be classified as 'high probability' of substance use disorder relative to Caucasians and to score higher on the DEF, RAP and COR scales. Studies suggest that SASSI scores are influenced by general distress and deviance; positive relationships with SASSI scales reported for conduct disorder, depression, social anxiety, general distress and traumatic histories, and suicidal ideation or attempts. This is particularly linked with the indirect scales.	International
Lazowski *et al*. 1998	Cross-sectional diagnostic evaluation, ++	To psychometrically assess the Substance Abuse Subtle Screening Inventory-3 (SASSI-3).	(i, ii) Participants were recruited via clinical centres and advertisements. The study population (n=1901) was drawn from across the USA from clinical settings (addiction centres, general psychiatric hospitals, a vocational rehabilitation programme, a sex-offender treatment programme); correctional centre; and the community via advertisements for participants with family history of alcohol abuse). The population was approximately 70% male, 32% employed, 72% substance dependent, 51% White, with a mean age of 35 yrs.	SASSI-3	SASSI-3 was found to have a sensitivity of 96% and specificity of 93% for the identification of substance dependence. No outcome measures were reported for alcohol abuse alone	USA
Rogers *et al*. 1997 USA	Cross-sectional diagnostic evaluation, +	To evaluate the screening properties of the SASSI-A instrument among dually-diagnosed youth offenders	(i, ii) The study population was made up of juvenile offenders with a dual diagnosis at a state psychiatric clinic in Texas, USA (n=317, 242 male, 75	SASSI-A	SASSI-A 90.8% successful in identifying chemically dependent adolescents. Details of sensitivity and specificity not explicit. For non-admitters (which SASSI-A is designed to elucidate), the success rate was approximately 5% less for Hispanic Americans than Whites.	USA

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
			female). The mean age of the sample was 15.4 yrs (SD=1.06). The median educational level reached was that of 8th Grade. 38.8% of the sample were White, 9.1% African American, 30.3% Hispanic American and 21.8% classed as other/missing data. Subjects were classed into 4 groups: non-users (n=19, alcohol only (n=25), drugs only (n=66) and alcohol-drugs (n=201).			
Stein *et al.* 2005 USA	Cross-sectional diagnostic evaluation, ++	To evaluate the use of SASSI-A in a juvenile correctional facility	(i, ii) A sample of 178 young people at a juvenile correctional facility in the USA (mean age of 17 yrs, SD=1.9, 92.1% male, 39.6% Hispanic, 19.5% Black and 40.9% White) participated in the study.	SASSI-A	Classification rates for alcohol were as follows: sensitivity 84%; specificity 63%; positive predictive power 84%. No indication of age-related bias, but SASSI-A operates differently for Whites vs. Hispanics (differences in OAT scores predict higher or lower alcohol use for Hispanics, but not for Whites). ChemDep better predictor of alcohol use for Hispanics than for Blacks or Whites.	USA
Cagnasaby & Vinson, 2005	Cross-sectional diagnostic evaluation, ++	To determine the effectiveness of quantity-frequency (QF) questions in screening for hazardous or harmful drinking	(i, ii) Three groups were included as participants and were interviewed: i) patients presenting to emergency departments for care of an acute injury (n=1537); ii) or a medical illness (n=1151); and community controls interviewed by telephone (n=1112). Cases were recruited from patients presenting to care to one of three emergency departments in Columbia, Missouri, USA within 48 hrs of an acute	SASQ	Hazardous drinking was classed as the consumption of >4 drinks per day or > 14 drinks per week among men (with values of 3 and 7 respectively among women) (NIAAA). AuROC values for the three samples combined were 0.81 (95%CI 0.79 to 0.82) for SASQ, 0.80 for a question about average frequency alone (95%CI 0.79 to 0.82) and 0.85 (95%CI 0.84 to 0.86) for the product of usual frequency times average quantity. The QF product and the question about average frequency were found to perform consistently across the 3 groups. Whilst the AuROCs for QF were almost identical (0.84 and 0.85 respectively) and were similarly so for the quantity question (0.80 and 0.81), values were different for SASQ, being 0.74 (95%CI 0.69 to 0.79) for African Americans and 0.81 (95%CI 0.80 to 0.83) for Caucasians. Sensitivity and specificity values for SASQ (with a positive response for consuming stated number of drinks in 3 months) = 85% and 70% for men and 82% and 77% for women.	USA

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			injury. Patients were eligible if they were 18 yrs or over, English speaking, of intact cognition, not in police custody, or if the injury did not occur in a setting where access to alcohol was controlled (eg. nursing home).			
Burd *et al.* 2003 USA	Cross-sectional study, +	To test the use of the TWEAK questionnaire in screening for alcohol misuse in pregnancy	(i, ii) Pregnant women <28 weeks gestation at risk from alcohol misuse were included as the population (n=1081) in this US-based study.	TWEAK	Mean TWEAK score obtained was 0.69 (SD=1.25, range 0-7). 253 women (23.4%) had a score of 2 or more. Of those identified, over half the women had drunk before, about a quarter were at risk, 6% reported drinking during the previous month, and 4% during this pregnancy. Age, marital status, previous abortion and smoking were predictors of TWEAK score ($p<0.001$).	USA
Chang *et al*. 1998 USA	Cross-sectional study, ++	To test the effectiveness of T-ACE in an ethnically and socio-economically diverse sample at risk of alcohol misuse.	(i, ii) The study population was based in the USA. Pregnant women attending first pre-natal appointment. Women beyond a gestational period of 28 weeks were not eligible.	T-ACE, AUDIT	105 of total of 350 women were risk drinkers as measured by AUDIT scores; these were more likely to be current drinkers (45.3% compared to 29.5%; $p=0.004$). 40% of T-ACE positive women and 14% of T-ACE negative women satisfied DSM-III-R criteria for lifetime alcohol abuse ($p<0.001$). T-ACE was most sensitive screening tool for detecting lifetime alcohol diagnoses (88%), risk drinking (92%) and current drinking (89%), but least specific. AUDIT performed significantly better than either the T-ACE ($p<0.005$) or the SMAST ($p<0.005$) as a predictor of lifetime alcohol diagnoses, and current drinking (T-ACE $p<0.04$; SMAST $p>0.05$))	USA
Dawson *et al*. 2001	Cross-sectional study, ++	To evaluate TWEAK for predicting high-risk and moderate-risk drinking during pregnancy.	(i, ii) Data for 404 subjects were analysed (mean age 26.6 yrs (SD=6.3), mean gestational age at time of interview 24 weeks (SD=11).	TWEAK	21.1% met the criteria for moderate-risk drinking during pregnancy, whilst 8.4% were classified as high-risk. 30.4% had a TWEAK score of 2 or higher. TWEAK sensitivity = 70.6% for high-risk drinking during pregnancy (at a threshold of 2 points). At a cut-off of 1, the sensitivity was 65.6% to predict any risk or moderate-risk (57.6%). Specificity was 73.2% for high-risk and 63.7% for any risk.	USA

First author and date and country of corresponding author	Study Design & Quality (++/+/-)	Research Objective	Setting (i) & Study Population (ii)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
Russell *et al.* 1996 USA	Cross-sectional study, +	To investigate the efficacy of screening for risky drinking during pregnancy using TWEAK and T-ACE questionnaires	(i, ii) The study sample was made up of disadvantaged African American obstetric patients (n=2717) in the USA.	TWEAK and T-ACE	TWEAK and T-ACE displayed optimal combinations of sensitivity and specificity at a cut-off point of 2. At every cut-off score, TWEAK was more sensitive than T-ACE. At threshold scores of 1 and 2, TWEAK and T-ACE were more sensitive to risk drinking than MAST or CAGE. However, at a threshold of 3, MAST was comparable. CAGE was not particularly sensitive at any cut-off score. The reported sensitivity of T-ACE alone was 67%, specificity 86%, with a positive predictive value of 33%.	USA
Santolaria *et al.* 1997 Canary Islands	Cross-sectional study	To investigate physical signs and biological markers predictive of excessive alcohol consumption in apparently healthy people	(i, ii) The study sample was made up of 492 (232 males, 260 females) randomly selected inhabitants aged older than 15 yrs of a rural village in Tenerife. 65% of the sample consumed alcohol. 18.2% (34.1% males, 4.2% females) of the sample reported excessive alcohol intake (>80g/day and 40 g/day respectively).	Variables associated with excessive alcohol consumption	Variables associated with excessive alcohol consumption assessed by logistic regression. Liver enlargement, parotid swelling, hoarseness, retches and tremor in the morning were independent predictors of excessive alcohol consumption.	Canary Islands
Saunders & Conigrave 1990	Literature review	To discuss the use of clinical examination findings in the identification of alcohol misuse.	International range of settings	Variables associated with excessive alcohol consumption	Development of the Alcohol Clinical Index by Skinner *et al.* (1986) was described. The clinical signs included several from the Le Go grid used extensively in France for the screening of alcoholism, with further clinical indicators including tandem gait, deep knee bend, oedema of the soft palate, bruises, abrasions, trauma-related scars and cigarette burns. The use of clinical signs in screening for alcohol misuse was investigated in a WHO collaborative study reported by Saunders and Aasland (1987). The association between clinical signs and alcohol-related problems was not strong (r=0.2 to 0.4). A relationship appeared only to be present above alcohol consumption in excess of 80g/day. Clinical signs (with the exception of scars and bruises) were perceived to reflect prolonged and extensive daily drinking with advanced alcohol-related harm. The study found the 5 most discriminatory clinical signs indicative of alcohol misuse to be abnormal skin vascularisation, conjunctival infection, hand tremor, tongue tremor and soft hepatomegaly.	International

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Wahie & Lawrence 2006 UK	Case study	To describe 3 case studies	UK	Variables associated with excessive alcohol consumption	Cases of 3 patients with a total of 4 episodes of inflammatory dermatosis associated with alcohol abuse. Rash itchy, scaly and erythematous and typically located over the legs and groin before spreading across the body. The skin condition responded well to emollients and topical steroids but not to zinc replacement therapy. Long term remission required alcohol consumption to be reduced.	

APPENDIX 14: Screening Summary Tables

Summary Table: Primary care

Study characteristics and screening properties are presented for primary studies included in the review of the effectiveness of screening tools in the identification of alcohol misuse. Key findings of systematic reviews are described in the narrative review synthesis.

Screening tool Author Year Study design Quality	**Type**	**Delivered by**	**Drinking pattern targeted**	**Population**	**Setting**	**No of Items**	**Time to complete**	**Reference standard used**	**Sensitivity (%)**	**Specificity (%)**	**Positive and Negative-predictive values (%)**	**AuRoc Value**	**Reported optimal threshold**	**Other properties (including reliability and test-retest)**
Primary care														
ASSIST WHO ASSIST Working Group, 2002 Evaluation and qualitative study, ++	Questionnaire	Interviewers selected on basis of familiarity with substance abuse (2-4 per site). 71% female. Average age 32 yrs and 15 yrs of education. ¼ employed as researchers, 1/3 employed mainly in alcohol and drug treatment field, remainder employed in medical, psychiatric or other settings.	Tool designed for detection of psychoactive substance use and related problems in primary care patients	Volunteer participants n=236 Mean age 34 yrs 54% male 61% unemployed Mean education duration 10 yrs 60% recruited from alcohol and drug abuse facilities; remainder drawn from general medical and psychiatric settings	Primary care, general medical, community settings and specialised alcohol and drug treatment services Australia, Brazil, India, Ireland, Israel, UK, Zimbabwe, the Palestinian Territories and Puerto Rico	12 items selected for initial evaluation (test shortened as a result of this study to 8 items	Mean time to administer = 16 min. Average re-test time was 17.5 min. (17.88 min for patients from alcohol and drug abuse facilities, retest time 19.70 min)	N/A	N/A	N/A	N/A	N/A	N/A	Test-retest procedure used to determine consistency of responses of subjects to same items on two separate occasions. Average test-retest reliability coefficients (kappa) ranged between high of 0.90 (consistency of reporting 'ever' use of substance) to low of 0.58 (regretted what was done under substance influence). High average kappa

														observed for alcoholic beverages (0.72) observed. High alpha statistic also obtained for alcohol (0.92), demonstrating high internal consistency of items. Qualitative data showed acceptability of items to subjects. Data used to guide selection of smaller number of items for future inclusion. Average time between test and retest = 2.16 days (range 1.32 to 3.28).
ASSIST Humeniuk *et al.*, 2008 Cross-sectional diagnostic evaluation, ++	Questionnaire	2-5 tertiary-educated interviewers with experience of substance abuse issues at each site.	Tool designed for detection of psychoactive substance use and related problems in primary care patients	n=1047 (697 from primary care, 350 from specialised settings) Mean age 30.4 yrs, SD=8.2	Project conducted at Clinical Research Units in Australia, Brazil, India, UK, Thailand, USA and Zimbabwe, patients recruited from primary care and specialised settings	n/r	Average time to complete = 8.7 min (SD=4.6)	Independent clinical examination from specialist addition clinician blinded to other test outcomes for diagnosis of current and lifetime substance dependence, based on DSM-IV criteria.	Alcohol Use vs abuse (at cut-off ≤ 5.5) = 83% Abuse vs dependence (at cut-off ≤ 10.5) = 67%	Alcohol Use vs abuse (at cut-off ≤ 5.5) = 79% Abuse vs dependence (at cut-off ≤ 10.5) = 60%	n/r	Alcohol Use vs abuse (at cut-off ≤ 5.5) = 0.87 Abuse vs dependence(at cut-off ≤ 10.5) = 0.70	n/r	Significant positive correlations observed between current frequency of use of alcohol, cannabis, cocaine, amphetamine, sedatives and opiods (0.77 to 0.94 p<0.001, n=1047). Alcohol Cronbach's alpha coefficient =

														0.84. Significant correlation between ASSIST and AUDIT (r=0.82).
ASSIST Newcombe *et al.*, 2005 Cross-sectional diagnostic evaluation, +	Questionnaire	Since study was carried out as part of multi-site international evaluation, interveners can be assumed to be as above (Humeniuk *et al.*)	Tool designed for detection of psychoactive substance use and related problems in primary care patients. Study carried out as part of multi-site international study and reported to present findings for Australian sample.	n=150 recruited from drug treatment (n-50) and primary health care (n=100) settings Mean age 31.3 yrs (SD=8.4) 50% male 61% unemployed, 95% Caucasian, 12 yrs mean education (SD=2.8)	Participants recruited from drug treatment and primary health care settings in Australia. Baseline test battery conducted at research office.	n/r	n/r	Independent clinical evaluation by registered addiction psychologist to determine diagnoses of lifetime and current dependence	Alcohol Use vs abuse (at cut-off ≤ 4.5) = 71% Abuse vs dependence (at cut-off ≤ 10.5) = 86%	Alcohol Use vs abuse (at cut-off ≤ 4.5) = 63% Abuse vs dependence (at cut-off ≤ 10.5) = 77%	n/r	Alcohol Use vs abuse (at cut-off ≤ 4.5) = 0.76 Abuse vs dependence (at cut-off ≤ 10.5) = 0.83	n/r	ASSIST scores significantly positively correlated with AUDIT score (r=0.84, p<0.001). Participants contacted 3 months post-assessment and re-interviewed using condensed test battery. 139 (92.7%) successfully followed up. Mean time from baseline to follow-up interviews was 104 days (SD=14.9 days, range 78 to 181 days). Marginally significant difference observed in AUDIT scores at baseline and follow-up for alcohol (3.1 SD=1.5 vs 2.4 SD=0.9, P=0.04).
AUDIT Aalto *et al.*, 2006	Questionnaire	Mailed health screening questionnaire included separate forms	Heavy drinking (defined as ≥ 140 g/wk alcohol	Females All subjects aged 40 yrs (total set of AUDIT and	Primary care, Tampere, Finland	AUDIT=10 items AUDIT-C=3 items (first 3	n/r	Timeline Followback (mean weekly reported alcohol	AUDIT (at ≥ 3) = 100% AUDIT (at ≥ 4) = 98% AUDIT (at ≥	AUDIT (at ≥ 3) = 47% AUDIT (at ≥ 4) = 68% AUDIT (at ≥	AUDIT (at ≥ 3) = 11% AUDIT (at ≥ 4) = 17% AUDIT (at ≥	95%CI in parentheses AUDIT 0.94 (0.91 to 0.96)	AUDIT ≥ 6 AUDIT-C ≥ 5 Five-shot	Strong and significant correlations between self-reported

Cross-sectional diagnostic evaluation, +)		with 10 AUDIT questions and 4 CAGE questions for completion before interview. Participants then interviewed by primary care nurses and Timeline Followback method administered.	during past month)	CAGE questions and Timeline Followback data from 894 women)		questions of AUDIT) AUDIT-PC = 5 items (questions 1, 2, 4, 5 and 10 of AUDIT) Five-shot = 5 items (first 2 questions from AUDIT and last 3 questions from CAGE) AUDIT-QF = 2 items (first 2 questions of AUDIT relating to quantity and frequency of consumption) AUDIT-3 = 1 item (question 3 from AUDIT relating to binge drinking)		consumption = 45 g (SD=67, range 0 to 396 g/wk) ethanol. 55/894 (6.2%) categorised as heavy drinkers.	5) = 93% AUDIT (at ≥ 6) = 87% AUDIT (at ≥ 7) = 75% AUDIT (at ≥ 8) = 64% AUDIT (at ≥ 9) = 53% AUDIT-C (at ≥ 3) = 100% AUDIT-C (at ≥ 4) = 98% AUDIT-C (at ≥ 5) = 84% AUDIT-C (at ≥ 6) = 66% AUDIT-C (at ≥ 7) = 53% Five-shot (at ≥ 1.0) = 100% Five-shot (at ≥ 1.5) = 98% Five-shot (at ≥ 2.0) = 93% Five-shot (at ≥ 2.5) = 62% Five-shot (at ≥ 3.0) = 42% AUDIT-PC (at ≥ 2) = 100% AUDIT-PC (at ≥ 3) = 98% AUDIT-PC (at ≥ 4) = 93% AUDIT-PC (at ≥ 5) = 58% AUDIT-3 (at ≥ 1) = 96% AUDIT-3(at ≥ 2) = 64% AUDIT-3 (at	5) = 81% AUDIT (at ≥ 6) = 88% AUDIT (at ≥ 7) = 91% AUDIT (at ≥ 8) = 95% AUDIT (at ≥ 9) = 96% AUDIT-C (at ≥ 3) = 48% AUDIT-C (at ≥ 4) = 71% AUDIT-C (at ≥ 5) = 88% AUDIT-C (at ≥ 6) = 95% AUDIT-C (at ≥ 7) = 98% Five-shot (at ≥ 1.0) = 25% Five-shot (at ≥ 1.5) = 60% Five-shot (at ≥ 2.0) = 83% Five-shot (at ≥ 2.5) = 91% Five-shot (at ≥ 3.0) = 95% AUDIT-PC (at ≥ 2) = 27% AUDIT-PC (at ≥ 3) = 63% AUDIT-PC (at ≥ 4) = 87% AUDIT-PC (at ≥ 5) = 95% AUDIT-3 (at ≥ 1) = 54% AUDIT-3(at ≥ 2) = 92%	5) = 24% AUDIT (at ≥ 6) = 32% AUDIT (at ≥ 7) = 35% AUDIT (at ≥ 8) = 43% AUDIT (at ≥ 9) = 48% AUDIT-C (at ≥ 3) = 11% AUDIT-C (at ≥ 4) = 18% AUDIT-C (at ≥ 5) = 31% AUDIT-C (at ≥ 6) = 44% AUDIT-C (at ≥ 7) = 60% Five-shot (at ≥ 1.0) = 8% Five-shot (at ≥ 1.5) = 14% Five-shot (at ≥ 2.0) = 27% Five-shot (at ≥ 2.5) = 32% Five-shot (at ≥ 3.0) = 36% AUDIT-PC (at ≥ 2) = 8% AUDIT-PC (at ≥ 3) = 15% AUDIT-PC (at ≥ 4) = 33% AUDIT-PC (at ≥ 5) = 43% AUDIT-3 (at ≥ 1) = 12% AUDIT-3(at ≥ 2) = 34% AUDIT-3 (at	AUDIT-C 0.94 (0.91 to 0.96) Five-shot 0.92 (0.89 to 0.94) AUDIT-PC 0.93 (0.91 to 0.96) AUDIT-3 0.87 (0.82 to 0.92) AUDIT-QF 0.94 (0.91 to 0.97) CAGE 0.70 (0.62 to 0.78)	≥ 2 AUDIT-PC ≥ 4 AUDIT-QF ≥ 4. When using optimal cut-offs, AUDIT-C, Five-shot, AUDIT-PC and AUDIT-QF performed as well as AUDIT.	alcohol consumption and AUDIT (r=0.727, p<0.001), AUDIT-C (r=0.733, p<0.001), Five-shot (r=0.680, p<0.001), AUDIT-PC (r=0.729, p<0.001) and AUDIT-QF (r=0.732, p<0.001). Correlations were weaker between alcohol consumption and AUDIT-3 (r=0.564, p<0.001) and CAGE (r=0.166, p<0.001).

									≥ 3) = 36% AUDIT-QF (at ≥ 3) = 98% AUDIT-QF (at ≥ 4) = 87% AUDIT-QF (at ≥ 5) = 46% CAGE (at ≥ 1) = 58% CAGE (at ≥ 2) = 33% CAGE (at ≥ 3) = 15%	AUDIT-3 (at ≥ 3) = 99% AUDIT-QF (at ≥ 3) = 64% AUDIT-QF (at ≥ 4) = 90% AUDIT-QF (at ≥ 5) = 99% CAGE (at ≥ 1) = 79% CAGE (at ≥ 2) = 94% CAGE (at ≥ 3) = 98%	≥ 3) = 61% AUDIT-QF (at ≥ 3) = 15% AUDIT-QF (at ≥ 4) = 37% AUDIT-QF (at ≥ 5) = 66% CAGE (at ≥ 1) = 15% CAGE (at ≥ 2) = 25% CAGE (at ≥ 3) = 33% *NPV* AUDIT (at ≥ 3) = 100% AUDIT (at ≥ 4) = 100% AUDIT (at ≥ 5) = 99% AUDIT (at ≥ 6) = 99% AUDIT (at ≥ 7) = 98% AUDIT (at ≥ 8) = 98% AUDIT (at ≥ 9) = 97% AUDIT-C (at ≥ 3) = 100% AUDIT-C (at ≥ 4) = 100% AUDIT-C (at ≥ 5) = 100% AUDIT-C (at ≥ 6) = 98% AUDIT-C (at ≥ 7) = 97% Five-shot (at ≥ 1.0) = 100% Five-shot (at ≥ 1.5) = 100%			

											Five-shot (at ≥ 2.0) = 99% Five-shot (at ≥ 2.5) = 97% Five-shot (at ≥ 3.0) = 96% AUDIT-PC (at ≥ 2) = 100% AUDIT-PC (at ≥ 3) = 100% AUDIT-PC (at ≥ 4) = 100% AUDIT-PC (at ≥ 5) = 97% AUDIT-3 (at ≥ 1) = 97% AUDIT-3(at ≥ 2) = 98% AUDIT-3 (at ≥ 3) = 96% AUDIT-QF (at ≥ 3) = 100% AUDIT-QF (at ≥ 4) = 99% AUDIT-QF (at ≥ 5) = 97% CAGE (at ≥ 1) = 100% CAGE (at ≥ 2) = 96% CAGE (at ≥ 3) = 95%			
AUDIT and others Aertgeerts *et al.*, 2001 Cross-sectional diagnostic evaluation, ++	Questionnaire and laboratory markers	Patients self-completed questionnaire including Composite International Diagnostic Interview, CAGE and AUDIT.	Alcohol abuse or dependence	N=1992 Patients aged 18 yrs and over (mean age of males = 54 yrs, mean age of females = 48 yrs Data	Primary care, Belgium	AUDIT=10 items CAGE=4 items AUDIT-PC= 5 items Five-shot = 5 items AUDIT-C = 3 items	n/r	Composite International Diagnostic Interview to categorise patients as 'alcohol dependent', 'alcohol abusing' or 'normal'	**Males** AUDIT (≥ 5) = 82.6% AUDIT (≥ 6) = 74.2% AUDIT (≥ 7) = 67.4% AUDIT (≥ 8) = 60.6%	**Males** AUDIT (≥ 5) = 72.9% AUDIT (≥ 6) = 81.4% AUDIT (≥ 7) = 85.7% AUDIT (≥ 8) = 90.3%	***PPV*** **Males** AUDIT (≥ 5) = 32.4% AUDIT (≥ 6) = 38.6% AUDIT (≥ 7) =42.6% AUDIT (≥ 8) = 49.7%	**Males:** AUDIT 0.85 (no statistics reported) AUDIT-C 0.83 (no statistics reported) Five-shot	n/r	n/r

				reported separately for males (n=971) and females (n=1021).		GGT ≥ 50 units/l (males) and ≥ 32 units/l (females) MCV ≥ 96 fl %CDT		according to DSM-III-R criteria. Past yr prevalence of abuse or dependence = 8.9% (178/1992).	AUDIT-C (≥ 5) = 78.0% AUDIT-C (≥ 6) = 66.7% AUDIT-C (≥ 8) = 48.5% AUDIT-PC (≥ 5) = 68.2% AUDIT-PC (≥ 6) = 58.3% AUDIT-PC (≥ 7) = 45.5% AUDIT-PC (≥ 8) = 37.9% Five-shot (≥ 1.5) = 93.2% Five-shot (≥ 2.0) = 86.4% Five-shot (≥ 2.5) = 74.2% Five-shot (≥ 3.0) = 62.1% CAGE (≥ 1) = 62.1% CAGE (≥ 2) = 47.7% MCV = 39.4% GGT = 6.8% %CDT = 18.2% **Females** AUDIT (≥ 5) = 65.2% AUDIT (≥ 6) = 58.7% AUDIT (≥ 7) = 56.5% AUDIT (≥ 8) = 50.0%	AUDIT-C (≥ 5) = 74.9% AUDIT-C (≥ 6) = 84.3% AUDIT-C (≥ 8) 94.3% AUDIT-PC (≥ 5) 83.9% AUDIT-PC (≥ 6) = 91.5% AUDIT-PC (≥ 7) = 95.7% AUDIT-PC (≥ 8) = 97.5% Five-shot (≥ 1.5) = 50.2% Five-shot (≥ 2.0) = 63.6% Five-shot (≥ 2.5) = 80.9% Five-shot (≥ 3.0) = 88.3% CAGE (≥ 1) = 81.2% CAGE (≥ 2) = 92.3% MCV = 39.4% GGT = 95.5% %CDT = 95.6% **Females** AUDIT (≥ 5) = 91.9% AUDIT (≥ 6) = 95.9% AUDIT (≥ 7) = 97.6% AUDIT (≥ 8) = 98.7%	AUDIT-C (≥ 5) = 32.8% AUDIT-C (≥ 6) = 40.0% AUDIT-C (≥ 8) = 57.1% AUDIT-PC (≥ 5) = 40.0% AUDIT-PC (≥ 6) = 52.0% AUDIT-PC (≥ 7) = 62.5% AUDIT-PC (≥ 8) = 70.4% Five-shot (≥ 1.5) = 22.7% Five-shot (≥ 2.0) = 27.2% Five-shot (≥ 2.5) = 38.0% Five-shot (≥ 3.0) = 45.6% CAGE (≥ 1) = 34.2% CAGE (≥ 2) = 49.2% MCV = 19.9% GGT = 19.1% %CDT = 39.0% **Females** AUDIT (≥ 5) = 27.5% AUDIT (≥ 6) = 40.3% AUDIT (≥ 7) = 53.1% AUDIT (≥ 8) = 63.9% AUDIT-C (≥ 5) = 25.8% AUDIT-C (≥	0.84 (no statistics reported) AUDIT-PC 0.83 (no statistics reported) CAGE 0.74 (0.71 to 0.77) Laboratory tests 0.57 to 0.66 (CDT) **Females:** AUDIT 0.87 (0.85 to 0.89) AUDIT-C 0.82 (0.80 to 0.85) Five-shot 0.88 (0.86 to 0.90)		

									AUDIT-C (≥ 5) = 50.0% AUDIT-C (≥ 6) = 39.1% AUDIT-C (≥ 7) = 28.3% AUDIT-C (≥ 8) = 21.7% AUDIT-PC (≥ 5) = 56.4% AUDIT-PC (≥ 6) = 41.3% AUDIT-PC (≥ 7) = 30.4% AUDIT-PC (≥ 8) = 19.6% Five-shot (≥ 1.5) = 80.4% Five-shot (≥ 2.0) = 67.4% Five-shot (≥ 2.5) = 63.0% Five-shot (≥ 3.0) = 37.0% CAGE (≥ 1) = 54.3% CAGE (≥ 2) = 37% MCV = 41.3% GGT = 6.5% %CDT = 15.2%	AUDIT-C (≥ 5) = 93.2% AUDIT-C (≥ 6) = 97.3% AUDIT-C (≥ 7) = 99.0% AUDIT-C (≥ 8) = 99.6% AUDIT-PC (≥ 5) = 95.7% AUDIT-PC (≥ 6) = 98.8% AUDIT-PC (≥ 7) = 99.1% AUDIT-PC (≥ 8) = 99.5% Five-shot (≥ 1.5) = 73.4% Five-shot (≥ 2.0) = 87.4% Five-shot (≥ 2.5) = 94.7% Five-shot (≥ 3.0) = 97.3% CAGE (≥ 1) = 92.1% CAGE (≥ 2) = 96.8% MCV = 79.3% GGT = 91.8% %CDT = 95.5%	6) = 40.9% AUDIT-C (≥ 7) = 56.5% AUDIT-C (≥ 8) = 71.4% AUDIT-PC (≥ 5) = 38.2% AUDIT-PC (≥ 6) = 61.3% AUDIT-PC (≥ 7) = 60.9% AUDIT-PC (≥ 8) = 64.3% Five-shot (≥ 1.5) = 12.5% Five-shot (≥ 2.0) = 20.1% Five-shot (≥ 2.5) = 35.8% Five-shot (≥ 3.0) = 39.5% CAGE (≥ 1) = 24.5% CAGE (≥ 2) = 35.4% MCV = 8.6% GGT = 3.6% %CDT = 14.0% ***NPV*** **Males** AUDIT (≥ 5) = 96.4% AUDIT (≥ 6) = 95.3% AUDIT (≥ 7) = 94.4% AUDIT (≥ 8) = 93.6% AUDIT-C (≥ 5) = 95.6% AUDIT-C (≥ 6) = 94.1%	CAGE 0.76 (0.73 to 0.79) AuROC values and statistics reported where available		

											AUDIT-C (≥ 8) = 92.1% AUDIT-PC (≥ 5) = 94.4% AUDIT-PC (≥ 6) = 93.3% AUDIT-PC (≥ 7) = 91.8% AUDIT-PC (≥ 8) = 90.9% Five-shot (≥ 1.5) = 97.9% Five-shot (≥ 2.0) = 96.7% Five-shot (≥ 2.5) = 95.2% Five-shot (≥ 3.0) = 93.7% CAGE (≥ 1) = 93.2% CAGE (≥ 2) = 91.8% MCV = 88.7% GGT = 86.7% %CDT = 88.0% **Females** AUDIT (≥ 5) = 98.2% AUDIT (≥ 6) = 98.0% AUDIT (≥ 7) = 97.9% AUDIT (≥ 8) = 97.7% AUDIT-C (≥ 5) = 97.5% AUDIT-C (≥ 6) = 97.1% AUDIT-C (≥ 7) = 96.7% AUDIT-C (≥			

											8) = 96.4% AUDIT-PC (≥ 5) = 97.9% AUDIT-PC (≥ 6) = 97.3% AUDIT-PC (≥ 7) = 96.8% AUDIT-PC (≥ 8) = 96.3% Five-shot (≥ 1.5) = 98.8% Five-shot (≥ 2.0) = 98.3% Five-shot (≥ 2.5) = 98.2% Five-shot (≥ 3.0) = 97.0% CAGE (≥ 1) = 97.7% CAGE (≥ 2) = 97% MCV = 96.6% GGT = 95.4% %CDT = 96.0%			
AUDIT **AUDIT-C** **AUDIT Question 3** **Augmented version of CAGE (including quantity and frequency questions and a question about episodic heavy drinking)** **CAGE**	Questionnaires	Patients completed written questionnaires before appointments and in-person interviews with non-clinician interviewers after appointments. Interviewers did not score questionnaires during interviews.	Alcohol misuse in the past year (defined as DSM alcohol use disorder and/or drinking above recommended limits in the past year) and alcohol use disorders in the past year	Primary care outpatients aged over 18 yrs of White, African American or Hispanic origin (n=1319; 393 male, 927 female) Mean age 46 yrs for males and 42 yrs for females. White: 41.6%	Primary care academic practice in Texas, USA	AUDIT=10 items AUDIT-C = 3 items AUDIT-3 = 1 item Augmented CAGE n/r	n/r	Alcohol misuse diagnosed according to DSM-IV criteria and/or drinking above recommended limits in the past yr. Risky drinking defined as drinking above NIAAA recommended limits (>14	***<u>Alcohol Misuse in the Past Yr</u>*** **Males** AUDIT-C (≥ 2) = 98% AUDIT-C (≥ 3) = 92% AUDIT-C (≥ 4) = 86% AUDIT-C (≥ 5) = 72% AUDIT-C (≥ 6) = 52% AUDIT (≥ 2) = 98% AUDIT (≥ 3)	***<u>Alcohol Misuse in the Past Yr</u>*** **Males** AUDIT-C (≥ 2) = 63% AUDIT-C (≥ 3) = 79% AUDIT-C (≥ 4) = 89% AUDIT-C (≥ 5) = 96% AUDIT-C (≥ 6) = 97% AUDIT (≥ 2) = 53% AUDIT (≥ 3)	n/r	***<u>Alcohol misuse in the past yr</u>*** **Males** AUDIT-C 0.94 (0.91 to 0.96) AUDIT 0.92 (0.90 to 0.95) Augmented CAGE 0.78 (0.73 to 0.83) **Females** AUDIT-C 0.90 (0.87 to 0.93) AUDIT (0.90	Cut-off scores for optimal screening properties higher for alcohol use disorders than both risky drinking and/or alcohol use disorders (past yr alcohol misuse)	n/r

Bradley *et al*., 2007 Cross-sectional diagnostic evaluation, ++				(males), 36.6% females; African American: 31.9% (males), 35.8% (females); Hispanic: 25.0% (males), 25.4% females; mixed: 1.5% (males), 2.3% (females)				drinks/wk and/or 5 or more drinks on any single occasion for men; >7 drinks/wk and/or 4 or more drinks on any single occasions for women. DSM-IV alcohol use disorder (abuse or dependence) classed as chronic maladaptive pattern of use resulting in clinically significant impairment or distress. Alcohol misuse classed as presence of risky drinking or alcohol use disorder in the past yr. Alcohol misuse in 128 men (33%) and 177 (19%). DSM-IV abuse or dependence in 66 (17%) men and 83 (9%) women.	= 96% AUDIT (≥ 4) = 91% AUDIT (≥ 5) = 81% AUDIT (≥ 6) = 69% AUDIT (≥ 7) = 61% AUDIT (≥ 8) = 54% Augmented CAGE (≥ 1) = 87% Augmented CAGE (≥ 2) = 63% Augmented CAGE (≥ 3) = 40% **Females** AUDIT-C (≥ 2) = 89% AUDIT-C (≥ 3) = 73% AUDIT-C (≥ 4) = 57% AUDIT-C (≥ 5) = 36% AUDIT-C (≥ 6) = 23% AUDIT (≥ 2) = 92% AUDIT (≥ 3) = 79% AUDIT (≥ 4) = 65% AUDIT (≥ 5) = 53% AUDIT (≥ 6) = 42% AUDIT (≥ 7) = 34% AUDIT (≥ 8) = 27% Augmented CAGE (≥ 1) = 62% Augmented CAGE (≥ 2)	= 71% AUDIT (≥ 4) = 80% AUDIT (≥ 5) = 90% AUDIT (≥ 6) = 92% AUDIT (≥ 7) = 93% AUDIT (≥ 8) = 95% Augmented CAGE (≥ 1) = 61% Augmented CAGE (≥ 2) = 78% Augmented CAGE (≥ 3) = 88% **Females** AUDIT-C (≥ 2) = 78% AUDIT-C (≥ 3) = 91% AUDIT-C (≥ 4) = 96% AUDIT-C (≥ 5) = 98% AUDIT-C (≥ 6) = 99% AUDIT (≥ 2) = 74% AUDIT (≥ 3) = 87% AUDIT (≥ 4) = 93% AUDIT (≥ 5) = 95% AUDIT (≥ 6) = 97% AUDIT (≥ 7) = 98% AUDIT (≥ 8) = 98% Augmented CAGE (≥ 1) = 81% Augmented CAGE (≥ 2)		(0.87 to 0.92) Augmented CAGE 0.73 (0.69 to 0.78) ***<u>Alcohol use disorders in the past yr</u>*** **Males** AUDIT-C 0.89 (0.86 to 0.93) AUDIT 0.91 (0.88 to 0.94) Augmented CAGE 0.82 (0.77 to 0.87) CAGE 0.73 (0.66 to 0.79) **Females** AUDIT-C 0.91 (0.88 to 0.94) AUDIT 0.94 (0.91 to 0.96) Augmented CAGE 0.84 (0.79 to 0.89) CAGE 0.77 (0.71 to 0.83)		

									= 40% Augmented CAGE (≥ 3) = 22% ***DSM-IV alcohol use disorders in the past year*** **Males** AUDIT-C (≥ 2) = 100% AUDIT-C (≥ 3) = 96% AUDIT-C (≥ 4) = 88% AUDIT-C (≥ 5) = 79% AUDIT-C (≥ 6) = 59% AUDIT (≥ 2) = 100% AUDIT (≥ 3) = 98% AUDIT (≥ 4) = 94% AUDIT (≥ 5) = 89% AUDIT (≥ 6) = 82% AUDIT (≥ 7) = 79% AUDIT (≥ 8) = 68% Augmented CAGE (≥ 1) = 95% Augmented CAGE (≥ 2) = 76% Augmented CAGE (≥ 3) = 55% CAGE (≥ 1) = 82% CAGE (≥ 2) = 55%	= 92% Augmented CAGE (≥ 3) = 96% ***DSM-IV alcohol use disorders in the past year*** **Males** AUDIT-C (≥ 2) = 52% AUDIT-C (≥ 3) = 66% AUDIT-C (≥ 4) = 75% AUDIT-C (≥ 5) = 84% AUDIT-C (≥ 6) = 89% AUDIT (≥ 2) = 44% AUDIT (≥ 3) = 59% AUDIT (≥ 4) = 67% AUDIT (≥ 5) = 78% AUDIT (≥ 6) = 83% AUDIT (≥ 7) = 87% AUDIT (≥ 8) = 88% Augmented CAGE (≥ 1) = 53% Augmented CAGE (≥ 2) = 73% Augmented CAGE (≥ 3) = 86% CAGE (≥ 1) = 60% CAGE (≥ 2) = 79%				

									Females AUDIT-C (≥ 2) = 94% AUDIT-C (≥ 3) = 87% AUDIT-C (≥ 4) = 71% AUDIT-C (≥ 5) = 49% AUDIT-C (≥ 6) = 33% AUDIT (≥ 2) = 98% AUDIT (≥ 3) = 94% AUDIT (≥ 4) = 82% AUDIT (≥ 5) = 75% AUDIT (≥ 6) = 61% AUDIT (≥ 7) = 55% AUDIT (≥ 8) = 45% Augmented CAGE (≥ 1) = 82% Augmented CAGE (≥ 2) = 65% Augmented CAGE (≥ 3) = 37% CAGE (≥ 1) = 69% CAGE (≥ 2) = 43%	**Females** AUDIT-C (≥ 2) = 71% AUDIT-C (≥ 3) = 85% AUDIT-C (≥ 4) = 92% AUDIT-C (≥ 5) = 96% AUDIT-C (≥ 6) = 98% AUDIT (≥ 2) = 67% AUDIT (≥ 3) = 81% AUDIT (≥ 4) = 88% AUDIT (≥ 5) = 92% AUDIT (≥ 6) = 95% AUDIT (≥ 7) = 96% AUDIT (≥ 8) = 97% Augmented CAGE (≥ 1) = 78% Augmented CAGE (≥ 2) = 91% Augmented CAGE (≥ 3) = 96% CAGE (≥ 1) = 83% CAGE (≥ 2) = 93%				
AUDIT and others Coulton *et al*., 2006	Questionnaires and laboratory markers	Research nurses asked patients to complete AUDIT	Alcohol use disorders	Male general practice patients aged 18 yrs	6 general practices, South Wales, UK	AUDIT=10 items	n/r	Hazardous and binge drinking assessed by Timeline	**Hazardous alcohol use** AUDIT (≥ 8) = 69% (57 to 81)	**Hazardous alcohol use** AUDIT (≥ 8) = 98% (97 to 100)	***PPV*** **Hazardous alcohol use** AUDIT (≥ 8) = 95% (91 to	**Hazardous alcohol use** AUDIT (≥ 8) = 0.94 GGT (≥ 55	n/r	Significant correlation between alcohol consumption

Cross-sectional diagnostic evaluation, ++		embedded in general lifestyle questionnaire whilst awaiting appointments. Patients interviewed by researcher to determine alcohol consumption using Timeline Followback method.		and over (n=194). Average age 46.2 yrs (range 18.1 to 80.9 yrs).				Follow Back procedure to assess number of weeks in previous 180 days that patient exceeded over 21 Units in any one week and binge frequency (over 8 Units in any one day) (inclusive of both harmful consumption and dependence). Dependence classed using DSM-IV criteria by researcher.	GGT (≥ 55 IU/l) = 37% (26 to 47) %CDT (>2.5%) = 47% (36 to 58) MCV (≥ 95 fl) = 32% (21 to 43) **Monthly binge consumption** AUDIT (≥ 8) = 66% (54 to 78) GGT (≥ 55 IU/l) = 42% (31 to 54) %CDT (>2.5%) = 59% (48 to 71) MCV (≥ 95 fl) = 36% (24 to 47) **Weekly binge consumption** AUDIT (≥ 8) = 75% (61 to 90) GGT (≥ 55 IU/l) = 44% (32 to 57) %CDT (>2.5%) = 61% (49 to 74) MCV (≥ 95 fl) = 31% (19 to 43) **Alcohol dependence** AUDIT (≥ 8) = 84% (66 to 100)	GGT (≥ 55 IU/l) = 72% (62 to 83) %CDT (>2.5%) = 71% (60 to 82) MCV (≥ 95 fl) = 71% (60 to 82) **Monthly binge consumption** AUDIT (≥ 8) = 97% (95 to 99) GGT (≥ 55 IU/l) = 76% (65 to 86) %CDT (>2.5%) = 76% (66 to 86) MCV (≥ 95 fl) = 71% (60 to 82) **Weekly binge consumption** AUDIT (≥ 8) = 90% (88 to 93) GGT (≥ 55 IU/l) = 74% (64 to 83) %CDT (>2.5%) = 76% (66 to 86) MCV (≥ 95 fl) = 71% (60 to 82) **Alcohol dependence** AUDIT (≥ 8) = 83% (81 to 86)	99) GGT (≥ 55 IU/l) = 41% (28 to 54) %CDT (>2.5%) = 46% (34 to 58) MCV (≥ 95 fl) = 36% (23 to 50) **Monthly binge consumption** AUDIT (≥ 8) = 91% (86 to 97) GGT (≥ 55 IU/l) = 49% (34 to 63) %CDT (>2.5%) = 57% (44 to 71) MCV (≥ 95 fl) =40% (26 to 54) **Weekly binge consumption** AUDIT (≥ 8) = 71% (63 to 80) GGT (≥ 55 IU/l) =35% (22 to 47) %CDT (>2.5%) = 41% (29 to 53) MCV (≥ 95 fl) = 24% (14 to 35) **Alcohol dependence** AUDIT (≥ 8) = 41% (32 to 50)	IU/l) = 0.64 %CDT (>2.5%) = 0.68 MCV (≥ 95 fl) = 0.62 **Monthly binge consumption** AUDIT (≥ 8) = 0.96 GGT (≥ 55 IU/l) = 0.62 %CDT (>2.5%) = 0.73 MCV (≥ 95 fl) = 0.64 **Weekly binge consumption** AUDIT (≥ 8) = 0.94 GGT (≥ 55 IU/l) = 0.62 %CDT (>2.5%) = 0.72 MCV (≥ 95 fl) = 0.59 **Alcohol dependence** AUDIT (≥ 8) = 0.94		and AUDIT score (r=0.74) and measures of GGT (r=0.20) and %CDT (r=0.36).

									GGT (≥ 55 IU/l) = 32% (18 to 45) %CDT (>2.5%) = 57% (41 to 73) MCV (≥ 95 fl) = 28% (15 to 41)	GGT (≥ 55 IU/l) = 69% (61 to 78) %CDT (>2.5%) = MCV (≥ 95 fl) = 70% (61 to 79)	GGT (≥ 55 IU/l) = 13% (7 to 18) %CDT (>2.5%) = 20 (12 to 28) MCV (≥ 95 fl) = 11% (6 to 17) ***<u>NPV</u>*** **Hazardous alcohol use** AUDIT (≥ 8) = 86% (78 to 94) GGT (≥ 55 IU/l) = 69% (61 to 77) %CDT (>2.5%) = 72% (64 to 80) MCV (≥ 95 fl) = 67% (59 to 74) **Monthly binge consumption** AUDIT (≥ 8) = 84% (76 to 92) GGT (≥ 55 IU/l) = 71% (63 to 78) %CDT (>2.5%) = 78% (70 to 85) MCV (≥ 95 fl) = 67% (59 to 75) **Weekly binge consumption** AUDIT (≥ 8) = 92% (86 to 98) GGT (≥ 55 IU/l) = 81% (75 to 86) %CDT (>2.5%) = 85% (80 to	GGT (≥ 55 IU/l) = 0.59 %CDT (>2.5%) = 0.70 MCV (≥ 95 fl) = 0.57		

											91) MCV (≥ 95 fl) = 76% (69 to 82) **Alcohol dependence** AUDIT (≥ 8) = 97% (94 to 100) GGT (≥ 55 IU/l) = 88% (83 to 93) %CDT (>2.5%) = 92% (88 to 96) MCV (≥ 95 fl) = 87% (83 to 93)				
AUDIT-C and CAGE Frank *et al.*, 2008 Cross-sectional diagnostic evaluation, ++	Questionnaires	Patients completed comparison standard interviews and screening questionnaires administered by non-clinician interviewer after appointments	Alcohol misuse (risky drinking and alcohol use disorders)	White (W) (females n=339, males n=163), African American (AA) (females n=332, males n=125) and Hispanic (H) (females n=235, males, n=98) adult primary care patients (n=1292) aged 18 yrs and above, mean age 43 yrs, 70% female	Primary care, USA	AUDIT-C = 3 items CAGE = 4 items	n/r	Alcohol misuse (risky drinking and alcohol abuse) defined according to criteria for DSM-IV alcohol use disorder or risky drinking. Risky drinking defined as drinking above recommended limits according to the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Risky drinking was defined as	***Risky drinking and alcohol use disorders (alcohol misuse)*** **AUDIT-C** **Females (≥3)** AA= 67% W= 70% H= 85% **Males (≥4)** AA= 76% W= 95% H= 85% ***Alcohol abuse or dependence in past yr*** **AUDIT-C** **Females (≥3)**	***Risky drinking and alcohol use disorders (alcohol misuse)*** **AUDIT-C** **Females (≥3)** AA= 92% W= 91% H= 88% **Males (≥4)** AA= 93% W= 89% H= 84% ***Alcohol abuse or dependence in past yr*** **AUDIT-C** **Females (≥3)**	n/r	***Risky drinking and alcohol use disorders (alcohol misuse)*** **AUDIT-C** **Females** AA= 0.90 (0.85 to 0.95) W= 0.86 (0.81 to 0.92) H= 0.93 (0.89 to 0.97) **Males** AA= 0.95 (0.92 to 0.99) W= 0.95 (0.92 to 0.98) H= 0.91 (0.85 to 0.97) ***Alcohol abuse or dependence in past yr*** **AUDIT-C** **Females**	**n/r**	n/r

								drinking greater than 7 drinks a week or 4 or more drinks on any single occasion (women) and greater than 14 drinks a week or 5 or more drinks in any single occasion (men). The alcohol problems module of the Alcohol Use Disorder and Associated Disabilities Interview Schedule was used to identify DSM-IV alcohol use disorders. Interviews were administered to all participants, with the exception of those who reported drinking less than 12 drinks ever during their lives. AUDIT-C was compared with a reference standard of alcohol misuse (alcohol use disorders and risky	AA= 88% H= 91% W= 87% **Males (≥4)** AA= 65% H= 100% W= 96% **<u>CAGE</u>** **Females (≥2)** AA= 69% H= 23% W= 45% **Males (≥2)** AA= 47% H= 41% W= 72%	AA= 89% H= 77% W= 86% **Males (≥4)** AA= 83% H= 72% W= 70% **<u>CAGE</u>** **Females (≥2)** AA= 94% H= 96% W= 90% **Males (≥2)** AA= 74% H= 88% W=77%		AA= 0.94 (0.90 to 0.99) H= 0.90 (0.84 to 0.95) W= 0.90 (0.84 to 0.96) **Males** AA= 0.87 (0.81 to 0.94) H= 0.90 (0.84 to 0.96) W= 0.91 (0.86 to 0.96) **<u>CAGE</u>** **Females** AA= 0.88 (0.81 to 0.95) H= 0.69 (0.58 to 0.80) W= 0.77 (0.68 to 0.85) **Males** AA= 0.67 (0.52 to 0.81) H= 0.74 (0.63 to 0.85) W= 0.79 (0.71 to 0.87)		

								drinking) as well as alcohol use disorders alone. CAGE was compared only with a reference standard of alcohol use disorders.						
AUDIT and others Reinert & Allen, 2007 Literature review	Questionnaires FAST 4-item scale, derived from items 3, 5, 8 and 10 from AUDIT. Item 3 is performed first and classifies over half of respondents into either hazardous or non-hazardous groups. Those not classified at first stage are asked items 5, 8 and 10, whereby response other than 'never' to any item classifies subject as hazardous drinker (Raistrick *et al.*, 2006). FAST is scored dichotomously, either positive or negative (Reinert & Allen, 2007) AUDIT used at cut-off of ≥ 8 *FAST data*	Delivery unclear in Hodgson *et al.*, 2002. A&E sample may have completed in waiting room. Questionnaires administered by triage nurses in Hodgson *et al.*, 2003	Alcohol misuse	Males and females (Hodgson *et al.*, 2002; 2003)	UK Fracture clinic Primary care Dental hospital A&E (Hodgson *et al.*, 2002) A&E only (Hodgson *et al.*, 2003)	AUDIT=10 items FAST=4 items	FAST 12.52 s (SD=14.2) CAGE 14.37 s (SD=7.2) AUDIT 78 s (SD=35.5) (Hodgson *et al.*, 2003)	AUDIT used at cut-off of ≥ 8 as reference standard (intoxicated patients excluded by Hodgson *et al.*, 2003).	FAST 66% of A&E patients categorised as hazardous or non-hazardous drinkers using Question 3 of AUDIT ('how often do you have 6 or more drinks on one occasion?') (score of 3 or 4) (Hodgson *et al.*, 2002). FAST (≥1 as stated by Reinert & Allen, 2007) 94% in fracture clinic (for detection of hazardous drinking) (n=100, 57% male, 60% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST (≥1) 91% in primary care (for detection of hazardous	FAST 89% (≥1) in fracture clinic (for detection of hazardous drinking) Hodgson *et al.*, 2002) FAST (≥1) 95% in primary care (for detection of hazardous	n/r	n/r	n/r	n/r

	only presented in table								drinking) (n=100, 40% male, 74% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST (≥1) 97% in dental hospital (for detection of hazardous drinking) (n=102, 59% male, 58% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST (≥1) 94% in A&E (for detection of hazardous drinking) (n=100, 52% male, 76% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST (≥1) 93% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003)	drinking) (Hodgson *et al.*, 2002) FAST (≥1) 91% in dental hospital (for detection of hazardous drinking) (Hodgson *et al.*, 2002) FAST (≥1) 86% in A&E (for detection of hazardous drinking) (Hodgson *et al.*, 2002) FAST (≥1) 88% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003)				

									CAGE 40% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003	CAGE 98% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003)				
Five-shot CAGE Seppä *et al.*, 1998 Cross-sectional diagnostic evaluation, +	Questionnaires Five-shot comprised of 2 questions from AUDIT (relating to consumption) and 3 from CAGE (equivalent to Q2, 3 and 4).	Self-completed questionnaires during interview with nurse	Heavy drinking	40 yr old males	Primary care, Tampere, Finland	Five-shot=5 items	n/r	Self-estimated mean weekly alcohol consumption Moderate drinking = 557 subjects drinking <140 g/wk absolute alcohol Heavy drinking= 70 subjects consuming 280 g/wk or more.	Five-shot (≥ 1.0) 100% Five-shot (≥ 1.5) 100% Five-shot (≥ 2.0) 47% Five-shot (≥ 2.5) 96% Five-shot (≥ 3.0) 77% Five-shot (≥ 3.5) 70% Five-shot (≥ 4.0) 56% Five-shot (≥ 4.5) 41% Five-shot (≥ 5.0) 29% No acceptable effectiveness found for CAGE (≥ 2 = 47%)	Five-shot (≥ 1.0) 10% Five-shot (≥ 1.5) 28% Five-shot (≥ 2.0) 87% Five-shot (≥ 2.5) 76% Five-shot (≥ 3.0) 83% Five-shot (≥ 3.5) 89% Five-shot (≥ 4.0) 94% Five-shot (≥ 4.5) 96% Five-shot (≥ 5.0) 98% No acceptable effectiveness found for CAGE (≥ 2 = 87%)	n/r	n/r	n/r	Validity measures of Five-shot and CAGE (self-reported alcohol consumption as gold standard) Five-shot (≥ 2.5) 96% sensitivity, 76% specificity Five-shot (≥ 3.0) 77% sensitivity, 83% specificity (p<0.001) CAGE 47% sensitivity, 87% specificity (p<0.001)
AUDIT **AUDIT-C** **AUDIT-3** Tuunanen *et al.*, 2007	Questionnaire	Self-completion and discussion with nurse	Binge drinking Patients categorised as follows: a) non-	45 yr old male primary care patients. Self-reported drinking	Primary care, Tampere, Finland	AUDIT=10 items AUDIT-3=item ADIT-3=1	n/r	Self-reported alcohol consumption	*BMD* AUDIT 84% (≥ 6) AUDIT 73% (≥ 7) AUDIT 60% (≥ 8)	*BMD* AUDIT 66% (≥ 6) AUDIT 76% (≥ 7) AUDIT 81% (≥ 8)	*BMD* *PPV* AUDIT 68% (≥ 6) AUDIT 72% (≥ 7) AUDIT 74%	All risky drinkers AUDIT AuROC among all risky drinkers (BMD, BHD,	AUDIT ≥ 7 or ≥ 8 AUDIT-C ≥ 6 AUDIT-3	n/r

Cross-sectional diagnostic evaluation, ++			binging moderate drinkers (N-BMD) (n=352, 63.5%) (those who drank less than 280g absolute alcohol per week and those who binged (drank 6 or more drinks at one sitting) less than once a week. b) binging moderate drinkers (BMD) (n=130, 23.5%) (who drank less than 280 g absolute alcohol per week and who binged (drank 6 or more drinks in 1 sitting) at least once a week) c) non-binging heavy drinkers (N-BHD) (n=10, 1.6%) (who drank at least 280 g absolute alcohol per week and who binged (drank 6 or more drinks in 1 sitting) less than once a week) d) binging	behaviour available for 555 subjects.		item			AUDIT 53% (≥ 9) AUDIT 44% (≥ 10) AUDIT 36% (≥ 11) AUDIT-C 87% (≥ 5) AUDIT-C 70% (≥ 6) AUDIT-C 47% (≥ 7) AUDIT-3 98% (≥ 1) AUDIT-3 70% (≥ 2) AUDIT-3 31% (≥ 3) *BHD* AUDIT 83% (≥ 6) AUDIT 72% (≥ 7) AUDIT 65% (≥ 8) AUDIT 61% (≥ 9) AUDIT 52% (≥ 10) AUDIT 46% (≥ 11) AUDIT-C 83% (≥ 5) AUDIT-C 72% (≥ 6) AUDIT-C 54% (≥ 7) AUDIT-3 97% (≥ 1) AUDIT-3 72% (≥ 2) AUDIT-3 40% (≥ 3) *All risky*	AUDIT 87% (≥ 9) AUDIT 91% (≥ 10) AUDIT 94% (≥ 11) AUDIT-C 61% (≥ 5) AUDIT-C 77% (≥ 6) AUDIT-C 92% (≥ 7) AUDIT-3 16% (≥ 1) AUDIT-3 73% (≥ 2) AUDIT-3 94% (≥ 3) *BHD* AUDIT 66% (≥ 6) AUDIT 76% (≥ 7) AUDIT 81% (≥ 8) AUDIT 87% (≥ 9) AUDIT 91% (≥ 10) AUDIT 94% (≥ 11) AUDIT-C 61% (≥ 5) AUDIT-C 77% (≥ 6) AUDIT-C 92% (≥ 7) AUDIT-3 16% (≥ 1) AUDIT-3 73% (≥ 2) AUDIT-3 94% (≥ 3) *All risky*	(≥ 8) AUDIT 78% (≥ 9) AUDIT 82% (≥ 10) AUDIT 83% (≥ 11) AUDIT-C 66% (≥ 5) AUDIT-C 73% (≥ 6) AUDIT-C 83% (≥ 7) AUDIT-3 50% (≥ 1) AUDIT-3 69% (≥ 2) AUDIT-3 81% (≥ 3) *NPV* AUDIT 82% (≥ 6) AUDIT 76% (≥ 7) AUDIT 70% (≥ 8) AUDIT 68% (≥ 9) AUDIT 65% (≥ 10) AUDIT 63% (≥ 11) AUDIT-C 84% (≥ 5) AUDIT-C 75% (≥ 6) AUDIT-C 66% (≥ 7) AUDIT-3 91% (≥ 1) AUDIT-3 74% (≥ 2) AUDIT-3 61% (≥ 3) ***BHD*** *PPV* AUDIT 60%	N-BHD) 0.824 (95%CI 0.789 to 0.859) AUDIT-C AuROC among all risky drinkers (BMD, BHD, N-BHD) 0.829 (95%CI 0.795 to 0.854) AUDIT-3 AuROC among all risky drinkers (BMD, BHD, N-BHD) 0.756 (95%CI 0.712 to 0.800) BMD AUDIT AuROC 0.809 (95%CI 0.769 to 0.848) AUDIT-C AuROC 0.816 (95%CI 0.777 to 0.854) AUDIT-3 AuROC 0.756 (95%CI 0.712 to 0.800) BHD AUDIT AuROC 0.814 (95%CI 0.770 to 0.859) AUDIT-C AuROC	≥ 2	

			heavy drinkers (BHD) (n=63) (who drank at least 280 g absolute alcohol per week and who binged (drank 6 or more drinks in 1 sitting) at least once a week)						*drinkers (BMD, N-BHD, BHD)* AUDIT 87% (≥ 6) AUDIT 76% (≥ 7) AUDIT 65% (≥ 8) AUDIT 59% (≥ 9) AUDIT 51% (≥ 10) AUDIT 45% (≥ 11) AUDIT-C 89% (≥ 5) AUDIT-C 75% (≥ 6) AUDIT-C 55% (≥ 7) AUDIT-3 99% (≥ 1) AUDIT-3 76% (≥ 2) AUDIT-3 42% (≥ 3)	*drinkers (BMD, N-BHD, BHD)* AUDIT 64% (≥ 6) AUDIT 74% (≥ 7) AUDIT 81% (≥ 8) AUDIT 86% (≥ 9) AUDIT 89% (≥ 10) AUDIT 92% (≥ 11) AUDIT-C 59% (≥ 5) AUDIT-C 75% (≥ 6) AUDIT-C 90% (≥ 7) AUDIT-3 16% (≥ 1) AUDIT-3 71% (≥ 2) AUDIT-3 93% (≥ 3)	(≥ 6) AUDIT 64% (≥ 7) AUDIT 68% (≥ 8) AUDIT 75% (≥ 9) AUDIT 79% (≥ 10) AUDIT 81% (≥ 11) AUDIT-C 57% (≥ 5) AUDIT-C 66% (≥ 6) AUDIT-C 80% (≥ 7) AUDIT-3 41% (≥ 1) AUDIT-3 62% (≥ 2) AUDIT-3 79% (≥ 3) <u>*NPV*</u> AUDIT 86% (≥ 6) AUDIT 82% (≥ 7) AUDIT 79% (≥ 8) AUDIT 79% (≥ 9) AUDIT 76% (≥ 10) AUDIT 74% (≥ 11) AUDIT-C 85% (≥ 5) AUDIT-C 82% (≥ 6) AUDIT-C 77% (≥ 7) AUDIT-3 91% (≥ 1) AUDIT-3 86% (≥ 2) AUDIT-3 82% (≥ 3)	0.817 (95%CI 0.773 to 0.861) AUDIT-3 AuROC 0.767 (95%CI 0.718 to 0.816)		

											All risky drinkers (BMD, N-BHD, BHD *<u>PPV</u>* AUDIT 72% (≥ 6) AUDIT 76% (≥ 7) AUDIT 78% (≥ 8) AUDIT 82% (≥ 9) AUDIT 84% (≥ 10) AUDIT 85% (≥ 11) AUDIT-C 70% (≥ 5) AUDIT-C 77% (≥ 6) AUDIT-C 86% (≥ 7) AUDIT-3 56% (≥ 1) AUDIT-3 74% (≥ 2) AUDIT-3 85% (≥ 3) *<u>NPV</u>* AUDIT 82% (≥ 6) AUDIT 75% (≥ 7) AUDIT 68% (≥ 8) AUDIT 66% (≥ 9) AUDIT 63% (≥ 10) AUDIT 61% (≥ 11) AUDIT-C 83% (≥ 5) AUDIT-C 74% (≥ 6) AUDIT-C			

											65% (≥ 7) AUDIT-3 91% (≥ 1) AUDIT-3 73% (≥ 2) AUDIT-3 59% (≥ 3)			

n/r = authors do not report
n/t = authors report as not tested

Summary Table: General hospital and other settings

Study characteristics and screening properties are presented for primary studies included in the review of the effectiveness of screening tools in the identification of alcohol misuse. Key findings of systematic reviews are described in the narrative review synthesis.

Screening tool **Author** **Year** **Study design** **Quality**	**Type**	**Delivered by**	**Drinking pattern targeted**	**Population**	**Setting**	**No of Items**	**Time to complete**	**Reference standard used**	**Sensitivity (%)**	**Specificity (%)**	**Positive and Negative-predictive values (%)**	**AuRoc Value**	**Reported optimal threshold**	**Other properties** **(including reliability and test-retest)**
General hospital and other settings														
AUDIT and others Aertgeerts *et al.*, 2002 Cross-sectional diagnostic evaluation, ++	Questionnaires and laboratory markers	Physician responsible for patients recorded CAGE responses. Patient self-completed questionnaire included Composite International Diagnostic Interview, CAGE and AUDIT.	Alcohol abuse and dependence	Male patients aged older than 18 yrs admitted to hospital settings (n=233), mean age 62 yrs (percentile 25/75: 19-74), 72% married, 60.2% retired, ethnicity n/r	3 general hospitals and 1 University hospital	AUDIT=10 items AUDIT-PC = 5 items AUDIT-C = 3 items Five-shot = 5 items CAGE = 4 items GGT (≥ 50 U/l) MCV (≥ 96FL) %CDT ≥ 6	n/r	Diagnosis of alcohol abuse or dependence according to DSM-III-R criteria (4.2% (n=10) classed as alcohol abuse and 8.2% (n=19) were alcohol dependent)	CAGE (≥ 1) = 72.4% CAGE (≥ 2) = 41.4% AUDIT (≥ 5) = 82.8% AUDIT (≥ 6) = 72.4% AUDIT (≥ 7) = 69.0% AUDIT (≥ 8) = 65.5% AUDIT-C (≥ 5) = 69.0% AUDIT-C (≥ 6) = 65.5% AUDIT-C (≥ 7) = 62.1% AUDIT-C (≥ 8) = 51.7% AUDIT-PC	CAGE (≥ 1) = 85.3% CAGE (≥ 2) = 94.6% AUDIT (≥ 5) = 85.3% AUDIT (≥ 6) = 90.2% AUDIT (≥ 7) = 92.6% AUDIT (≥ 8) = 95.6% AUDIT-C (≥ 5) = 86.8% AUDIT-C (≥ 6) = 93.6% AUDIT-C (≥ 7) = 95.1% AUDIT-C (≥ 8) = 97.1% AUDIT-PC (≥ 5) = 91.2%	***PPV*** CAGE (≥ 1) = 41.2% CAGE (≥ 2) = 52.2% AUDIT (≥ 5) = 44.4% AUDIT (≥ 6) = 51.2% AUDIT (≥ 7) = 57.1% AUDIT (≥ 8) = 67.9% AUDIT-C (≥ 5) = 42.6% AUDIT-C (≥ 6) = 59.4% AUDIT-C (≥ 7) = 64.3% AUDIT-C (≥ 8) = 71.4% AUDIT-PC (≥ 5) = 52.6%	AUDIT 0.86 (0.81 to 0.90) CAGE 0.80 (0.74 to 0.85) AUDIT-C 0.84 (0.78 to 0.88) AUDIT-PC 0.86 (0.81 to 0.90) Five-shot 0.86 (0.81 to 0.90) %CDT 0.68 (0.54 to 0.80) GGT 0.67 (0.61 to 0.74) MCV 0.57 (0.51 to 0.64)	n/r	n/r

									(≥ 5) = 69.0% AUDIT-PC (≥ 6) = 58.6% AUDIT-PC (≥ 7) = 55.2% AUDIT-PC (≥ 8) = 41.4% Five-shot (≥ 1.5) = 89.7% Five-shot (≥ 2.0) = 86.2% Five-shot (≥ 2.5) = 79.3% Five-shot (≥ 3.0) = 58.6% MCV = 34.5% GGT= 51.9% % CDT = 10.3%	AUDIT-PC (≥ 6) = 95.6% AUDIT-PC (≥ 7) = 98.0% AUDIT-PC (≥ 8) = 98.0% Five-shot (≥ 1.5) = 65.7% Five-shot (≥ 2.0) = 78.9% Five-shot (≥ 2.5) = 87.7% Five-shot (≥ 3.0) = 93.1% MCV = 81.4% GGT= 71.6% % CDT = 89.0%	AUDIT-PC (≥ 6) = 65.4% AUDIT-PC (≥ 7) = 80.0% AUDIT-PC (≥ 8) = 75.0% Five-shot (≥ 1.5) = 27.1% Five-shot (≥ 2.0) = 36.8% Five-shot (≥ 2.5) = 47.9% Five-shot (≥ 3.0) = 54.8% MCV = 21.3% GGT= 20.3% % CDT = 12.0% ***NPV*** CAGE (≥ 1) = 95.6% CAGE (≥ 2) = 91.9% AUDIT (≥ 5) = 97.2% AUDIT (≥ 6) = 95.8% AUDIT (≥ 7) = 95.5% AUDIT (≥ 8) = 95.1% AUDIT-C (≥ 5) = 95.2% AUDIT-C (≥ 6) = 95.0% AUDIT-C (≥ 7) = 94.6%			

											AUDIT-C (≥ 8) = 93.4% AUDIT-PC (≥ 5) = 95.4% AUDIT-PC (≥ 6) = 94.2% AUDIT-PC (≥ 7) = 93.9% AUDIT-PC (≥ 8) = 92.2% Five-shot (≥ 1.5) = 97.8% Five-shot (≥ 2.0) = 97.6% Five-shot (≥ 2.5) = 96.8% Five-shot (≥ 3.0) = 94.1% MCV = 89.5% GGT= 91.4% % CDT = 87.0%			
AUDIT **CAGE** **POSIT** **CRAFFT** Knight *et al.*, 2003 Cross-sectional diagnostic evaluation	Questionnaires	CAGE and CRAFFT administered verbally by research assistant. AUDIT and POSIT self-completed with monitoring.	Any alcohol problem (alcohol problem use, abuse or dependence), abuse or dependence	Patients aged 14 to 18 yrs (final study sample n=538), average age n/r, broadly distributed across age bands, 68% female, 51% Black non-Hispanic	Hospital-based adolescent clinic, USA	AUDIT=10 items CAGE = 4 items CRAFFT = 6 items POSIT = 17 items	POSIT 20 to 30 min, CRAFFT 1-2 min	Adolescent Diagnostic Interview according to DMS-IV criteria No use=no reported drinking during past yr Non-problem use= any reported drinking during past yr	*Any problem* AUDIT (≥ 2) = 88% AUDIT (≥ 3) = 72% AUDIT (≥ 5) = 50% AUDIT (≥ 8) = 24% POSIT (≥ 1) = 84% POSIT (≥ 2)	*Any problem* AUDIT (≥ 2) = 81% AUDIT (≥ 3) = 89% AUDIT (≥ 5) = 97% AUDIT (≥ 8) = 100% POSIT (≥ 1) = 89% POSIT (≥ 2) = 94% POSIT (≥ 3) = 97%	n/r	*Any problem* AUDIT = 0.92 (0.89 to 0.94) POSIT = 0.88 (0.85 to 0.92) CAGE = 0.67 (0.61 to 0.72) CRAFFT = 0.88 (0.85 to 0.92) *Any disorder*	*Any problem* CRAFFT ≥ 2 *'Any disorder'* AUDIT ≥ 3 POSIT ≥ 2 CAGE ≥ 1 CRAFFT ≥ 2	n/r

								but no reported alcohol-related problems Problem use= 1 or more reported alcohol-related problems not reaching diagnostic threshold	= 65% POSIT (≥ 3) = 48% CAGE (≥ 1) = 37% CAGE (≥ 2 = 18% CRAFFT (≥ 1) = 92% CRAFFT (≥ 2) = 70% *Any disorder* AUDIT (≥ 2) = 93% AUDIT (≥ 3) = 88% AUDIT (≥ 5) = 73% AUDIT (≥ 8) = 54% POSIT (≥ 1) = 98% POSIT (≥ 2) = 88% POSIT (≥ 3) = 80% CAGE (≥ 1) = 61% CAGE (≥ 2 = 37% CRAFFT (≥ 1) = 98%	CAGE (≥ 1) = 96% CAGE (≥ 2 = 99% CRAFFT (≥ 1) = 64% CRAFFT (≥ 2) = 94% *Any disorder* AUDIT (≥ 2) = 66% AUDIT (≥ 3) = 77% AUDIT (≥ 5) = 88% AUDIT (≥ 8) = 97% POSIT (≥ 1) = 73% POSIT (≥ 2) = 82% POSIT (≥ 3) = 90% CAGE (≥ 1) = 91% CAGE (≥ 2 = 97% CRAFFT (≥ 1) = 52% CRAFFT (≥ 2) = 81% *Dependence* AUDIT (≥ 2) = 63% AUDIT (≥ 3) = 73% AUDIT (≥ 5) = 85% AUDIT (≥ 8) = 94% POSIT (≥ 1) = 69% POSIT (≥ 2) = 79% POSIT (≥		AUDIT = 0.91 (0.87 to 0.95) POSIT = 0.93 (0.89 to 0.96) CAGE = 0.77 (0.67 to 0.86) CRAFFT = 0.88 (0.83 to 0.93) *Dependence* AUDIT = 0.95 (0.91 to 0.99) POSIT = 0.95 (0.91 to 0.98) CAGE = 0.87 (0.74 to 0.99) CRAFFT = 0.89 (0.83 to 0.95)		

									CRAFFT (≥ 2) = 83% *Dependence* AUDIT (≥ 2) = 100% AUDIT (≥ 3) = 100% AUDIT (≥ 5) = 83% AUDIT (≥ 8) = 75% POSIT (≥ 1) = 100% POSIT (≥ 2) = 100% POSIT (≥ 3) = 92% CAGE (≥ 1) = 83% CAGE (≥ 2 = 42% CRAFFT (≥ 1) = 100% CRAFFT (≥ 2) = 92%	3) = 86% CAGE (≥ 1) = 88% CAGE (≥ 2 = 95% CRAFFT (≥ 1) = 49% CRAFFT (≥ 2) = 77%				
AUDIT and others Reinert & Allen, 2007 Literature review	Questionnaires FAST 4-item scale, derived from items 3, 5, 8 and 10 from AUDIT. Item 3 is	Delivery unclear in Hodgson *et al*., 2002. A&E sample may have completed in waiting room.	Alcohol misuse	No data available	Fracture clinic Primary care Dental hospital	AUDIT=10 items FAST=4 items	FAST 12.52 s (SD=14.2) CAGE 14.37 s (SD=7.2)	AUDIT used at cut-off of ≥ 8 as reference standard (intoxicated patients excluded by	FAST 66% of A&E patients categorised as hazardous or non-hazardous drinkers using		n/r	n/r	n/r	n/r

	performed first and classifies over half of respondents into either hazardous or non-hazardous groups. Those not classified at first stage are asked items 5, 8 and 10, whereby response other than 'never' to any item classifies subject as hazardous drinker (Raistrick *et al.*, 2006) AUDIT used at cut-off of ≥ 8 *FAST data only presented in table*	Questionnaires administered by triage nurses in Hodgson *et al.*, 2003			A&E (Hodgson *et al.*, 2002) A&E only (Hodgson *et al.*, 2003)		AUDIT 78 s (SD=35.5) (Hodgson *et al.*, 2003)	Hodgson *et al.*, 2003).	Question 3 of AUDIT ('how often do you have 6 or more drinks on one occasion?') (Hodgson *et al.*, 2002). FAST 94% in fracture clinic (for detection of hazardous drinking) (n=100, 57% male, 60% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST 91% in primary care (for detection of hazardous drinking) (n=100, 40% male, 74% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST 97% in dental hospital (for detection of hazardous drinking) (n=102, 59% male, 58% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST 94% in A&E (for detection of hazardous	FAST 89% in fracture clinic (for detection of hazardous drinking) Hodgson *et al.*, 2002) FAST 95% in primary care (for detection of hazardous drinking) (Hodgson *et al.*, 2002) FAST 91% in dental hospital (for detection of hazardous drinking) (Hodgson *et al.*, 2002) FAST 86% in A&E (for detection of hazardous drinking) (Hodgson *et al.*, 2002) FAST 88% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003) CAGE 98%				

									drinking) (n=100, 52% male, 76% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST 93% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003) CAGE 40% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003	(for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003)				
CAGE **MAST** **Severity of Dependence Questionnaire** **CDT** **GGT** **MCV** Bisson & Milford-Ward, 1994 Cross-sectional diagnostic evaluation, ++	Questionnaires and laboratory markers	n/r	Alcohol misuse	Male solders under age of 30 yrs admitted for alcohol treatment with primary diagnosis of alcohol misuse or dependence. Further analysis undertaken	Alcohol treatment unit, London, UK	CAGE=4 items MAST n/r SADQ n/r	n/r	Semi-structured interview to obtain full drinking history. All patients with primary diagnosis of misuse or dependence.	CAGE (≥ 1) 97% MAST (≥ 4) 100% Severity of Alcohol Dependence Questionnaire (≥ 11) (77%) CDT (pos) 31% GGT (>48)	n/r	n/r	n/r	n/r	n/r

				for 35 subjects (60% of study sample) who had been drinking over 80g alcohol in 3 weeks previous to participation and had continued to drink at this level in week before study.					11% MCV (>96) 14% Specificities n/r					
CAGE **MAST** **CDT** **GGT** **Alanine aminotransferase** **Aspartate aminotransferase** **MCV** Wetterling *et al.*, 1998 Cross-sectional diagnostic evaluation	Questionnaires and laboratory markers	n/r	Alcohol misuse	Patients aged less than 65 yrs (n=204), 74 women (mean age 43.7 yrs, SD=15.1), 130 men (mean age 43.1 yrs (SD=15.1) admitted to internal or surgical departments	Internal and surgical departments of general hospital, Germany	CAGE = 4 items MAST n/r		Reported alcohol consumption obtained by structured questionnaire, with subjects consuming more than 350 g/wk (men) or 225 g/wk (women) ad at least twice in a month more than 100g (men) or 65 g (women) alcohol/day diagnosed with 'alcohol problems.' Diagnoses of alcohol abuse (n=5) and dependence (n=50) made according to ICD-10 criteria. Against self-reported recent harmful	*Against ICD-10 diagnosis of abuse or dependence* CAGE (≥ 2) 49.1% MAST (≥ 5) 47.3% CDT (>26 mg/l females; > 20 mg/l males, as reported) 47.3% GGT (>19 U/l females; >28 U/l males) 57.6% MCV (≥ 95 fl) 33.3% *Harmful drinking* CAGE (≥ 2) 53.8% MAST (≥ 5) 50.0% CDT (>26 mg/l females;	*Against ICD-10 diagnosis of abuse or dependence* CAGE (≥ 2) 98.0% MAST (≥ 5) 98.7% CDT (>26 mg/l females; > 20 mg/l males, as reported) 88.6% GGT (>19 U/l females; >28 U/l males) 69.5% MCV (≥ 95 fl) 88.4% *Harmful drinking* CAGE (≥ 2) 89.2% MAST (≥ 5) 89.9% CDT (>26 mg/l females; > 20 mg/l	***PPV*** *Against ICD-10 diagnosis of abuse or dependence* CAGE (≥ 2) 90.0% MAST (≥ 5) 92.9% CDT (>26 mg/l females; > 20 mg/l males, as reported) 60.5% GGT (>19 U/l females; >28 U/l males) 47.5% MCV (≥ 95 fl) 52.8% *Harmful drinking* CAGE (≥ 2) 46.7% MAST (≥ 5) 46.4% CDT (>26 mg/l females; >	n/r	n/r	n/r

								alcohol consumption (women >225 g/wk, men >350 g/wk), <60% for all screening tools. Against ICD-10 diagnosis, CAGE, MAST and alcohol markers < 60%.	> 20 mg/l males, as reported) 53.8% GGT (>19 U/l females; >28 U/l males) 55.9% MCV (≥ 95 fl) 38.5%	males, as reported) 82.4% GGT (>19 U/l females; >28 U/l males) 62.9% MCV (≥ 95 fl) 84.9%	20 mg/l males, as reported) 35.0% GGT (>19 U/l females; >28 U/l males) 26.8% MCV (≥ 95 fl) 31.3% ***NPV*** *Against ICD-10 diagnosis of abuse or dependence* CAGE (≥ 2) 83.9% MAST (≥ 5) 83.5% CDT (>26 mg/l females; > 20 mg/l males, as reported) 82.0% GGT (>19 U/l females; >28 U/l males) 77.4% MCV (≥ 95 fl) 77.9% *Harmful drinking* CAGE (≥ 2) 91.7% MAST (≥ 5) 91.1% CDT (>26 mg/l females; > 20 mg/l males, as reported) 91.0% GGT (>19 U/l			

											females; >28 U/l males) 85.4% MCV (≥ 95 fl) 88.6%			
SASSI-A Stein *et al*., 2005 Cross-sectional diagnostic evaluation, ++	Questionnaire	Self-completed	Substance abuse	178 young people, mean age 17 yrs (SD=1.9), 92.1% male, 39.6% Hispanic, 19.5% Black, 40.9% White.	Juvenile correctional facility, USA	SASSI-A = 26 items	n/r	Clinical interview with chemical dependence counsellor for substance abuse history	Alcohol Face Valid Alcohol Scale ≥ 2 = 92% Face Valid Alcohol Scale ≥ 3 = 84% Face Valid Alcohol Scale ≥ 4 = 77% Face Valid Alcohol Scale ≥ 6 = 61% Obvious Attribute Scale ≥ 30 = 94% Obvious Attribute Scale ≥ 40 = 92% Obvious Attribute Scale ≥ 50 = 65% Obvious Attribute Scale ≥ 60 = 8%	Alcohol Face Valid Alcohol Scale ≥ 2 = 55% Face Valid Alcohol Scale ≥ 3 = 63% Face Valid Alcohol Scale ≥ 4 = 71% Face Valid Alcohol Scale ≥ 6 = 84% Obvious Attribute Scale ≥ 30 = 18% Obvious Attribute Scale ≥ 40 = 24% Obvious Attribute Scale ≥ 50 = 51% Obvious Attribute Scale ≥ 60 = 98%	n/r	n/r	n/r	n/r

									Subtle Attribute Scale ≥ 50 = 91% Subtle Attribute Scale ≥ 60 = 71% Subtle Attribute Scale ≥ 70 = 57% Defensive Dependent vs defensive non-dependence ≥ 4 = 6% Defensive Dependent vs defensive non-dependence ≥ 6 = 83% Defensive Dependent vs defensive non-dependence ≥ 8 = 57% Defensive Dependent vs defensive non-dependence ≥ 10 = 24%	Subtle Attribute Scale ≥ 50 = 31% Subtle Attribute Scale ≥ 60 = 69% Subtle Attribute Scale ≥ 70 = 80% Defensive Dependent vs defensive non-dependence ≥ 4 = 98% Defensive Dependent vs defensive non-dependence ≥ 6 = 39% Defensive Dependent vs defensive non-dependence ≥ 8 = 71% Defensive Dependent vs defensive non-dependence ≥ 10 = 94%				

									Chemical dependence scale ≥ 1 = 55%	Chemical dependence scale ≥ 1 = 77%				

n/r = authors do not report
n/t = authors report as not tested

Summary Table: Prenatal care

Study characteristics and screening properties are presented for primary studies included in the review of the effectiveness of screening tools in the identification of alcohol misuse. Key findings of systematic reviews are described in the narrative review synthesis.

Screening tool **Author** **Year** **Study design** **Quality**	**Type**	**Delivered by**	**Drinking pattern targeted**	**Population**	**Setting**	**No of Items**	**Time to complete**	**Reference standard used**	**Sensitivity (%)**	**Specificity (%)**	**Positive and Negative-predictive values (%)**	**AuRoc Value**	**Reported optimal threshold**	**Other properties** **(including reliability and test-retest)**
<u>Prenatal care</u>														
T-ACE **AUDIT** **S-MAST** Chang *et al.*, 1998	Questionnaires	n/r	DSM-III-R alcohol use disorders, risky drinking and current alcohol consumption	Pregnant women attending first prenatal appointment (below gestational period of 28 weeks)	USA	AUDIT=10 items T-ACE = 4 items S-MAST n/r	n/r	Clinical interview and diagnosis according to DMS-III-R criteria and Timeline Followback method	*<u>DSM-III-R lifetime alcohol diagnoses</u>* T-ACE (≥ 2) = 87.8% AUDIT (≥ 11) = 7.0% AUDIT (≥ 10) = 11.0% AUDIT (≥ 8) = 22.6% SMAST (cut-off n/r) = 14.8% *<u>Risk drinking</u>* T-ACE (≥ 2) = 92.4% AUDIT n/r SMAST (cut-off n/r) = 11.4% *<u>Current alcohol consumption</u>*	*<u>DSM-III-R lifetime alcohol diagnoses</u>* T-ACE (≥ 2) = 36.6% AUDIT (≥ 11) = 99.6% AUDIT (≥ 10) = 99.0% AUDIT (≥ 8) = 97.4% SMAST (cut-off n/r) = 97.9% *<u>Risk drinking</u>* T-ACE (≥ 2) = 37.6% AUDIT n/r SMAST (cut-off n/r) = 95.9% *<u>Current alcohol consumption</u>*	n/r	*<u>DSM-III-R lifetime alcohol diagnoses</u>* T-ACE = 0.644 (SE=0.030) AUDIT= 0.763 (SE=0.028) SMAST= 0.624 (SE=0.032) *<u>Risk drinker</u>* T-ACE = 0.687 (SE=0.029) SMAST= 0.551 (SE=0.034) *<u>Current drinker</u>* T-ACE = 0.647 (SE=0.029) AUDIT= 0.708 (SE=0.028) SMAST= 0.518	n/r	n/r

									T-ACE (≥ 2) = 89.2% AUDIT (≥ 11) = 3.3% AUDIT (≥ 10) = 6.7% AUDIT (≥ 8) = 15.0% SMAST (cut-off n/r) = 7.5%	T-ACE (≥ 2) = 37.8% AUDIT (≥ 11) = 97.8% AUDIT (≥ 10) = 96.9% AUDIT (≥ 8) = 93.9% SMAST (cut-off n/r) = 94.3%		(SE=0.032)		
TWEAK Dawson *et al.*, 2001 Cross-sectional study, ++	Questionnaire	Self-completed	High risk and moderate risk drinking	Pregnant women, n=404, mean age 26.6 yrs (SD=6.3), mean gestational age at time of interview 24 weeks (SD=11)	USA	TWEAK=5 items	n/r	Interview for history of alcohol consumption before and during pregnancy Low risk: no drinking at all during period Moderate risk: some drinking but average daily alcohol intake of 1 drink or less and drank 3+ drinks less than once a month High risk: average daily alcohol intake of over 1 drink or drank 3+ drinks once a month or	Cut-off scores used: 0, low-risk, 1 moderate risk, 2+ high risk 70.6% (high-risk) 65.6% (any risk) 57.6% (moderate risk)	73.2% (high-risk) 63.7% (any risk)	n/r	n/r	n/r	n/r

								more often						
TWEAK **T-ACE** **CAGE** **MAST** Russell *et al.*, 1996 Cross-sectional study, +	Questionnaires TWEAK 5 items T-ACE 4 items	Administered by 'screeners' (no further detail)	Risk drinking	Disadvantaged female African American obstetric patients, n=2717	Prenatal clinic, USA	TWEAK= 5 items T-ACE = 4 items MAST = 25 items CAGE = 4 items	n/r	Timeline Follow Back procedure used to assess risk drinking.	*Cut-off 1* TWEAK = 92% T-ACE = 91% MAST = 80% CAGE = 66% *Cut-off 2* TWEAK = 91% T-ACE = 88% MAST = 69% CAGE = 46% *Cut-off 3* TWEAK = 67% T-ACE = 61% MAST = 61% CAGE = 27%	*Cut-off 1* TWEAK = 67% T-ACE = 70% MAST = 73% CAGE = 81% *Cut-off 2* TWEAK = 77% T-ACE = 79% MAST = 84% CAGE = 93% *Cut-off 3* TWEAK = 92% T-ACE = 95% MAST = 91% CAGE = 99%	***PPV*** *Cut-off 1* TWEAK = 17% T-ACE = 18% MAST = 17% CAGE = 20% *Cut-off 2* TWEAK = 22% T-ACE = 23% MAST = 23% CAGE = 32% *Cut-off 3* TWEAK = 39% T-ACE = 47% MAST = 32% CAGE = 56%	TWEAK = 0.894 (0.867 to 0.921) T-ACE = 0.887 (0.858 to 0.916) MAST = 0.821 (0.782 to 0.860) CAGE 0.763 (0.720 to 0.806)	n/r	n/r

n/r = authors do not report
n/t = authors report as not tested

Summary Table: Emergency care

Study characteristics and screening properties are presented for primary studies included in the review of the effectiveness of screening tools in the identification of alcohol misuse. Key findings of systematic reviews are described in the narrative review synthesis.

Screening tool **Author** **Year** **Study design** **Quality**	**Type**	**Delivered by**	**Drinking pattern targeted**	**Population**	**Setting**	**No of Items**	**Time to complete**	**Reference standard used**	**Sensitivity (%)**	**Specificity (%)**	**Positive and Negative-predictive values (%)**	**AuRoc Value**	**Reported optimal threshold**	**Other properties** **(including reliability and test-retest)**
<u>Emergency care</u>														
Mm-MAST, CAGE and Trauma Scale **CDT** **GGT** Forsberg *et al.*, 2002 Cross-sectional diagnostic evaluation, ++	Questionnaires and laboratory markers assessed separately and in combination	Questionnaires completed in interviews with surgical nurses (16%) and psychologists from alcohol clinic (84%) (as some patients had difficulty in writing due to illness).	Binge drinking (at least 6 standard drinks for men and 3 for women), with 1) binge drinking on 2 or more occasions per month over the previous 12 months month and 2) to have consumed at least 1.65/1.10g (men/women) alcohol/kg bodyweight on occasion during that period).	Patients on emergency surgical ward (n=149) aged 16 to 73 yrs.	Emergency surgical ward, Stockholm, Sweden	Mm-MAST = 9 items CAGE = 4 items Trauma Scale = 5 items	n/r	Timeline Follow Back procedure used to assess drinking in preceding 14 days, with addition of binge drinking questions Cut-off level for binge drinking ≥ 2 positive answers on questionnaires	**Males** *Men aged 16 to 29 yrs* CAGE 27% Trauma Scale 36% CAGE, Trauma Scale and Mm-MAST combined 82% Mm-MAST and CAGE 73% Mm-MAST and Trauma Scale 73% CDT 9% GGT 9% *Men aged 30 to 73yrs* Mm-MAST 92%	**Males** *Men aged 16 to 29 yrs* Mm-MAST 66% CAGE and CDT 78% CAGE 97% CDT 79% *Men aged 30 to 73yrs* Mm-MAST, CAGE and Trauma Scale 80% Mm-MAST and CAGE 80%	***<u>PPV</u>*** **Males** *Men aged 16 to 29 yrs* Mm-MAST 50% CAGE and CDT 59% CAGE 90% CDT 56% *Men aged 30 to 73yrs* Mm-MAST, CAGE and Trauma Scale 75% Mm-MAST and CAGE 73% Mm-Mast and Trauma Scale 73% ***<u>NPV</u>*** **Males** *Men aged 16*	n/r	n/r	n/r

									CAGE 75% CDT 75% CAGE and CDT combined 83% Trauma Scale 42% GGT 17% **Females** No tools or combinations observed to have sensitivity of 70% or above	Mm-Mast and Trauma Scale 80%	*to 29 yrs* Mm-MAST 95% CAGE and CDT 93% CAGE 91% CDT 89% *Men aged 30 to 73yrs* Mm-MAST, CAGE and Trauma Scale 86% Mm-MAST and CAGE 80% Mm-Mast and Trauma Scale 80%			
AUDIT **CAGE** **CRAFFT** **Modified RAPS-QF** Kelly *et al*., 2004 Cross-sectional diagnostic evaluation, ++	Questionnaires	Diagnostic interviews conducted by master's-level clinical assessors. Mode of completion of questionnaires n/r	Alcohol abuse or dependence	Older adolescents, sample for analysis limited to 18 to 29 yr olds, median age 19 yrs (SD=0.9), 55% male, 81% White	Emergency department setting, USA	AUDIT=10 items CAGE=4 items CRAFFT=6 items Modified RAPS-QF = n/r (apparently 6 items)	n/r	Structured Clinical Interview for DSM-IV disorders	**Optimal cut-off scores recommended by authors:** AUDIT 82% (≥ 10) (85% for alcohol-positive respondents) CAGE 66% (≥ 1) (70% for alcohol-positive respondents) CRAFFT 82% (≥ 3) (85% for alcohol-positive respondents) RAPS-QF 82% (≥ 3)	**Optimal cut-off scores recommended by authors:** AUDIT 78% (≥ 10) (53% for alcohol-positive respondents) CAGE 58% (≥ 1) (35% for alcohol-positive respondents) CRAFFT 67% (≥ 3) (53% for alcohol-positive respondents) RAPS-QF 54% (≥ 3) (41% for alcohol-positive	***PPV*** **Optimal cut-off scores recommended by authors:** AUDIT (≥ 10) 71% CAGE (≥ 1) 52% CRAFFT (≥ 3) 63% RAPS-QF (≥ 3) 55% ***NPV*** **Optimal cut-off scores recommended by authors:** AUDIT (≥ 10) 88% CAGE (≥ 1) 71% CRAFFT (≥ 3)	AUDIT 0.85 (0.75 to 0.93) CAGE 0.68 (0.56 to 0.79) CRAFFT 0.79 (0.69 to 0.88) RAPS-QF 0.76 (0.66 to 0.86)	AUDIT ≥ 10 CAGE ≥ 1 CRAFFT ≥ 3 RAPS-QF ≥ 3	n/r

									(80% for alcohol-positive respondents)	respondents)	84% RAPS-QF (≥ 3) 81%			
AUDIT and others Reinert & Allen, 2007 Literature review	Questionnaires FAST 4-item scale, derived from items 3, 5, 8 and 10 from AUDIT. Item 3 is performed first and classifies over half of respondents into either hazardous or non-hazardous groups. Those not classified at first stage are asked items 5, 8 and 10, whereby response other than 'never' to any item classifies subject as hazardous drinker (Raistrick *et al*., 2006) AUDIT used at cut-off of ≥ 8 *FAST data only presented in table*	Delivery unclear in Hodgson *et al.*, 2002. A&E sample may have completed in waiting room. Questionnaires administered by triage nurses in Hodgson *et al.*, 2003	Alcohol misuse	No data available	Fracture clinic Primary care Dental hospital A&E (Hodgson *et al.*, 2002) A&E only (Hodgson *et al.*, 2003)	AUDIT=10 items FAST=4 items	FAST 12.52 s (SD=14.2) CAGE 14.37 s (SD=7.2) AUDIT 78 s (SD=35.5) (Hodgson *et al*., 2003)	AUDIT used at cut-off of ≥ 8 as reference standard (intoxicated patients excluded by Hodgson *et al.*, 2003).	FAST 66% of A&E patients categorised as hazardous or non-hazardous drinkers using Question 3 of AUDIT ('how often do you have 6 or more drinks on one occasion?') (Hodgson *et al.*, 2002). FAST 94% in fracture clinic (for detection of hazardous drinking) (n=100, 57% male, 60% aged > 25 yrs) (Hodgson *et al*., 2002) FAST 91% in primary care (for detection of hazardous drinking) (n=100, 40% male, 74% aged > 25 yrs) (Hodgson *et al*., 2002) FAST 97% in dental hospital (for detection of hazardous drinking) (n=102, 59% male, 58% aged > 25 yrs)	FAST 89% in fracture clinic (for detection of hazardous drinking) Hodgson *et al*., 2002) FAST 95% in primary care (for detection of hazardous drinking) (Hodgson *et al*., 2002) FAST 91% in dental hospital (for detection of hazardous drinking) (Hodgson *et al*., 2002) FAST 86% in A&E (for detection of hazardous drinking) (Hodgson *et al*., 2002) FAST 88% (for detection of alcohol misuse	n/r	n/r	n/r	n/r

									(Hodgson *et al.*, 2002) FAST 94% in A&E (for detection of hazardous drinking) (n=100, 52% male, 76% aged > 25 yrs) (Hodgson *et al.*, 2002) FAST 93% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003) CAGE 40% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003	(delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003) CAGE 98% (for detection of alcohol misuse (delivered by nurse to adults aged 16 to 75 yrs in UK A&E setting) (Hodgson *et al.*, 2003)				
AUDIT-C Rodríguez-Martos & Santamarina, 2007 Cross-sectional diagnostic evaluation, +	Questionnaire	n/r	Hazardous drinking	120 traffic casualties, 78% male, median age 27 yrs (interquartile range 22 to 34)	Urban emergency room setting, Spain	AUDIT-C=3 items	n/r	AUDIT-C evaluated against AUDIT (at ≥8 and ≥ 6 for males and females respectively)	**Males** AUDIT-C (≥ 3) = 100% AUDIT-C (≥ 4) = 95% AUDIT-C (≥ 5) = 76% AUDIT-C (≥ 6) = 63%	**Males** AUDIT-C (≥ 3) = 20% AUDIT-C (≥ 4) = 48% AUDIT-C (≥ 5) = 73% AUDIT-C (≥ 6) = 92% **Females**	***PPV*** **Males** AUDIT-C (≥ 3) = 46% AUDIT-C (≥ 4) = 55% AUDIT-C (≥ 5) = 66% AUDIT-C (≥ 6) = 86% **Females**	AUDIT-C AuROC 0.861 in males and 0.990 in females.	n/r	n/r

									Females AUDIT-C (≥ 3) = 100% AUDIT-C (≥ 4) = 100% AUDIT-C (≥ 5) = 60% AUDIT-C (≥ 6) = 220% (as reported)	AUDIT-C (≥ 3) = 75% AUDIT-C (≥ 4) = 95% AUDIT-C (≥ 5) = 100% AUDIT-C (≥ 6) = 100%	AUDIT-C (≥ 3) = 50% AUDIT-C (≥ 4) = 83% AUDIT-C (≥ 5) = 100% AUDIT-C (≥ 6) = 100% ***NPV*** **Males** AUDIT-C (≥ 3) = 100% AUDIT-C (≥ 4) = 93% AUDIT-C (≥ 5) = 82% AUDIT-C (≥ 6) = 79% **Females** AUDIT-C (≥ 3) = 100% AUDIT-C (≥ 4) = 52% AUDIT-C (≥ 5) = 91% AUDIT-C (≥ 6) = 84%			
AUDIT **CAGE** **B-MAST** Soderstrom *et al*., 1997 Cross-sectional diagnostic evaluation, ++	Questionnaires	Interviewers (including a social worker, who performed most interviews, a nurse, and two psychologists) administered diagnostic interview and screening tools.	Lifetime and current alcohol dependence	Trauma centre patients (n=1118), 72.1% male, 56.3% White, male mean age of 35.5 yrs, female mean age of 42.3 yrs.	Trauma centre, USA	AUDIT=10 items CAGE=4 items B-MAST=10 items	n/r	Abuse and dependence according to DSM-III-R criteria. Abuse diagnosed in 90 (8.1%), dependence in 397 (35.5%). *Further analysis confined to dependence only.*	CAGE 84% (dependence at optimal cut-off ≥ 2) AUDIT 73% (dependence at optimal cut-off ≥ 9) B-MAST 80% (dependence at optimal cut-off ≥ 5)	CAGE 90% (dependence at optimal cut-off ≥ 2) AUDIT 89% (dependence at optimal cut-off ≥ 9) B-MAST 85% (dependence at optimal cut-off ≥ 5)	CAGE PPV 82%, NPV 91% (dependence at optimal cut-off ≥ 2) AUDIT PPV 80%, NPV 86% (dependence at optimal cut-off ≥ 9) B-MAST PPV 74%, NPV 89% (dependence at optimal cut-off ≥ 5	CAGE AuROC 0.93 (P<0.003 vs AUDIT) AUDIT AuROC 0.85 (P<0.003 vs B-MAST) B-MAST AuROC 0.85	n/r	n/r
Paddington Alcohol Test	Questionnaire	Delivered by nurses	Alcohol misuse	Adults aged between 16	A&E department,	n/r	Time to administer	AUDIT	PAT 70% (Hodgson *et*	PAT 85% (Hodgson *et*	n/r	n/r	n/r	n/r

Patton *et al.*, 2002 Short communication				and 75 yrs	London, UK		42 s (SD=31.9)		*al.*, 2003)	*al.*, 2003)				
Paddington Alcohol Test Patton *et al.*, 2004 Short communication	Questionnaire (modified version of PAT in which item 3 (frequency of heavy drinking episodes) included a monthly cut-off for increased detection of binge drinking.	Medical student (5th year) undertaking research as part of the Intercallated BSc in Psychology. (In usual practice at St Mary's Hospital, PAT administered by SHOs. Based on a waiting room sample (as opposed to delivery following assessment and treatment for the primary presenting condition to A&E)	Alcohol misuse	A&E attendees. No data relating to population available.	A&E department, London, UK	PAT version = 4 items	Time taken to complete PAT an AUDIT assessed for sub-sample of 47 participants: PAT 20 sec (SD=9.53) AUDIT 1 min 13 sec (SD=27.6)	AUDIT used as reference standard. AUDIT (10 item) score of 8+, PAT male admitting 8+ units on a single occasion (at least once per month), Female 6+ OR anyone admitting attendance in the AED due to alcohol consumption	PAT 79%	PAT 88%	n/r	n/r	n/r	n/r

n/r = authors do not report
n/t = authors report as not tested

APPENDIX 15: Characteristics and main findings from systematic reviews included in the review of effectiveness of brief interventions*

** Details of the RCTs included in the review of effectiveness of brief interventions in young people are tabulated within the narrative summary*

First author and date (i) and country of corresponding author (ii)	**Study Design & Quality (++/+/-)**	**Research Objective (i) & Funding (ii)**	**Included primary studies (i), Setting (ii) & Study Population (iii)** **Inclusion/exclusion criteria for review (iv)** **Inclusion/exclusion criteria for primary studies (v)**	**Intervention(s) & Comparator(s)**	**Main findings**	**Review Team Comments**
(i) Ashenden *et al.*, 1997 (ii) Australia	Systematic review ++	(i) To investigate the effectiveness of lifestyle advice delivered by GPs in changing patient behaviour in the following areas: smoking, alcohol consumption, diet and exercise (findings relating to alcohol are presented in this assessment) (ii) General Practice Evaluation Programme, Commonwealth Department of Health and Family Services	(i) 6 included primary studies relating to alcohol (ii) Primary care. 4 studies from UK, 1 from USA, 1 from Sweden. (iii) Ages of included participants ranged from 17 to 69 years. (iv) English language publications of trials to investigate the effectiveness of lifestyle advice in general practice. (v) Baseline alcohol consumption: above recommended safe levels (where safe levels were described as being below 2 standard drinks per day for women and 4 for men).	Verbal advice was supplemented by written materials (in 5 of 6 studies). In all studies advice was delivered by GP. Duration of intervention not reported. Single intervention in 5 studies, multifactorial intervention in 1 study. Control group received no intervention.	A significantly greater proportion of intervention group subjects moderated their drinking to a safe level compared with control group participants (who received no intervention) in 3 of 6 included studies: i) Single intervention of intensive advice with written advice: Men: reduction of 10.1 standard drinks/wk (P<0.001) Women: reduction of 5.2 drinks/wk (P<0.05) Difference in change of proportion of subjects drinking heavily (no further detail): intervention group vs control Men: 18.2% (P<0.001) Women: 18.5% (P<0.05) ii) Multifactorial intervention (no further detail) of verbal advice with written materials Difference in change of proportion of subjects drinking heavily (no further detail): intervention group vs control = 15.5% (P<0.01) iii) Single intervention of brief advice delivered to men only, with written materials	4 of 6 included studies undertaken in the UK.

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
					Change in consumption = 6.5 standard drinks/wk (P<0.05) Difference in change of proportion of subjects drinking heavily (no further detail): intervention group vs control = 13% (P<0.05) Significantly lower GGT levels in intervention group subjects in 2 trials (no further data).	
(i) (Ballesteros, Duffy, Querejeta, Arino, Gonzalez-Pinto, Ballesteros, Duffy, Querejeta, Arino, & Gonzalez-Pinto 2004a) (ii) Spain	Systematic review ++	(i) To investigate the effectiveness of brief interventions for hazardous drinkers delivered in primary care (ii) Funding not reported	(i) 13 studies included in meta-analysis (ii) Primary care. 4 studies from UK, 5 from USA, 1 from Australia, 3 from Spain. (iii) Hazardous drinkers (n=4353 (CTRL n=1788, MI n=580, BI n=1410, EBI n=575)). Most studies included patients in age range 18 to 70 yrs (1 study was performed in older patients aged 65 yrs and over) (iv) Inclusion: 1) parallel trials with 2 or more intervention arms 2) patients randomised to interventions 3) included hazardous drinkers not satisfying criteria for dependence 4) BIs applied in primary care 5) outcomes assessed available for 6 to 12 months 6) data available for	Interventions categorised as follows: 1) control (CTRL, no specific advice on alcohol consumption except if required by reported health problem or requested by patient) 2) minimal intervention (MNI, session of general advice on alcohol consumption lasting approx 3-5 min but without advice on strategies to reduce consumption), 3) brief intervention (BI, specific intervention of 10-15 min in 1 session concerning advice and strategies to reduce consumption, with option of booster sessions of 3-5 min each), 4) extended brief intervention (EBI, with characteristics of BI but also with several specific reinforcement sessions through follow-up, approx 1-15 min each). 11 of 13 studies presented comparisons between 2 arms (6 BI vs CTRL, 1 MNI vs CTRL, 2 BI vs MNI, 2 EBI vs CTRL), whilst 2 reported 3-arm comparison (1 BI vs MNI vs CTRL, 1 EBI vs MNI vs CTRL).	Odds ratio of response (decrease in proportion of hazardous drinkers) Analysis according to 4 levels of intervention: Random effects model favoured BI (OR=1.6, 95%CI 1.33 to 1.93) and EBI (OR=1.5, 95%CI 1.12 to 1.95) vs CTRL. MNI not significantly different from CTRL (OR=0.95, 95%CI 0.72 to 1.25). Test for linear trend did not show adequate fit against the 4-level treatment model, but 2-level treatment model fit was adequate, therefore this latter grouping was selected for further analyses. Analysis according to 2 levels of intervention: Random effects model favoured BI (OR=1.55, 95%CI 1.27 to 1.90) with improvement of 11% in the success rate (RD=0.11, 95%CI 0.06 to 0.16; NNT=10, 95%CI 7 to 17). Type of drinkers and type of patients included in studies accounted for significant part of variability between groups. BIs more effective when delivered in general screening programmes (non-treatment seekers, fixed effects model OR=2.19, 95%CI 1.68 to 2.84) vs consultation (treatment seekers, fixed effects model OR=1.41, 95%CI 1.20 to 1.65). BIs more effective in heavy drinkers (fixed effects model, OR=1.94, 95%CI 1.55 to 2.43) vs moderate drinkers (fixed	4/13 studies from UK.

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
			intention-to-treat analysis Exclusion: 1) trials not undertaken in primary care or, if in primary care, BIs administered within other health programmes (ie. hypertension control, pregnancy) 2) studies using cognitive interventions (on basis that these interventions do not form part of usual workload) v) Hazardous drinkers classified according to whether moderate or heavy drinkers (moderate where study inclusion criteria for ethanol consumption were >132 to 168 g/wk in men and >96 to 132 g/wk in women; heavy where inclusion criteria were >280 g/wk in men and >160 g/wk in women) and whether non-treatment seekers or treatment seekers (participants were classed as non-treatment seekers if all population in practices were targeted for screening and as including treatment seekers if screening was restricted to patients attending medical consultation). All studies (bar one, in which older patients (≥ 65 yrs) only were included) recruited patients in the age range 18 to 70 yrs.		effects model OR=1.42, 95%CI 1.19 to 1.68). Corresponding RD and NNT values: Non-treatment seekers (RD=0.20 (95%CI 0.13 to 0.26), NNT=6 (95%CI 4 to 8) Treatment seekers (RD=0.09 (95%CI 0.05 to 0.12), NNT=12 (95%CI 9 to 22) Heavy drinkers (RD=0.16, 95%CI 0.11 to 0.22), NNT= 7 (95%CI 5 to 10) Moderate drinkers (RD=0.09 (95%CI 0.05 to 0.13), NNT=12 (95%CI 8 to 23) No clear evidence of dose-effect relationship linking intensity of BIs to outcome.	

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
			4 studies included only men and 1 study included only women. 6 studies included heavy drinkers and 7 included moderate drinkers. 3 studies undertaken on non-treatment seekers.			
(i) Ballesteros *et al.*, 2004b (ii) Spain	Systematic review ++	(i) To investigate the effectiveness of brief interventions in hazardous drinkers according to gender subtype (ii) Grant from the Ministerio del Interior – Plan Nacional contra las Drogas (Spain, 2000-02)	(i) 7 studies, giving 6 independent pairs of gender comparisons (ii) Primary care settings in UK (3 studies, Australia (1 study) and USA (3 studies) (iii) Male and female hazardous drinkers in primary care (n=2981) iv) Inclusion: 1) subjects recruited from population of primary care practices 2) individual or cluster randomisation of subjects 3) inclusion of control group or group with minimal intervention 4) alcohol intake as outcome 5) follow-up of 6 to 12 months 6) separate reporting of outcomes by gender v) Alcohol consumption in terms of weekly alcohol consumption or AUDIT score	Following criteria were used to classify interventions: 1) control, no specific intervention on excessive drinking beyond assessment of consumption 2) minimal intervention (MNI), assessment of alcohol consumption including advice on safe limits and recommendations to reduce but without advice on strategies (lasting 3-5 min and could be supplemented by follow-up visits of similar duration) 3) brief intervention (BI), interventions of 10-15 min duration, with focus on assessment, advice and strategies for reduction in consumption (performed in 1 session, with option of follow-up visits of 3-5 min duration) 4) extended brief intervention (EBI), several interventions of 10-15 min duration, with focus on assessment, advice and behaviour modification (BIs with follow-up visits lasting for 10-15 min also classified as EBI).	1) Quantity of typical weekly alcohol consumption (standardised effect sizes) Similar effect size by gender within studies. No significant heterogeneity (P=0.12) Similar SES results relating to BI vs reference treatments for males (d=-0.25, 95%CI -0.34, -0.17), P<0.001) and women (d=-0.26, -0.38, -0.13, P<0.001). No significant heterogeneity (males P=0.19, females P=0.10). effect size pooled for both genders d=-0.26 (95%CI -0.33 to -0.18, P<0.001) 2) Frequency of drinkers who reported consumption below hazardous levels following intervention Data was available for 4 studies for analysis. OR for males=2.32 (95%CI 1.78, 2.93); OR for females=2.31 (1.60, 3.17) (P=0.001). Pooled OR for both genders=2.32 (1.86 to 2.78) No significant heterogeneity overall (P=0.69), in males (P=0.78) or females (P=0.28) or between genders (P=1).	2/6 studies from UK

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(i) Beich *et al*., 2003 (ii) Denmark	Systematic review ++	(i) To determine the effectiveness of screening programmes for excessive alcohol use in general practice and providing brief interventions (BI data only presented here) (ii) Danish Ministry and Board of Health and Association of County Councils in Denmark	(i) 19 studies. 8 studies included in meta-analysis (ii) General practice. Of 8 studies included in meta-analysis: 4 from USA, 3 from UK, and 1 from Australia. (iii) Non-alcohol-dependent patients in general practice (individual study n= 50 to 748). Treatment goals ranged from 12 to 23 maximum drinks/wk. iv) Inclusion: 1) focus on excessive alcohol use (but not on specific disease or alcohol dependent patients) 2) recruitment involved screening or process similar to screening 3) BI were studies (min of interaction) in general practice settings only 4) RCT of BI vs no/less intervention Exclusion 1) Studies set in hospital wards, emergency rooms, ad hoc research clinics v) Lowest age cut-off was 17 yrs, 1 study was in over 65s only. 1 study was solely in men, 2 studies were solely in women. Definition of excessive drinking ranged from >11/week to >29/wk.	8 trials included in meta-analysis of which all used health questionnaires for screening, provided to patients at visit to doctor. Health questionnaires not specified, although 1 study used CAGE. BI included feedback, information and advice. Ranged from 10 min consultation to up to 5 consultations lasting 5 to 20 min. Protocols all included feedback on present drinking, education on risk, strategies for reducing drinking and practitioners advice.	Pooled absolute risk reduction was 10.5% (95%CI 7.1 to 13.9%). Pooled NNT was 10 (statistic not reported, 7 to 14). 9% patients screened positive (range 3.3 to 18%). Further assessment identified 2.5% (range 0.9 to 5.4%) given BI. 2.6 (Statistic not reported 1.7 to 3.4) patients per 1000 screened achieved sensible drinking levels (based on weighted average of admission to BI of 2.46%). In single studies, screening effect values ranged from 0.1 to 6.2 patients per 1000 screened. Screening effect (per 1000 screened) for non-binge-drinking (occasional excessive drinking) in studies that included measure (n=6). Only 1 study reported combined outcome of safe weekly drinking and non-binge drinking (Ockene *et al*). Overall, in 1000 screened patients, 90 screened positive and required further assessment, 25 qualified for BI (many excluded by protocol, eg severe alcohol problems or false positive screening results) and after 1 year, 2.6 (95%CI 1.7 to 3.4) reported drinking less than maximum recommended level.	3/8 studies in meta-analysis from UK.

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(i) Bertholet *et al*., 2005 (ii) Switzerland	Systematic review ++	(i) To evaluate the efficacy of brief interventions aimed at reducing long-term alcohol use and related harm amongst active attendees of primary health care centres, but not seeking treatment for alcohol misuse (ii) Clinical Epidemiology Center and the Alcohol Treatment Center, University Hospital, Lausanne, Switzerland	(i) 19 included studies (ii) Primary care (9 studies conducted in North America, 7 in Europe, 2 in Africa, and 1 in Australia). (iii) Non-treatment seeking patients attending primary health care settings (n=5639). 6 trials did not consider women; remainder were mixed in terms of gender. Age range of participants 14 years and above. iv) Inclusion 1) RCTs reporting at least 1 outcome related to alcohol consumption, drinking status, health-related quality of life or functional status, laboratory markers of alcohol use, utilisation of health care resources or cost data 2) Studies having at least 75% if study population consisting of primary care patients (where this proportion was below 75%, subanalyses must have been performed according to population) Exclusion 1) Studies not undertaken in outpatients actively attending a primary health care centre/provider 2) Studies involving alcohol treatment-seeking patients (classed as individuals responding to	Eligible interventions: 1) intervention delivered individually focusing on alcohol consumption with face to face component in initial session 2) intervention defined as 'brief intervention' or 'motivational intervention' or reporting use of feedback or advice to reduce alcohol consumption. No restrictions applied to repeated interventions or reinforcement sessions. Length of follow-up ranged from 6 to 48 months. All studies included advice being given to BI subjects. All except 1 (Huas *et al*) included feedback regarding consumption. 6 studies made reference to Motivational Interview method and 2 to cognitive behavioural techniques. Length of intervention ranged from 5 to 45 min. BI repeated or included booster session in 10 studies. Principal providers ranged from GP, psychologists, nurses, researcher, computer, trained interventionist.	Of 17 trials reporting alcohol consumption, 8 reported statistically significant effects of BI. No studies reported negative effects of BI. In studies reporting results at both 6 and 12 months of follow-up, reduction in consumption was similar at both time points (P=0.91). Only a small difference in effect size was found between men and women in studies reporting data for gender subgroups (P=0.75) (therefore meta-analysis performed on all studies reporting data with either 6 or 12 months follow-up (12 months if both) independent of sex). In 3 trials that evaluated 2 different intervention modalities, each intervention was considered separately to examine contribution to effect size. Overall pooled effect size of trials = net change of -50g of ethanol (approximately 5 drinks) per week (95%CI -65 to -34) (based on follow-up observations without adjustment for drop-out). Net change of -50g/wk corresponds to relative mean reduction of 15% in consumption in BI (relative mean reduction 34%), compared with control groups (relative mean reduction 19%). ITT analysis possible for 12/13 intervention groups. When only trials for which ITT possible were considered, unadjusted pooled effect size was similar (-47 g/wk, 95%CI -62 to -31 g/wk) and adjusted effect size after correction for lost subjects was smaller (-38 g/wk, 95%CI -51 to -24 g/wk). Between-studies heterogeneity in effect size not significant (P=0.24). I^2=25.8%, indicated low level of heterogeneity. In ITT analysis, heterogeneity was smaller (P=0.82, I^2=0%). No evidence of publication bias. Significantly greater effect size found in trials published after 1996 (effect -54.8 vs 6.6, P=0.02). Cumulative meta-analysis indicates trend. No linear association between effect size and quality scores. All high quality trials were from USA and baseline consumption less than 300g/wk. Heterogeneity higher among low (P=0.08,	No studies from UK.

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			advertisements or referred for alcohol treatment) 3) Studies conducted in hospital ward or emergency department 4) Studies that recruited patients by means of registers or patient lists or convened individuals specifically for alcohol screening v) Inclusion criteria included sex, age (lowest was 14 years and above), absolute ethanol consumption, binge drinking, CAGE or AUDIT score). Exclusion criteria included alcohol dependence, treatment for alcohol problems, high cut-off of absolute ethanol consumption, pregnancy, drug use, somatic disease, psychiatric disease and previous advice to cut down.		I^2=82.9%) vs. high quality studies (P=0.71, I^2=0%). Meta-regression showed that correlation between mean baseline alcohol consumption and effect size was weak (P=0.71) in high quality trials but very strong (p<0.001) in low quality trials. Study quality and mean baseline alcohol consumption accounted for 67% of between-trials heterogeneity in effect size. Meta-regression on intervention modalities (type of provide, duration, motivational technique used, written material and repeated intervention) showed only a minor impact on effect size. Follow-up rates ranged from 31.5% to 92.4%. 9 studies had attrition rate of less than 20%.	
(i) Bien *et al.*, 1993 (ii) USA	Systematic review +	(i) To review the effectiveness of brief interventions for alcohol problems in 1) general health care settings 2) with self-referred drinkers and 3) in specialist treatment settings. (ii) Supported in part by the National Institute on Alcohol Abuse and	(i) 32 studies included in formal analysis (ii) Health care system (n=13), presenting for treatment for alcohol problems (n=15), media recruited (n=4 studies). Setting of studies by country not reported by authors. (iii) Patients drinking excessively (n=5951). Mean age=41 yrs (no further data), 75% male, mean follow-up=22 months	Brief intervention vs control Brief intervention vs more extensive treatment (in specialist treatment setting in patients referred /self-referred for treatment)	BIs in health care settings have been compared with untreated controls in trials undertaken in 14 countries (not summarised). Significant reductions in alcohol use/and or related problems were reported for BI vs no counselling in 7 of 8 RCTs in health care settings. Effect sizes pooled for range of outcomes relating to alcohol consumption (varied between studies, eg. weekly alcohol consumption, typical daily consumption, days since last drink etc). Within-group effect size: (baseline mean – follow-up mean/weighted pooled SD)	Country of setting not reported.

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		Alcoholism	iv) Not reported v) Not reported		Between-group effect size (control follow-up mean – BI follow-up mean/weighted pooled SD) BI vs control Within-group effect size= Mean 0.70 (SD=0.36) Between-group effect size= Mean 0.38 (SD=0.33) BI vs extended therapy Within-group effect size= Mean 0.80 (SD=0.53) Between-group effect size= Mean 0.06 (SD=0.31)	
(i) Burke *et al.*, 2003 (ii) USA	Systematic review ++	(i) To investigate the effectiveness of adaptations of motivational interviewing across clinical problem areas (ii) Not reported	(i) 15 studies focusing on alcohol (ii) Six studies were undertaken in a substance abuse clinic, 3 on college campuses, and the remainder in hospital (n=3), trauma (n=1) and prenatal care (n=1) settings. Setting of studies by country not reported. (iii) No information on population characteristics, including baseline alcohol consumption (iv) Intervention based on adaptations of motivational interviewing (AMI), delivered on individual face-to-face basis, controlled clinical trials design with	Adaptations of motivational interviewing (AMI) which incorporated the use of feedback to the patient on problem behaviours, including alcohol. Reported details of included interventions were limited; however the dose of AMI ranged from 30 to 240 total min. Control groups across all clinical problem areas largely no treatment/placebo.	The authors calculated a small to moderate combined effect size (Hedges' *g*) of 0.25 (95%CI 0.13, 0.37), showing a positive impact of AMI on alcohol consumption (in terms of standard ethanol intake) vs. no-treatment/placebo control. Subjects receiving AMI reduced their drinking frequency from 35.7 (SD=32.9) standard ethanol content (SEC) drinks/wk to 15.6 (SD=25.4) SEC drinks/wk, representing a 56% decrease in alcohol consumption (although the relatively large SD values and the associated uncertainty around these reported mean values must be taken into consideration).	Setting of studies by country not reported.

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			at least 1 control group (v) Not reported			
(i) Cuijpers *et al*., 2004 (ii) Netherlands	Systematic review ++	(i) To determine whether brief interventions for problem drinking reduce mortality (ii) Not reported	(i) 32 studies met inclusion criteria. More than 1 intervention was compared with control in 14 studies = 53 comparisons between experimental and control groups. 3 categories of studies: 1) Studies with verified death rates (eg by death certificates or other reliable sources) (n=4, 6 comparisons) 2) Studies reporting death at follow-up but without verification (n=6, 6 comparisons) 3) Studies without reported deaths at follow-up (n=22, 41 comparisons). Main analyses on 4 studies with verified mortality status. (ii) GP (2 studies), general hospital/GPs/health screening programme (1 study), medical wards (1 study). Apparent countries of original USA (2 studies), Australia (1 study), unclear (1 study). (iii) Problem drinkers (n=7521 (in 33 studies)).Total number of deaths: 33 (experimental groups), vs 46 (control groups). Heavy	Used operationalisation of brief interventions developed by Moyer *et al.* Brief interventions comprised no more than 4 sessions, with recommendation to reduce drinking. No limit for contact time used (as typically not contained in published reports). Written self-help guides without contact with professionals also considered to be brief interventions. Follow-up showed considerable variation (1 to 10 years). GP-delivered sessions with advice and education (2 studies), simple advice; brief counselling, extended counselling (1 study), counselling by nurse (1 study)	Follow-up periods for the 4 studies with verified mortality rates were 1 yr, 2 yrs, 4 yrs and 10 yrs. Mortality rates were based on person-years (used when follow-up times are unequal). 1) Relative risk of dying in subjects receiving brief intervention vs control subjects Studies with verified mortality rates (n comparisons=4) RR=0.47 (95%CI 0.25, 0.89) All studies (n comparisons=32) RR=0.57 (95%CI 0.38, 0.84) Studies without verified mortality rates (n comparisons= 28) RR=0.63 (95%CI 0.38, 1.06) Studies with reported mortality rates (n comparisons=10) RR=0.52 (95%CI 0.33, 0.82) All comparisons from studies with verified mortality rates (n comparisons=6) RR=0.52 (95%CI 0.31, 0.89) All comparisons from all studies (n comparisons= 53) RR=0.69 (95%CI 0.50, 0.97) 2) Prevented fraction Studies with verified mortality rates (n comparisons=4) 0.33 All studies (n comparisons= 32) 0.32 Studies without verified mortality rates (n comparisons=28) 0.28	No studies from UK.

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			drinkers, aged 18-65 (2 studies), aged 65 and above (1 study), aged 18-69 (1 study). 3 studies mixed gender, 1 study men only. iv) Inclusion 1) Comparison of brief intervention to no intervention control group 2) with at least pre-test and post-test measurement 3) randomised studies 4) Studies in subjects who did not seek treatment themselves Exclusion 1) Studies of treatment-seeking subjects 2) Studies of subjects who accepted referral to specialist services 3) Studies in which control subjects received advice to reduce alcohol consumption 4) Interventions in pregnant women 5) Studies in subjects with psychiatric disorders v) Not reported		Studies with reported mortality rates (n comparisons= 10) 0.36 All comparisons from studies with verified mortality rates (n comparisons=6) 0.23 All comparisons from all studies (n comparisons= 53) 0.23 3) Number needed to treat (ie. Number of subjects required to be treated to prevent one death) Studies with verified mortality rates (n comparisons=4) 282 All studies (n comparisons= 32) 243 Studies without verified mortality rates (n comparisons=28) 217 Studies with reported mortality rates (n comparisons= 10) 154 All comparisons from studies with verified mortality rates (n comparisons=6) 317 All comparisons from all studies (n comparisons= 53) 309	
(i) D'Onofrio & Degutis, 2002 (ii) USA	Systematic review +	(i) To review evidence for the effectiveness of screening and brief intervention (SBI) in the emergency department setting (due to limited studies relating specifically to ED, the review remit was	(i) 27 included studies (ii) Review remit was expanded to include general populations, primary care and inpatient interventions. Selected populations were: high school/college students, adult primary care, ED adults and adolescents and hospitalised adults. 4 studies in pregnant women (and therefore not suitable for discussion	Interventions were described as short, motivational sessions incorporating feedback, education and advice to lower consumption. Length and intensity of BI varies between studies. Initial session lasted between 5 and 60 min and consisted of a single session or up to 6 follow-up visits. Include D standard care and no intervention	4 studies reported on use of BI in ED: Chavetz *et al*. 65% of patients randomised to treatment group (user-friendly referral system) made follow-up visit to alcohol clinic (vs 5% in control) (and approx 50% returned to clinic for 5 or more visits). Monti *et al*. 30 min brief motivational interview vs standard care among 18-19 yr olds presenting to ED after alcohol-related event. At 6 months follow-up, BI group had significantly lower incidence of alcohol-related injuries ($p<0.01$), drinking and driving and social consequences and	Country of setting not reported.

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		expanded to include general populations, primary care and inpatient interventions). (ii) Funding not reported	by PHCC). 4 studies were specific to ED setting. 2 in primary care, 4 in prenatal clinics (therefore not suitable for discussion by PHCC), 2 in outpatients clinics, 3 in general population, 1 in inpatient care and 1 covered a range. Setting of studies by country not reported by authors. (iii) Selected populations were: high school/college students, adult primary care, ED adults and adolescents and hospitalised adults (n range=47 to 1119). Study populations covered 3 distinct subgroups: inpatients, outpatients and college students. Ages ranged from 12 to 70. Several studies were gender-specific. iv) Exclusion: studies containing subsets of or continuations of previously published original data. v) Some studies included alcohol dependent patients, whilst others focused on non-dependent patients.		alcohol-related social problems ($p<0.05$) vs standard care subjects (no further data reported). Both groups significantly reduced alcohol consumption during period (no further data reported). Bernstein *et al*. Screening of adult ED patients using health needs history by community outreach workers, with positively screened received brief interview (15-20 min) based on readiness-to-change principles. Patients enrolled in follow-up programme mainly alcohol/drug-dependent. 50% reported contact with specialised treatment centre and 56% reported reduction in alcohol use (no further data reported). Wright *et al*. Alcohol health workers identified and counselled patients in ED in UK (NB: specialist intervener). At 6 months follow-up, 65% (n=46) reported drinking less alcohol vs 8.5% (n=6) who reported drinking more. Overall reduction statistically significant ($p<0.0001$). Total of 32 studies reported positive effect in one or more outcome variables (no data reported for outcomes). Primary outcome of decreased morbidity and mortality observed in 12 studies (measured by GGT, blood pressure, foetal alcohol syndrome (therefore not suitable for discussion by PHCC) and injuries. Positive effect for secondary outcomes (no data reported) reported as follows: decreased alcohol consumption (29/32 studies, 90%), fewer ED/outpatient visits and hospitalisations (4/32, 13%), decrease in social consequences (4/32, 13%) and increase in referrals (4/32, 13%).	

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(i) Emmen *et al.*, 2004 (ii) Netherlands	Systematic review ++	(i) To determine the effectiveness of opportunistic brief interventions for alcohol misuse in a general hospital setting (ii) Netherlands Organisation for Health Research and Development	(i) 8 included studies (ii) Hospital inpatient and outpatient specialist clinic settings (2 trials: hypertension, somatic clinics). Setting of studies by country not reported by authors. (iii) Hospital inpatients and outpatients at specialist clinics. 1597 problem drinkers allocated to opportunistic intervention or usual care (trial range 45 to 428). Age not reported. 2 trials included men only. Remaining 6 included both men and women (proportions not reported). Ethnicity not reported. Mean alcohol intake not reported in 1 study. Mean (SD) intake at baseline (g/wk) ranged from Intervention 179 (106) vs Control 160 (140) (Persson and Magnusson) to Intervention 600 (252) vs Control 551 (228) (Maheswaran *et al*.). iv) Inclusion 1) Individually randomised, cluster randomised or quasi-randomised trials and non-randomised trials with equivalent groups at baseline 2) evaluating opportunistic brief intervention for problem drinking 3) having control group receiving no intervention 4) set in hospital or	Used classification defined by Poikolainen: brief interventions (5 to 20 minutes) and extended brief interventions (several visits). 3 trials: very brief interventions involving advice or education (booklet also distributed in 2 of these trials). Extended brief intervention lasted 30 to 75 minutes, mostly consisting of single counselling session by professional experienced in treatment of alcoholism or brief alcohol-related medical advice from physician with several follow-up sessions. Interveners: nurses, psychologists, combinations of these, or intervention team specialised in substance misuse (Welte *et al*.). Follow-up ranged from 2 to 18 months. Loss to follow-up ranged from 9% (Maheswaran *et al*., brief advice 10 to 15 min by clinic physician and 4 follow-up sessions) to 50% (Rowland and Maynard, audiovisual presentation by nurse or researcher and booklet). No intervention/usual care	Mean difference (95%CI) in alcohol consumption between baseline and follow-up: Only 1 trial showed statistically significant reduction in alcohol consumption: -309 (95%CI -470 to -148) (g/wk) (Maheswaran *et al*., brief advice (10 to 15 min) delivered by hypertension outpatient clinic physician and 4 follow-up sessions, 2 month follow-up, 9% loss to follow-up). Alcohol-related problems 4 trials reported reductions in alcohol-related problems (Elvy *et al*: confrontational interview by psychologist; Persson and Magnusson: biofeedback on lab tests monthly by nurse and every 3rd month by doctor in outpatients clinic); Chick *et al*: 60 min counselling with experienced nurse and booklet; Rowland and Maynard: audiovisual presentation by nurse/researcher and booklet) Changes in laboratory markers 2 trials showed statistically significant reductions in levels of gamma-glutamyltransferase (Maheswaran *et al*., Chick *et al*)	Country of setting not reported.

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			specialist outpatient clinic 5) had psychosocial (cognitive or behavioural) intervention 6) alcohol consumption reported as outcome measure v) Inclusion 1) weekly alcohol consumption 2) evidence of alcohol on screening 3) medical record of history of alcohol misuse 4) increased concentration of gamma-glutamyltransferase Exclusion 1) Patients with serious medical or psychiatric disorders 2) For 5 studies: history of advice or treatment for drinking problems or severe alcohol dependency			
(i) Havard *et al.*, 2008 (ii) Australia	Systematic review ++	(i) To investigate the effectiveness of emergency department-based brief interventions in reducing alcohol consumption and related harm (ii) Alcohol Education and Rehabilitation Foundation of Australia	(i) 13 included studies (ii) Emergency departments. Setting of studies by country not reported by authors. (iii) Emergency department attendees (n range=85 to 1334). iv) Exclusion: 1) not based on ED 2) not specific to alcohol use 3) repeated publication of included original data 4) non-peer reviewed publication 5) not evaluation of intervention 6) specialist treatment of alcohol dependent patient	Interventions were brief motivational counselling, with some including written materials, personalised feedback. 2 studies were computer-based. 10 sessions evaluated 1 session of counselling (1 study added booster session 7 to 10 days later). 8 of the counselling interventions included principles of motivational interviewing. 8 provided written materials with combination of generic advice and/or personalised feedback. Length of counselling session lasted 5 to 60 min (not reported in 2 studies). 6 studies stated that majority of counselling took place during ED visit; 2 studies reported counselling on outpatient basis (period of referral unclear). Interveners included research staff, ED	Quantity/frequency: 12 months: pooled effect size = -0.14 (NS, no further data) Frequency of heavy drinking 3 months: pooled effect size = 0.03 (NS, no further data) (statistically heterogeneous, P=0.05) 12 months: pooled effect size = 0.03 (NS, no further data) Drinking consequences: 6-12 months: pooled effect size = - 0.14 (NS, no further data) (statistically heterogeneous, P=0.09) Alcohol-related injuries: 6-12 months: pooled effect size OR = 0.59 (statistically significant, P<0.005)	Country of setting not reported.

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			v) Ten studies used at least 1 alcohol-related criterion: blood alcohol concentration >0%, 0.02% or 0.03%; CAGE score ≥1; AUDIT score >5 or >7; positive PAT score; hazardous drinking according to National Institute on Alcohol Abuse and Addiction; self-reported alcohol consumption in 6 hours before injury. 10 studies included mean age ranging from 16 to 44, 1 restricted to college students, 6 restricted inclusion to those presenting to ED with an injury or by accident type. Exclusion criteria included patients being too intoxicated on presentation; AUDIT score >14 or history of alcohol dependence; severe somatic and psychiatric co-morbidities; in contact with alcohol services; abstainers; pregnant, non-residents of ED area; member of hospital staff or not speaking English/Spanish/German.	staff, health promotion workers, nursing and social work staff, computer programme, and therapists. In 2 studies (Crawford *et al*., Wright *et al*), the intervener was an alcohol health worker. 5 studies reported minimum of 80% follow-up. Control groups included standard care (4 studies), standard care plus generic written advice (2 studies), 5 min brief advice plus generic written advice (2 studies) or generic written advice alone (1 study). 2 studies had 2 comparison conditions: standard care plus personalised written advice, and standard care plus further assessment. In 2 studies no control group was used.	Not possible to determine sources of heterogeneity through subgroup analyses as too few studies for inclusion.	
(ii) Hettema *et al.*, 2005 (ii) USA	Systematic review ++	(I) To review the evidence for the effectiveness of motivational interviewing (ii) Not reported	(i) 32 included studies on alcohol misuse (ii) Settings were mainly healthcare-based but included general practice, emergency care, outpatient or inpatient care, educational and mixed settings and	Comparisons included: MI vs. no treatment/placebo; testing additive effects of MI to standard/established treatment; and MI vs standard/established treatment. Dose ranged from 0.55 to 6 hours (although was typically of 1-2 hrs). Interveners included psychologists, masters level counsellors, research students, physicians and were	Effect sizes for all outcome variables related to the problem under study calculated (no further detail reported). A mean effect size of 0.41 (95%CI 0.31, 0.51) was reported at 3 months or less post-treatment and 0.26 (95%CI 0.18, 0.33) across all follow-up points. The largest effect sizes (>0.7 in each case) were observed in studies where MI was compared with no treatment, waiting list or education control groups or where MI was added to standard treatment.	Country of setting by study not reported.

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			were unspecified in some cases. Country of setting by study not reported. (iii) Reported mean ages of study participants ranged from 19 to 58 yrs. The gender composition of samples ranged from 0 to 100% male. Samples were typically largely European American. Baseline alcohol consumption not reported. (iv) Not reported (v) Not reported	unspecified in some cases.		
(i) Hunter Fager *et al.*, 2004(Hunter Fager & Mazurek Melnyk 2004) (ii) USA	Systematic review ++	(i) To review evidence of intervention studies targeted at decreasing alcohol use in college students (ii) Funding not reported	(i) 15 included studies (ii) Undergraduate college settings. All but 1 study included undergraduate college samples from the USA (with Sweden being the exception) (n range =23 to 814). (iii) Undergraduate college students. No data on drinking, mean age ranged from 18.1 (SD=0.05) to 21.3 (no stats reported), 2 studies solely in females, primarily White, with lowest proportion of White subjects=62%. iv) Inclusion 1) intervention studies in college	Interventions included screening, questions, brief motivational intervention, feedback on drinking (including by mail and telephone), 1 included education for bartenders, group sessions (no data on duration). No intervention	Of 15 studies, 9 showed evidence of at least short-term effect of reducing alcohol consumption in samples used. 1 study reported 4 year follow-up data (Baer *et al*., 2001) and showed significant reduction in consumption and associated problems from alcohol use between experimental and control group (narrative, no quantitative data reported).	No studies from UK. 14/15 from USA. Limited applicability to UK (due in part to college campus-specific setting, and USA policy relating to drinking age)

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			students 2) quasi-experimental or experimental design including control group not receiving intervention 3) at least 1 outcome relating to change in drinking or consequences of drinking Exclusion 1) relating to very specific subpopulations of general college population 2) primary outcomes not alcohol use v) Not reported			
(i) Hyman, 2006 (ii) USA	Systematic review +	(i) To investigate the effectiveness of brief alcohol interventions and the role of the nurse as intervener (ii) Funding not reported	(i) 6 systematic review and meta-analyses (already included in PHCC review and therefore not extracted). 3 RCTs investigating effectiveness of nurse-delivered brief interventions for alcohol misuse. (ii) Family practice (Canada), primary health centre (Sweden), general medical wards (England) (iii) Hazardous, harmful, heavy or high-risk adult drinkers (n not reported). iv) Inclusion: Clinical trials and meta-analyses of primary health care-based brief	Nurse-delivered brief interventions 1) McIntosh *et al*. i) physician-delivered brief intervention of 5 min brief advice ii) 2 30 min sessions of cognitive behaviour strategies delivered by physician vs same 2 strategies delivered by nurse 2) Tomson *et al*. BI vs control 3) McManus *et al*. BI (60 min BI with follow-up 1 month after discharge) vs no intervention	McIntosh *et al*. No difference between treatment groups at 3, 6 or 12 month follow up in monthly quantity and frequency measures (therefore interveners were considered to deliver interventions of equivalent effectiveness) Tomson *et al*. Interventions delivered by nurses are feasible. McManus *et al*. 63 to 68% reduction in alcohol consumption in BI vs 7% in controls (no further data)	1/3 studies from UK.

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			interventions for hazardous, harmful, heavy or high-risk adult drinkers Exclusion: Studies relating to alcohol treatment settings or with a focus on alcohol dependent individuals. v) Not reported			
(i) Kahan *et al*., 1995 (ii) Canada	Systematic review ++	(i) To review the effectiveness of brief interventions delivered by physicians to problem drinkers (ii) Not reported	(i) 11 included studies (ii) Studies conducted in general practice (n=4), general population (n=2), inpatient (n=1), outpatient (n=3) and mixed health and non-health (n=1) settings. Setting of studies by country not reported. (iii) Ages of participants and baseline alcohol consumption not reported. (iv) Inclusion: trials examining effectiveness of interventions and delivered by physicians in reducing alcohol consumption in healthcare. Exclusion: studies in which	Sessions were described as lasting 30 min or less (no further information). Interveners included GPs, clinic and research physicians, nurses, social workers and psychiatrists. It was noted that in several control groups subjects received minimal advice by the intervener to cut down on their drinking.	In 3 studies, the proportion of male subjects in the intervention group decreasing their alcohol consumption to moderate levels (where moderate drinking was defined as 13 to 16 drinkers per week (no further detail)), was greater than control group subjects by 18%, 13% and 7%. Four of the 8 studies measuring GGT levels, reported a significantly greater decline in levels in male intervention group patients vs control group subjects (no further data). Two studies described a significant decrease in systolic blood pressure. The authors noted that the findings for women were less conclusive. Only 1 trial reported statistically significant improvements in alcohol consumption, with a reduction of 3.4 drinks/wk on average and a greater proportion of female intervention group subjects reducing their drinking from heavy to moderate levels vs control group participants (18.5%).	Setting of studies by country not reported.

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			subjects attended specialist alcohol treatment clinic or where interventions were delivered by non-physicians (v) Not reported			
(i) Kaner *et al.*, 2007 (ii) UK	Systematic review ++	(i) To determine the effects of brief interventions in primary care on alcohol consumption and explore impact on different types of drinkers using the following comparisons: 1) Brief intervention (BI) vs control condition (assessment only, standard treatment or non-intervention) 2) Brief intervention vs extended psychological intervention (EBI) (ii) Department of Health Primary Care Career Scientist Award and Cochrane Collaboration, UK,	(i) 29 RCTs included in review. 22 RCTs in primary meta-analysis of BI vs control in terms of alcohol consumption. 5 trials evaluated effectiveness of extended interventions. (ii) Primary care (operationalised to include all immediately accessible general health facilities covering broad range of clinical needs and can be accessed on demand). 24 trials in general practice-based care, 5 in A&E departments. 11 trials in USA, 5 in UK, 5 in Spain, 2 in Canada, 2 in Sweden, 2 in Finland, 1 in France and 1 in Australia. (iii) Patients presenting to primary care not specifically for alcohol treatment, identified as having excessive alcohol consumption or have experienced harm as a result of their drinking (dependent drinkers not main focus of review). Baseline consumption of alcohol	Brief intervention of a single session (13 trials), up to a maximum of 4 sessions. Number of sessions ranged from 1 to 5. Individual sessions lasted from 1 to 50 min. Total intervention exposure time ranged from mean of 7.5 min to 60 min. Incorporated engagement with a patient and provision of information and advice to reduce alcohol consumption and/or alcohol-related problems. Interveners were GPs, nurse practitioners or psychologists. 1) control condition (assessment only, standard treatment/usual care (9 trials) or no intervention (3 trials)). In 6 studies, subjects were given a leaflet on general health issues or alcohol), 1 usual care and a leaflet 2) extended psychological intervention (EBI) (aimed at reducing alcohol consumption or alcohol-related problems) (not likely to be delivered in routine practice due to required length or intensity of intervention). 5 trials investigated EBI. Sessions ranged from 2 to 7, with duration of initial and booster sessions ranging from 15 to 50 min. 1 trial compared EBI vs nurse-delivered feedback on GGT levels.	*Brief intervention vs control* 1) Self or other-reported drinking quantity Meta-analysis: participants receiving brief intervention consumed less alcohol than control subjects after 1 yr or longer of follow-up (mean difference = -38 g/wk, 95%CI – 54 to -23) (but considerable heterogeneity between trials: I^2=57%). Subgroup analysis by gender (8 studies, 2307 subjects): BI effective in men (mean difference= - 57 g/wk, 95%CI – 89 to -25, I2=56%) but not in women (mean difference = -10 g/wk, 95%CI -48 to 29, I^2=45%). 11 effectiveness trials (mean difference = -28, 95%CI -48 to -9 g/wk) vs 11 efficacy trials (mean difference = - 51, 95%CI -77 to -25 g/wk). Meta-regression: no conclusive evidence of greater reduction in alcohol consumption with increased treatment exposure (increase in reduction of alcohol consumption of 1.0, 95%CI -0.1 to 2.2 g/wk) for each increase of 1 minute in treatment exposure) or among less clinically representative trials. Extended intervention had non-significantly greater reduction in alcohol consumption than brief intervention (mean difference= -28 g/wk, 95%CI -62 to 6, I2=0%). 2) Self or other-reported drinking frequency	5 studies from UK.

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		small grant from the University of Newcastle upon Tyne, UK	was reported in 21 trials and ranged from 89 to 456 g/wk (mean = 313 g/wk (no further data). Mean for males=377 g/wk (no further data). Mean amongst females=219 g/wk (no further data). 4 trials reported baseline drinking frequency, with a mean value of 0.9 binges/wk (no further data). Baseline intensity of drinking was reporting in 5 trials, with mean value of 110 g per drinking day. In 22 trials for primary meta-analysis of alcohol consumption (BI vs control) (n=7619 (range 83 to 909), mean age of participants was 43 years (no further data), with 5856 (77%) of subjects assessed at the end of follow-up. 67% of subjects were male in studies reporting gender. 8 trials reported ethnicity, in which 72% were white. Primary meta-analysis of extended intervention vs brief intervention included 4 trials. 3 trials reported mean ages of 44, 44 and 39 yrs. In 3 trials 57-70% of subjects were male. No trials reported ethnicity. iv) Studies 1) of RCT design (including cluster randomised trials) 2) including patients presenting to primary care not		3 trials reported number of drinking days per week, stating no significant effect of BI vs control (mean difference = -0.04, 95%CI -0.5 to 0.4 drinking days/wk). No significant difference by gender. 3 trials reported frequency of binge drinking, with no significant difference between groups observed (mean difference = - 0.3 (95%CI -0.6 to 0.0) binges/wk. 3) Self or other-reported drinking intensity 5 trials reported amount of alcohol consumed per drinking day. No significant reduction in drinking observed following BI: mean difference = -3.1, 95%CI -8.8 to 2.6 g/drinking day. No significant difference between men and women. Women experienced statistically non-significant increase in alcohol per drinking day following BI (mean difference = 24.2, 95%CI -17.2 to 65.5 g/drinking day). Amongst men, there was a statistically non-significant decrease (mean difference= -7.4, 95%CI -31.5 to 16.8 g/drinking day). 4) serum GGT and MCV GGT: No significant difference between BI vs control, with no heterogeneity (mean difference= -1.1, 95%CI -3.9 to 1.7 U/l, I^2=0%). No significant difference between men and women. Men showed non-significant decrease in GGT following BI (mean difference = -2.2, 95%CI 6.3 to 2.0 U/L) whilst women experienced a non-significant increase (mean difference = 3.5, 95%CI -6.0 to 12.9 U/l, I^2=29%). MCV: 1 trial reported MCV. No significant difference between B and control, both overall (mean difference=0.6, 95%CI -1.6 to 2.8 fl) and for each gender separately (no data reported). 5) Alcohol-related harm to drinker or others	

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			specifically for alcohol treatment 3) evaluating brief intervention of up to 4 sessions v) Patients screened if attending primary care or accident and emergency department, not specifically relating to alcohol use. Patients excluded if heavily alcohol dependent or already on treatment programme within preceding 12 months.		1 trial reported 0.5 fewer visits to ED by BI subjects during year after randomisation. 1 trial reported 47% reduction in new injuries requiring treatment in ED/readmission to trauma service in BI group (hazard ratio=0.53, 95%CI 0.26 to 1.07, p=0.07), reduction of 48% in inpatient hospital readmissions for injury vs control after 3 years (hazard ratio=0.52, 95%CI 0.21 to 1.29) but no significant difference in mortality between BI and control groups. 1 study reported no difference in DrInC consequences between BI and control group. *Extended interventions vs brief intervention* 1) Self or other-reported drinking quantity Subjects receiving EI consumed less alcohol than BI (mean difference= -28, 95%CI – 62 to 6 g/wk, I2=0%). However, the only trial with adequate concealment of allocation showed no significant difference between EI and BI (mean difference – 17, 95%CI -64 to 29 g/wk). By gender: no significant difference between EI and BI for men (mean difference = -17, 85%CI -90 to 57 g/wk) or women (mean difference = -52, 95%CI -181 to 77 g/wk). 2) Self or other-reported drinking frequency 1 trial reported number of drinking days, with statistically significant benefit of EI vs BI (mean difference = -0.7, 95%CI -1.3 to -0.1 g/drinking day (I^2=53%). 3) Self or other-reported drinking intensity 2 trials reported drinking intensity, with no significant difference observed (- 5.8 (95%CI – 12.7 to 24.4) g/drinking	

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					day (I^2=53%). 4) Serum GGT and MCV GGT: 2 trials showed no significant difference between EI and BI (mean difference = -2.6, 95%CI -15.7 to 10.4 U/l). MCV (no data reported). 5) Alcohol-related harm to drinker or others 1 study reported that, after 1 yr, participants who received extended intervention had significantly fewer DrInC consequences vs control.	
(i) Laker, 2007 (ii) UK	Systematic review (+)	(i) To investigate the effectiveness of harm reduction and motivational interviewing interventions in the treatment of patients with a dual diagnosis (ii) Not reported	(i) 3 studies included on alcohol misuse (ii) Not reported (iii) Not reported (iv) Not reported (v) Not reported	Motivational interviewing (no further detail reported) Control groups received information package alone or educational treatment (no further data)	One study, investigating the use of brief interventions for alcohol misuse in adult psychiatric in-patients, found a significant improvement (according to the National Health and Medical Research Council classification of categorization according to levels of improvement) in subjects in the motivational interviewing group vs control subjects receiving an information package alone (no further data). A further study showed no difference in effect between motivational interviewing and control group (receiving information package only) in terms of hospital admissions at 5 years. A third study reported significantly reduced alcohol consumption at 4, 8 and 24 weeks in the motivational interviewing group vs control group subjects receiving an educational treatment (no further data).	Setting of study by country not reported.
(i) Littlejohn, 2006(Littlejohn & Littlejohn 2006) (ii) UK	Systematic review +	(i) To determine whether socioeconomic status (SES) has effects on a) willingness to participate in brief intervention research b) attendance to	(i) 18 studies included in review (9 of which reported a significant outcome of intervention compared to control and 4 of which reported on SES influence on outcome. (ii) For 4 studies presenting data according to SES. Primary care.	Brief interventions for non-dependent alcohol misuse. BI defined as intervention providing feedback and advice to change to non-dependent, non-treatment seeking alcohol drinkers, where intervener is generalist medical or nursing staff. Control (no further information)	None of the included 4 papers found any evidence of SES influencing changes in alcohol consumption at follow-up (no further data).	Country of setting not reported.

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		receive BI once allocated c) treatment outcome. Only data related to outcome extracted in relation to this review question. (ii) Funding not reported	Setting of studies by country not reported by authors. (iii) Non-dependent hazardous or harmful drinkers in primary care. SES defined as follows: by social class (no further information) (Scott & Anderson, 1990; Anderson & Scott, 1992), by employment (professional or technical-mechanical or labour-machine or retired or farm or sales-service or homemaker or unemployed) and education (high school or less / some college / college degree or more) (Fleming *et al*., 1997), and education only (as above) (Fleming, 1999). For 4 studies presenting data according to SES: n= 1158 iv) Inclusion 1) RCTs of BI for non-dependent hazardous or harmful drinkers in primary care Exclusion 1) Secondary analyses of previously published trial data 2) Trials reporting only specialist treatment for alcohol use disorders (specialist treatment defined as any intervention delivered by a practitioner or service with a specialist focus on substance misuse or addiction)			

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			v) Not reported			
(i) McCambridge & Jenkins, 2008 (ii) UK	Systematic review ++	(i) To investigate the potential secondary effects of brief interventions that target alcohol consumption on cigarette smoking (ii) No specific funding obtained	(i) 7 individual trials (where smoking data were available for baseline and follow-up points) (ii) Primary care, occupational health clinic, emergency hospital settings, general hospital wards, teachers college and health screening agency. Finland (1 study), Sweden (1 study), USA (4 studies) and 10 countries (1 study). (iii) Smoking participants within studies of brief interventions for alcohol misuse. 2293 smokers identified at study entry across 7 studies (range 94 to 1599). 2283 smokers, 1426 randomised to intervention groups and 857 to control groups. General and older adults (with lowest stated age being 18 years). iv) Reviews published in peer-reviewed publications between 1995 and 2005 and providing information on search strategies and inclusion criteria for primary studies	Range of interventions, including advice, counselling, feedback, written materials Range of control conditions including general health booklet, advice to reduce drinking, one session on drinking, written material, no intervention, 20 min WHO composite interview	2 studies did not report between-group differences in alcohol consumption. 2 studies (Fleming, 1999, 2000) reported between-group differences in alcohol consumption as result of provision of 2 session of BI in community-based primary care practices in USA (workbook with feedback and information, follow-up phone call) (vs control condition of general health booklet only (no data reported). 1 study (Monti *et al*) reported between-group differences in harm as a result of 1 session of motivational interviewing and handout on drinking and driving in hospital emergency room in USA (vs control condition of handout only) (no data reported). 1 study (Welte *et al*) described between group differences in intervention groups (1) Health Care Intervention Service full intervention 2) Health Care Intervention Service risk reduction intervention (no further information)) (vs control condition of no intervention) In The WHO Brief Intervention Study Group study (1996) between group differences in alcohol consumption were seen for males only, with all interventions equivalent (incorporating combinations of advice, counselling, follow-ups). Smoking cessation In ITT analyses (including non-randomised study), higher	No studies from UK.

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			v) Not reported		levels of cessation in control groups (10.3% (95%CI 8.2 to 12.3%)) vs intervention groups (9.4% (95%CI 6.4 to 12.3%) (P=0.042). In ITT analyses (excluding the non-randomised study), difference in rates is no longer present: control (10.4% (95%CI 8.2 to 12.6%) vs intervention (10.5% (95%CI 7.3 to 13.7%)) (P=0.42) (I^2 reduced from 62% to 53%). Mean number of cigarettes smoked per day Mean difference between baseline and follow-up: no statistically significant difference between intervention and control groups: -0.08 (-1.38 to 1.21) cigarettes per day (P=0.74).	
(i) Moyer *et al.*, 2002 (ii) USA	Systematic review ++	(i) To investigate the effectiveness of brief interventions in treatment-seeking and non-treatment-seeking populations (ii) National Institute on Alcohol abuse and alcoholism grant, the VA Quality Enhancement Research Initiative and the VA Mental Health Strategic Healthcare Group	(i) 34 (BI vs control in non-treatment-seeking subjects). 20 (BI vs extended treatment in treatment-seeking subjects) (ii) Care setting not reported. Setting of studies by country not reported. (iii) Treatment-seeking (individuals responding to advertisements or referred/mandated to alcohol treatment) and non-treatment seeking (individuals identified opportunistically during care other than for alcohol) populations. iv) Inclusion 1) Studies of BIs of no more than 4	Brief intervention (classed as providing no more than 4 sessions, typically including interview, feedback and advice, some with written materials). Extended intervention (no further detail reported on extended intervention)	BI vs control in non-treatment-seeking subjects (aggregate effect sizes (positive values indicate more positive outcomes for BI vs control): Composite of all drinking-related outcomes (P value and 95%CI significance, p value for heterogeneity) Follow-up: ≤3 months 0.300 (P<0.01, 95%CI 0.082, 0.518) (p=0.211) >3-6 months 0.144 (P<0.001, 95%CI 0.081, 0.206) (P=0.391) >6-12 months 0.241 (P<0.001, 95%CI 0.184, 0.299) (p=0.105) >12 months 0.129 (NS, 95%CI -0.007, 0.060) (p=0.188) Alcohol consumption Follow-up:	Country of setting not reported. Applicability to UK unclear.

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			sessions. Some interventions involved no contact with intervener, but were based on use of written self-help materials. Exclusion 1) Studies in pregnant women v) 27/34 BI vs control studies (non-treatment-seeking) excluded alcohol-dependent subjects. 10/20 of BI vs extended treatment (treatment-seeking subjects) excluded such individuals. 39 studies excluded more severe drinkers.		≤3 months 0.669 (P<0.001, 95%CI 0.392, 0.945) (p=0.164) >3-6 months 0.160 (P<0.001, 95%CI 0.098, 0.222) (p=0.048) >6-12 months 0.263 (P<0.001, 95%CI 0.203, 0.323) (p=0.000) >12 months 0.202 (NS, 95%CI -0.008, 0.412) (p=0.381) At follow-up after >3-6 months, effect for BI vs control significantly larger if subjects with alcohol dependence were excluded. BI vs extended treatment in treatment-seeking samples (aggregate effect sizes (positive values indicate more positive outcomes for BI vs extended treatment): Composite of all drinking-related outcomes (P value and 95%CI significance, p value for heterogeneity) ≤3 months – 0.028 (NS, 95%CI – 0.224, 0.168) (p=0.995) >3-6 months 0.171 (NS, 95%CI – 0.015, 0.356) (p=0.194) >6-12 months 0.025 (NS, 95%CI – 0.101, 0.152) (p=0.998) >12 months 0.008 (NS, 95%CI – 0.118, 0.134) (p=0.965) Alcohol consumption ≤3 months 0.000 (NS, - 0.634, 0.634) (p=1.000) >3-6 months 0.415 (P<0.01, 95%CI 0.119, 0.711) (p=0.182) >6-12 months 0.004 (NS, 95%CI – 0.152, 0.161) (p=0.969) >12 months 0.034 (NS, 95%CI – 0.107, 0.175) (p=0.097)	

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					Only 2 studies described BI vs control in treatment-seeking subjects and found small to moderate effects sizes towards BI (no further data). 1 study compared BI vs extended treatment (series of drink driving workshops, and not of relevance to PHCC) in non-treatment-seeking subjects reported results as 'non-significant.' (no further data) Investigated impact on gender. No significant heterogeneity in effect sizes for males and females at any follow-up point.	
(i) Nilsen *et al*., 2008 (ii) Sweden	Systematic review, ++	(i) To review the effectiveness of brief interventions delivered to injury patients in emergency care settings (ii) Swedish National Rescue Servicxes Agency, Center for Disease Control, and the National Institute of Alcohol Abuse and Alcoholism	(i) 14 included studies. 12 reported pre and post BI results. 2 assessed only post BI results. (ii) Emergency care settings. 8 studies focued on injury patients treated I emergency departments. 5 studies involved patients admitted to hospital inpatient service (3 in Level 1 trauma centres, 2 in hospitals). 9 studies conducted in the USA, 5 in Europe (Finland, Wales, Spain, Germany, Switzerland) (iii) All studies with the exception of 2 (Antti-Poika and Smith, males only) included both genders. 6 studies included patients aged 18 yrs and over. Blow included	BIs were delivered by: nurses (Antti-Poika in inpatient hospital and outpatient department, Smith, Dauer, Sommers), physicians (Antti-Poika, outpatient department), psychologists (Gentilello), research assistants (Runge), social worker or trauma surgeon (Schermer), trained masters and/or PhD-level counsellors or psychologys students (Longabaugh, Daeppen, Soderstrom), computer-based BIs with provision of computer-generated feedback (Maio, Blow, Neumann). Duration of BI sessions varied from few min to 1 hour. Most studies included 1 BI session (Sommers and Longabaugh both included 2 sessions, Antti-Poika used 2 to 5 sessions. BIs in studies by Gentilello, Longabaugh, Smith, Duer, Schermer, Sommers, Daepen, Soderstrom based on motivational interviewing principles and guided by FRAMES methodology (Feedback,	BI patients showed greater reductions in negative outcomes than control group subjects. However control group patients also tended to show improvements. Antti-Poika observed that more than twice as many BI patients vs control group subjects had 'improved' at 6 months after intervention, with improvement classed as decrease in alcohol consumption by at least one third and decrease in GGT by at least 20%. Alcohol intake decreased in both BI and CG groups at 6 months but at 12 months FU, difference was mainted solely in BI subjects. Smith observed greater improvements at 12 months in BI patients vs CG patients in alcohol problems, drinking above recommended levels and proportion of hazardous drinkers. Most intensive condition but not regular BI condition reduced alcohol-related negative consequences more than CG group at 12 months. 5 studies (Dauer, Schermer, Sommers, Daeppen and Soderstrom) did not observe significant differences between treatment groups. Maio was only study in which favourable results for either BI or CG conditions were not observed. Blow and Neumann reported favourable results. Antti-Poika, Gentilello, Dauer, Sommers, Neumman and	

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			patients aged 19 yrs and over. Maio included patients aged 14 to 18 yrs. Most studies focued on non-dependent 'at risk' or hazardous drinkers. Maio was 'universal' and did not apply any alcohol inclusion criteria. Number of patients ranged from 85 (Dauer) to 1139 (Neumann). (iv) Key inclusion criteria: intervention study population included only injured patients; care and delivery of BI performed in emergency care settings; intervention goal was reduction in alcohol intake, reduced risky drinking practices, reduced alcohol-related negative consequences, reduced injury frequency, English publications only	responsibility, advice to change, menu of alternative choices, empathy and self-efficacy). 3 studies did not use tradition control group conditions but compared BI groups of varying intensity. Blow compared 4 BI conditions. Dauer compared regular BI group with shorter intervention of simple advice. Soderstrom compared personalised motivational interview with information and advice intervention.	Daeppen suggested alcohol-related injury may result in self-initiated behaviour change. More intensive interventions typically yielded more favourable effects, but unable to make any dose-response conclusions. Longabaugh found booster sessions to be required. 1 study focused on facial injury patients treated in outpatient clinic following ED care in Wales (Smith, 2003) (male patients aged 16-35 yrs, alcohol intake 8+ units prior to injury). BI vs control. Bi: 1 session delivered by nurse during follow-up care at outpatient clinic (duration not reported), consisting of manual-guided counselling based on MI principles. At 3 month follow-up, proportion drinking above recommended levels showed slight reduction. At 12 month, thisshowed decrease from 60% at baseline to 27% for BI group vs. 54% to 51% for CG. 70% of Bi subjects reported no alcohol problems at 12 months vs 58% of CG group. Proportion of hazardous drinkers (according to unstated AUDIT cut-off) reduced from 95% at baseline to 58% at 12 months for BI group vs 96% to 81% for CG. 11 of the 12 studies observed a significant effect of BI on at least 1 outcome: alcohol intake, risky drinking practices, alcohol-related negative consequences, injury frequency.	

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(i) Poikolainen, 1999 (ii) Finland	Systematic review ++	(i) To investigate the effectiveness of brief interventions delivered in primary care to reduce alcohol consumption (ii) Funding not reported	(i) 7 included studies (ii) Primary care. Setting of studies by country not reported by authors. (iii) Patients misusing alcohol identified in primary care (n=2546). 1 study was in males only, 1 study in females only and mixed in remainder. iv) Inclusion 1) Studies sampling from either general population or from population of family/GP practices 2) studies with random allocation of subjects to intervention and control (no intervention) groups 3) alcohol intake or GGT as outcome variable 4) means, number of cases and SD reported for outcomes 5) follow-up time 6 to 12 months Exclusion 1) Studies on hospital patients 2) Studies in alcohol-dependent patients v) Lowest age cut-off = 17 yrs, highest age cut-off = 70 years. Mean alcohol consumption at baseline ranged from BI 230 vs control 227 g/wk (Fleming, 1997) to BI 520 vs control 532 g/wk (Anderson and Scott).	Very brief interventions (classed as approx 5 to 20 min) and extended brief interventions (several visits). Range of interventions included advice, feedback, written materials, follow-up. No intervention. Some studies had one comparison group and 2 intervention groups, one receiving very brief intervention (approx 5 to 20 min) and another received extended brief intervention (several visits)	Pooled values Difference in alcohol intake (g/wk, 95%CI): Very brief interventions Men= - 42 (- 105 to 21) (heterogeneity: P>0.05) Women= - 4 (- 50 to 43) (heterogeneity: P>0.05) All= - 70 (- 99 to – 40) (heterogeneity: P<0.001) Only statistically significant results were for combined gender very BI, but significant heterogeneity mean findings not meaningful. Extended brief interventions Men= - 55 (- 77 to – 33) (heterogeneity: P<0.05) Women= - 51 (- 74 to – 29) (heterogeneity: P>0.05) All= - 65 (- 79 to -51) (heterogeneity: P<0.001) Only statistically significant results with low heterogeneity were for women receiving EBI. Pooled values GGT levels (U/l, 95%CI) Very BI -9.4 (- 15.6 to -3.3, significant heterogeneity P<0.01) EBI – 1.4 (- 3.9 to 1.2, significant heterogeneity P<0.001)	Country of setting not reported. Applicability to UK unclear.

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
(i) Tait & Hulse, 2003(Tait & Hulse 2003) (ii) Australia	Systematic review ++	(i) to evaluate the effectiveness of brief interventions for substance misuse in adolescents (ii) Healthway	(i) 8 studies (ii) All studies were based in the USA. Mjority OF participants (58%) were recuited via university based interventions, 26% through school-based interventions, 9% through hospital emergency department and 7% through outpatients clinic. (iii) Mean age ranged from 13.8 (SD=0.9) years to 19.6 (SD=0.90) years. Populations ranged from 22 to 84% female. Baseline alcohol consumption was not reported. (iv) Inclusion: studies that comapred BI vs control, defined BI as inclusing maximum of 4 sessions, including booster sessions, mean age less than 20 years Exclusion: school currculum based interventions, studies where outcomes were solely attitudinal rather than behavioural change (v) Not reported	The majority of interventions were based on the motivational interviewing (MI) approach. Some interventions also incorporated the use of written materials/telephone contasct. Interventions exposure was not reported. Interveners not reported, bar one trial in which nurses delivered the intervention. Control groups included no treatment/usual care/booklet or group feedback.	Overall effect size (Cohen's *d)* = 0.275 (P<0.0001, statistically homogeneous). Subgroup analysis of only interventions based on MI: effect size = 0.241 (P<0.01< statistically homogeneous). (Where multiple outcome measures were reported, mean effect size was used.)	All studies were based in the USA.
(i) Vasilaki *et al*., 2006 (ii) UK	Systematic review ++	(i) a) to examine whether motivational interviewing (MI) is more effective than no intervention in reducing alcohol	(i) Of 22 identified studies, 7 excluded as did not meet inclusion criteria or provided inadequate information (therefore 21 included).	BI delivered with MI principles. No treatment (9 studies) or comparison treatment (9 studies) (3 studies compared brief MI both with no treatment group and another treatment group) control groups	Aggregated effect size = 0.18 (0.07, 0.29, P<0.01) (individual studies reporting in terms of standard drinks per week or standard drinkers per day), indicating positive outcomes for MI vs. no treatment control groups (heterogeneity P=0.0002) Effect size was greater for follow-up periods of ≤ 3 months (effect size 0.60 (0.36, 0.83, P<0.001) (heterogeneity	Country of setting not reported. Applicability to UK unclear.

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
		consumption b) to examine whether MI is as effective as other interventions (ii) Funding not reported	(ii) Included: College student settings (7 studies), outpatient community settings (6 studies), emergency room/clinic settings with patients reporting alcohol-related problems eg. physical injury (5 studies), specialist treatment agencies (2 studies, Bien *et al*., Project Match). Setting of studies by country not reported by authors. (iii) Treatment and non-treatment seeking patients attending a range of settings (n=2767). Mean age=31.77 years (SD=10.26). 12 studies reported gender (total of 1265 males and 565 females). 996 classed as dependent drinkers. 1771 classed as heavy or abusive drinkers. iv) Inclusion: 1) Studies examining efficacy of brief intervention delivered according to the principles of MI 2) Articles of very brief interventions (30 min), providing they i) claimed to adopt principles of MI ii) delivered face-to-face intervention iii) randomly assigned participants to groups iv) had a control group v) were independent study vi) were published or in press v) Not reported		P=0.013) than ≤ 6 months (effect size = 0.06 (-0.06, 0.18 no P value reported) (heterogeneity P=0.788). Effect of MI compared with control was significant when dependent drinkers were excluded (d=0.40, 95%CI 0.36, 0.44) Mean duration of MI in these studies was 87 min (therefore approximately 87 min of brief MI is more effective than no treatment in reducing alcohol consumption among hazardous drinkers in short term (≤ 3 months). 5 studies compared brief MI with treatment as usual/brief advice/standard care, one with directive-confrontational counselling, one with skill-based counselling (SBC) and one with cognitive behavioural treatment. MI was more effective than range of other treatments for alcohol problems (aggregate effect size=0.43 (0.17, 0.70, P<0.01) (individual trials reporting standard drinks per week or number of heavy drinking days) (heterogeneity P=0.05). Average duration of MI was 53 min, indicating approximately 53 min of brief MI more effective than range of other treatments. Of 15 studies, 10 included non-treatment-seeking sample (screened as excessive drinkers from either primary care or emergency group settings) and 5 included treatment-seeking sample (recruited through media or simple advertisement). Of 9 studies MI vs no treatment, 4 studies included treatment-seeking population. When compared with other treatments, MI appears more effective with treatment-seeking samples (no data reported). Of 15 studies, 4 involved dependent drinkers. Magnitude of effect sizes increased when low-dependent, treatment-seeking population involved (therefore indicating that individuals	

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					seeking treatment may be more ready to change). Stated that average duration of brief MI was shorter thaN extended treatments (eg CBT) (53 min vs 90 min), making it potentially more cost-effective. Readiness to change. 2 of 15 studies assessed impact of MI on readiness to change. No clear trend emerged. 1 study explored impact of age on effectiveness. Patients who were older at baseline and consumed high levels of alcohol were significantly more likely to reduce number of binge episodes during post-treatment period (no data reported) (but authors also noted positive outcomes in studies of college students with mean age of 18 years in meta-analysis. 1 study explored impact of gender. No interaction between gender and treatment outcome (no data reported) (but authors note that it could be possible that different types of intervention eg. confrontational vs. non-confrontational more appropriate for one or other gender).	
(i) Webb *et al.*, 2009 (ii) Australia	Systematic review, ++	(i) To explore the methodological quality of workplace interventions for alcohol problems and determine the effectiveness of interventions	(i) 10 papers reportgin workplace alcohol interventions identified (ii) Occupational settings (ii) Industrial, paper and printing, healthcare professionals, postal staff, transport industry	Interventions included personal feedback, information, counselling, and education	An RCT conducted in Sweden in which paper, pulp and wood industry workers at routine Occupational Health Service checks were offered alcohol screening and randomised to brief counselling or intensive counselling (by Occupational Health Service staff) or no counselling (no further data available on experimental conditions) showed no significant differences between groups (Hermansson *et al.*, 1998). A trial in the USA by Heirich & Sieck (2000) suggested that	The majority of studies (8) were conducted in the USA, with remainder from Sweden (1) and Australia(1)

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
		(ii) Alcohol Education and Rehabilitation Foundation of Australia	professionals, food and retail workers (iv) Exlusion: studies not having primary focus of excessive alcohol use, abuse or alcohol problems, not publications, or not workplace-based. (v) Not reported		industrial workers selected through cardiovascular health screening decreased their alcohol consumption following an individual outreach counselling intervention by research staff (no further detail). Lapham *et al.* (2003) reported a significant reduction among USA-based healthcare professionals invited to attend health appraisals in the desire to binge drink following a project included brief counselling. Cook *et al.* (1996) found, in their study based in the USA, that printing company workers showed improved outcomes in drinking behaviour as a result of a working people programme based on self-efficiacy, social resistance skills and social support.	
(i) Whitlock *et al.*, 2004 (ii) USA	Systematic review ++	(i) To review evidence for the efficacy of brief behavioural counselling interventions in primary care to reduce risky and harmful alcohol consumption (ii) Agency for Healthcare Research and Quality	(i) 12 included studies (ii) Primary care. Studies conducted in: Australia (n=1), UK (n=3), USA (n=9), Norway (n=2). (iii) Risky/hazardous and harmful drinkers. Non-pregnant (pregnant women and adolescents reviewed elsewhere and not of relevance to PHCC). All but 3 trials included over 300 participants. Lowest inclusion cut-off = 12 years, with highest unspecified. Adults aged 65+ yrs were included in 9 trials. Baseline alcohol consumption ranged from 14.9 drinks/wk to 62.2 drinks/wk. Approx 1/3 subjects were women. Rates of non-white groups were low where reported in recent USA studies (4 to 27%). iv) Inclusion	Interventions classified according to intensity: 1) very brief interventions of 1 session up to 5 min duration (2 studies) 2) brief interventions of 1 session of up to 15 min duration (6 studies) 3) brief multi-contact interventions of initial session of up to 15 min duration and follow-up contacts & studies). Interveners included clinicians, research staff, nurse, with 12/15 delivered all or in part by patient's usual primary care physician (4 used health educators, counsellors or clinic nurses for some contacts). Comparators not reported	Brief multi-contact behavioural counselling interventions: 6/7 studies reported significant effect on at least 1 drinking outcome. 4 good quality trials reported reduction in weekly drinking of 13% to 34% more in BI group vs control (13% to 34% net reduction), translating to 2.9 to 8.7 fewer mean drinkers per week (data reported elsewhere). 1 good quality trial did report not significant change in average use. All 5 good quality trials resulted in 10% to 19% more BI subjects drinking within recommended patterns (data reported elsewhere). 2 good quality trials reported significant reduction in binge drinkers (no further data). In trials with at least 49% binge drinkers in study sample, binge drinking was still common after intervention (31% to 69%). Very brief interventions In terms of alcohol consumption, statistically significant differences were limited to 3 studies, but results tended to favour BI groups. 1 fair quality trial improved daily alcohol intake and proportion of subjects drinking moderately among males only. Good quality BI targeting males significantly improved proportion with safe or moderate use and	2/12 studies from UK. Potentially generalisable to UK

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
			1) Randomised or nonrandomised control clinical trials 2) non-dependent drinkers 3)12 years of age and above 4) receiving primary care behavioural counselling intervention to reduce alcohol intake Exclusion 1) Studies based in hospital or emergency departments, specialist addition treatment settings, behavioural health departments and schools or community agencies without health clinics 2) studies among comorbid patient populations (as limited generalisability to primary care) 3) studies rated as being of poor quality (n=27). v) Lowest inclusion cut-off = 12 years, with highest unspecified		proportion not bingeing. All interventions that showed significant improvements included at least 2 of 3 key elements: feedback, advice, and goal-setting. Most effective interventions were multi-contact. No consistent differences between men and women (data reported elsewhere). One intervention targeting older adults appeared as effective or more than similar intervention in younger adults. 4 reports of long-term health outcomes. 1 trial found reduced health care utilisation, with reduced self-reported hospital days at 12 months (no further data). Fewer hospital days self-reported by intervention group after 48 months (429 vs 664 days, P<0.05). Trend towards reduced all-cause mortality in BI group (3 vs 7 deaths; P>0.10). Other morbidity-related outcomes did not differ significantly. Significantly greater reductions in alcohol use in BI vs control groups were maintained at 48 months. In 1 study, a brief single-contact BI had no long-term effects on morbidity, mortality or consumption at 10 year follow-up.	
(i) Wilk *et al.*, 1997 (ii) USA	Systematic review ++	(i) To investigate the effectiveness of brief interventions in heavy drinkers (ii) Funding not reported	(i) 12 included studies (ii) 1 study was undertaken in Sweden. 1 study was undertaken in Norway. Setting of studies by country not reported by authors of remaining studies.	Intervention common to all trials described as 'short, motivational counselling sessions' including feedback and education in harm of drinking and advice to moderate drinking. Brief advice ranged from 10-15 min to 60 min. Follow-up sessions varied from 0 to 3 sessions.	Odds ratios for achieving alcohol moderation 6 or 12 months after intervention (95%CI) Of 12 RCTs, 9 trials reported a positive effect, whilst 3 reported no effect (no data reported). 8 RCTs reported data to allow calculation of ORs (individual range 1.09 (95%CI 0.38 to 3.09) (Scott and Anderson, brief	Country of setting not reported. Applicability to UK unclear.

First author and date (i) and country of corresponding author (ii)	Study Design & Quality (++/+/-)	Research Objective (i) & Funding (ii)	Included primary studies (i), Setting (ii) & Study Population (iii) Inclusion/exclusion criteria for review (iv) Inclusion/exclusion criteria for primary studies (v)	Intervention(s) & Comparator(s)	Main findings	Review Team Comments
			(iii) Participants were outpatients, inpatients and the general population. 3948 heavy/problem drinkers randomised to brief intervention or no intervention (range 47 to 1119). 9 studies included participants drinking more than 20 to 35 drinks per week. Other inclusion criteria were elevated GGT, positive CAGE or MAST questionnaire and scales of alcohol-related problems. Age data not reported, but inclusion criteria stated 19 to 65 years. 5 studies were males only. 1 study was females only. Remainder were mixed. iv) Criteria for full text retrieval: Studies having 1) clear focus on alcohol abuse, dependence or heavy drinking 2) focus on intervention and outcome 3) human subjects aged 19 to 65 years 4) study design of prospective clinical trial Criteria for inclusion in analyses: 1) Randomised studies 2) with control group receiving no alcohol-related treatment or intervention 3) sample size greater than 30 4) brief intervention that is motivational with self-help orientation Exclusion: 1) Articles not containing original clinical data	No intervention	advice (10 min, no follow-up sessions, female outpatients) to 3.20 (95%CI 1.20 to 8.54) (Anderson and Scott, brief advice (10 min), no follow-up sessions, male outpatients). Pooled OR showed heavy drinkers who received BI were nearly twice as likely to decrease and moderate drinking vs control (OR=1.95, 95%CI 1.66 to 2.30). No significant heterogeneity detected (P=0.51). Subanalysis of higher quality RCTs (n=6 trials): OR=1.91 (1.61 to 2.27) and no significant heterogeneity (P=0.51). Greater likelihood of alcohol moderation with greater intensity of intervention (OR=2.12 (1.66 to 2.70) for over 1 session (heterogeneity P=0.22) vs. OR=1.83 (1.46 to 2.28) for 1 session) (heterogeneity P=0.66). Subanalysis by gender (female trials n=3, male n=5): OR=2.42 (1.70 to 3.45) for women (heterogeneity P=0.12) vs. OR=1.90 (1.57 to 2.31) for men (heterogeneity P=0.23). Subanalysis by setting (outpatient trials n=6, inpatient n=2): OR=2.41 (1.40 to 4.15) for inpatients (heterogeneity P=.0.53) vs OR=1.91 (1.61 to 2.27) for outpatients (heterogeneity P=0.39).	

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			v) 9 studies included participants drinking more than 20 to 35 drinks per week. Other inclusion criteria were elevated GGT, positive CAGE or MAST questionnaire and scales of alcohol-related problems. 5 studies excluded patients with severe alcohol dependence. 5 studies excluded patients with previous history of alcohol-related advice. 4 studies excluded patients with serious medical and psychiatric disorders.			

APPENDIX 16: Characteristics and main findings from included studies in the review of barriers and facilitators to the implementation of screening and brief intervention

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
Aalto 2000 Finland	Survey +	To ascertain the compliance rate and compare associated factors among heavy drinkers willing and unwilling to enter BI programme.	**Number:** 41 GP practices 1011 patients screened as early phase heavy drinkers. **Ages** 20-29 200 30-39 266 40-49 331 50-60 210 **Gender:** 353 F; 658 M **Ethnicity:** **Educational Level:** Comp school 489 Vocational school 269 College 197 University 42 **Other characteristics:** 484 working; 414 unemployed; 100 retired 484 no partner	Demographics, health survey and questionnaire (CAGE) and quantity-frequency scale from last 2 months. **Response Rate:** 81.1%	**Participation:** 48.2% (487 out of 1011) heavy drinkers agreed to BI. **Main Results:** males complied 1.8 times more than females. 40-60yrs agreed to treatment 1.8-1.9 times more than younger. Education, employment, partner did not affect compliance. **Barriers:** **Facilitators to compliance:** • Heavy drinkers, males and older people more likely to comply with treatment	
Aalto 2001 Finland	Survey +	To identify barriers to healthcare providers carrying out BI Funding not specified	Primary Care Nurses and physicians		**Barriers:** Lack of training Lack of knowledge of BI	
Aalto 2002 Finland	Survey +	To test hypothesis that health professional activity in intervening in patient alcohol drinking is low.	Primary care 1000 (consecutive) Ages 16-65 (Mean age): 43.7 Gender: 37.4% M; 62.6% F Ethnicity:	Self-administered questionnaire asking: When did a doctor / nurse at this clinic last ask about your alcohol drinking? Did a doctor or nurse advise you	**Barriers:** Patients (majority) not being asked or advised about drinking, even when drinking is excessive Being female and/or young may limit chances of being asked about drinking	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			Educational Level: Other characteristics: Mean alcohol consumption 5.3 drinks (12g pure alcohol) per week	about alcohol drinking at this consultation? What is your opinion of a doctor or nurse talking about alcohol drinking with you? Response Rate: 66.5%	**Facilitators:** Only 1.8% of participants reported having a negative attitude toward professionals talking about alcohol drinking with them. (older more positive, excessive drinkers less positive, but negative attitudes rare.).	
Aalto 2003 Finland	Qualitative: 6 focus groups (+)	To identify possible obstacles to carrying out early identification and BI of heavy drinkers in primary health care. Funding: WHO Collaborative Project (Phase IV).	Setting: Primary Care Tampere. GPs n= 18 (8M 10F) Nurses n= 19 (1M 18F) No other details specified.	None specified	**Barriers:** Misunderstandings about content of early phase heavy drinking. Having to help once a problem is identified (easier not to address the issue). Doubting own ability to assist patients. Doubting that assisting in drinking problems is appropriate role. Increase in workload Underestimation by drinkers that they have a problem	Potential applicability to UK
Aalto 2004 Finland	Survey +	To evaluate patients' opinions of the usefulness of alcohol-related discussions with GPs, the time used for discussion, and its main content. Funding: WHO Collaborative project	Primary Care Patients: N=1203 Ages 16-65 Mean age: 44.2 Gender: 37.3% M; 62.7% F 11.4% drinkers.	Survey instruments: Self-administered questionnaire asking: How long did the discussion about alcohol last? Which of the following matters were addressed during the consultation? harm; hazardous drinking; extent of drinking; written material given; willing to reduce drinking?; practical advice Did you find the discussion useful? Response Rate: 60.2%	**Barriers:** Patients (majority) not being asked or advised about drinking, even when drinking is excessive Time used for discussion mainly less than 4 minutes (longer in heavy drinkers) **Facilitators:** Majority found discussion useful (80.7% - difference between heavy and non-heavy drinkers not significant)	
Aalto 2006 Finland	Survey +	To define whether the Alcohol Use Disorders Identification Test (AUDIT) scores of primary care physicians themselves predict their willingness to use brief	**Research Setting:** Primary care: All physicians in Finland. **Number:** 3193 Primary Care physicians **Ages:** Mean 42.1 years	Self-administered questionnaire; AUDIT Mailing of questionnaire at least twice to non- responders. Sample from register of Finnish Medical Association and the National	**Main Findings:** **Participation:** Response rate 65.7% (2099/3193) 1909 (59.8%) were used and reported upon. **Main Results:** Mean AUDIT score 4 overall; 3 for females, 4.5 for males ($p<0.001$)	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
		intervention. **Funder:**.Ministry of Social Affairs and Health	(median 42, SD 8.6) **Gender:** 1197 Female (62.7%) **Ethnicity:** **Educational Level / Relevant Experience:** Over 11 years as a primary care physician 58.7%	Authority for Medico-legal Affairs (3471 possible primary care physicians). Three mailing waves	Prevalence of heavy drinkers (AUDIT > or =8) 14.5% (7% of females, 27% of males). No correlation between AUDIT and age though highest scores in older group (51 or over 20.1%). 59.4% reported offering BI (9.4% regular, 50% occasional) AUDIT scores did not predict either regular or occasional use of BI. **Barriers** **Facilitators:** • Older and more experienced practitioners likely to implement BI Specialist license predicted higher proportion of regular and occasional use	
Adams 1997 New Zealand	Survey +	To assess current practices and attitudes of general practitioners towards prevention and intervention with problem drinkers. **Funder:** Part of WHO multicentre Collaborative project. Funded by the Alcohol Advisory Council of NZ.	NZ Primary care (Central and Southern Regional Health Authority) **Sample:** **Number:** 218 GPs generated from database; 191 approached; 161 agreed. **Ages:** Mean 44 yrs **Gender:** Male 76% **Educational Level / Relevant Experience:** Mean no. years practising = 14 **Other characteristics:** Solo practices 36%	134-item, self-administered questionnaire (piloted). Questions: Attitudes, perceived skills and current practices regarding: Demographics Disease prevention / health promotion Early intervention for alcohol problems Late stage interventions for alcohol dependency Structured responses to 2 case studies Shortened version of SAAPQ (measures role adequacy, role legitimacy, motivation, task-specific self-esteem and work satisfaction). Questions asked for both problem drinkers and dependent drinkers. Levels of agreement (5-point scale) with a list of 18 statements relating to disincentives for GP intervention with alcohol problems and 11 statements relating to incentives to	**Participation:** 71% response rate **Main Results:** 21% of time spent participating in disease prevention Over 80% managed less than 13 patients with alcohol problems in the previous year (less than 1% of consultations). Knowledge of alcohol problems consistent with guidelines. Role adequacy rated highest (4.76; 4.52) and work satisfaction lowest (3.46; 3.18) with both problem and dependent drinkers. Those GPs attending little PG training in managing alcohol problems tend to view themselves as less effective in helping patients make lifestyle changes and are less likely to manage patients for their alcohol problems. **Stated Barriers (disincentives):** • GPs who want to practice preventive medicine not supported by Government health policies • GPs not trained in counselling for alcohol problems • Government health scheme doesn't re-	Applicable to UK apart from government health policies which will vary between countries.

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
				intervene.	imburse GPs • GPs are too busy dealing with patient presenting problems • GPs believe that counselling is difficult as it involves wider network (families etc.) **Stated Facilitators (incentives):** • Patients request advice about alcohol consumption • Support services readily available • Early intervention proven to be successful • Public health campaigns raise awareness • Quick and easy counselling materials available • Training recognised for continuing medical credits • Training programmes for early intervention available • Quick and easy screening tools available **Summary:** GPs supported: • Health education campaigns • Financial and other incentives • Readily available materials for screening and BI • Training that focuses on competencies • Efforts to increase GP idea of importance of preventive care	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
Adams, 1998 US	RCT (+)	To assess the use of a brief provider delivered alcohol counselling intervention of 5-10 mins with high risk drinking patients by primary care providers trained and supported with an office support system. Funding:National Institutes of Health / National Institute on Alcohol Abuse and Alcoholism grant	Setting: Primary care 4 practice sites 1994-7 Providers: N = 29 providers (21 physicians; 7 nurses; 1 resident) Ages Usual Care Mean = 35.9 Intervention Mean = 39.1 Gender: Usual Care 6 M, 6 F; Intervention 6M, 11 F Ethnicity: Predominantly white Educational Level / Relevant experience: (Years since MD) Usual Care Mean 8.3 Intervention Mean 10.1 Other characteristics: Patients: N =344 (received PEI) Ages: Usual Care Mean = 45.2 Intervention Mean = 45.0 Gender: UC 84 M, 60 F; I 134 M, 66 F Ethnicity: White UC = 126, I = 171; Nonwhite UC = 6, I = 8 Educational Level / Relevant experience: < High school UC 10 I =11; High school & some College UC = 69 I =95; > College graduate UC = 59 I = 83 Other characteristics: Drinks per week: U C Mean = 18.5 I Mean = 17.5 Marital status: U C Married =	Special intervention: providers received 21.5 hrs training in a SBI, then supported by office system that screened patients, cued providers to intervene, and made patient education materials up as tip sheets. Comparitor(s):Usual Care vs Special Intervention Comments: High risk drinking defined as WHO (Males >5 drinks per occasion / 12 per week; Females >4 or 9). Prevalence in sites populations 9.5%. Screening 3 methods: 61% in office, 20% mail, 19% telephone. Patient Exit Interview (PEI) to measure implementation.	**Participation:** 29 providers; 344 patients **Main Results:** Significantly more counselling steps carried out in intervention condition; out of potential 15 steps, mean int = 9.8, mean control = 1.7 (p=0.0001). More frequent healthy drinking discussion carried out in intervention sites. **Barriers:** **Facilitators:** From this study, training and support appears to increase the extent that SBI is implemented.	Theoretically applicable to UK in respect to training as a facilitator

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			85; Not married = 51; I Married = 112; Not married = 75 Employment: U C White collar = 42, Blue collar = 40, Other =51; I White collar = 76, Blue collar = 55; Other =60			
Aira 2003 Finland	Semi-structured interviews (+)	To explore factors having an effect on primary health care physicians inquiring about patients' alcohol consumption Funding not specified	Setting: Primary Care 1998 (four centres; 2 rural, 2 in towns) N =35 Age range: 29-55 Mean age: 42 Gender: 18 female; 17 male Ethnicity: Not specified Educational Level: Practised medicine average 16 years (range 1-25). Other characteristics: Physicians in health	None specified	**Barriers:** Sensitive nature of topic Reason for consultation Awareness of patient's problem Availability of tools Expectations of effectiveness Lack of time	Potential transferability
Anderson 2001 UK	Survey ++	To examine the prevalence of alcohol-related attendances and staff's attitudes towards identifying and responding to alcohol-related attendances. Health Education Board for Scotland	**Number:** 84 units; 2 individuals (one medical, one nursing, in each) **Ages:** 67% > 40 **Gender: Staff:** 91 medical staff male; 83% nursing staff female **Educational Level / Relevant Experience:** Mean experience 14 yrs in A&E; Training in Alcohol work – 49%medical staff, 28% nurses	Piloted postal questionnaire covering 3 areas: 1) prevalence of alc-related attendances; 2) current screening, recording and intervention procedures; 3) attitudes of A&E staff in identifying and responding to attendances. Demographics also covered.	**Participation:** 96 (57%) response rate; mostly nurses (63%); 2 reminders sent. Refusals: 16 **Main Results:** Respondents estimated that almost 1 in 7 attendances in A&E is alcohol – related. More common in full A&E than minor injury units, but not stat sig difference. **Barriers** • 42% of units do not have alcohol screening in place • Recording of alcohol use is sparse (38% do not record alcohol related attendances). • Lack of confidence in nurses in dealing with alcohol-related attendances (53% reluctant, compared to 35% medical) • Nurses require training to respond to	Transferable

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					such patients • Nurses concerned about patient reactions (90% felt that patients might find discussion offensive compared to 56% medics). • 19% recognise that the mental state of patients not conducive to receiving advice at time of presenting • Staff (14%) consider poor patient motivation to stop or moderate drinking as a problem • Timing of attendance – often out-of – hours, poses staffing difficulties. • Patients not in department long enough to build up rapport • Lack of appropriately trained staff and low staff motivation (26%) • Difficulties identifying suitable sources of help • Medical staff in full A&E units more likely to view A&E as inappropriate forum for alcohol work compared to those in MIU **Facilitators** • 42% of respondents reported that they routinely ask about alcohol if a problem is suspected. • 69% of staff would record details if breath smells of alcohol or other signs of misuse • Staff in full A&E more likely to provide written information (48% / 19% MI unit $p<0.05$) and to refer to specialists (52% / 24% $p<0.01$) • Overall positive attitude toward preventive role of A&E (82% agree it is worthwhile trying to identify patients;	

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					69% think BI worthwhile; <23% felt that nothing can be done to help change behaviour in A&E setting).	
Anderson 2004 Cross-national	Survey ++	To determine if GPs attitudes towards working with drinkers moderated the impact that training and support had on screening and brief intervention activity in routine practice.	Primary Care 340 GPs (randomly selected from databases of 2924 practitioners who had previously agreed to use SBI in a BI marketing trial). Intervention for patients 16 years and over, well enough to complete q, understood native language. Only one GP per practice. **Exclusions:** Repeat attendees	SBI 'drink-less' translated and adapted for each country. **Comparitors:** Training and support vs control groups. **Survey instruments:** AUDIT or modification.	App one fifth GPs in control group scored high on SBI rates; two fifths in T&S group scored high. 69.9% in total sample felt role secure, but only n16.4% felt therapeutically committed. **Barriers:** Low baseline role security and therapeutic commitment was not improved with training and support at 6 months follow-up, and undertaking high SBI rates made those with low role insecurity worse over time. **Facilitators:** Training and support associated with increased SBI rates but only in presence of high baseline role security and therapeutic commitment.	
Babor 2005 US	RCT (++)	To compare two different implementation strategies for Cutting Back, a primary care alcohol screening and brief intervention program for hazardous and harmful drinkers. (Cluster RCT) **Funding:** Robert Wood Johnson Foundation Grant 029620	**Research Setting**: Primary Care (5 Managed Care Organizations with at least 3 comparably sized practices - >7,000 patient visits per year) **Inclusions**: Cluster RCT – 5 MCOs with at least 3 comparably sized practices (> 7,000 visits per year, one co-ordinator, clinic-based liaisons to assist co-ordination of activities, and no current alcohol screening programmes). Patients > 18 years **Number:**	**Comparitor(s):** Two different implementation strategies for 'Cutting Back' and a control at each site. P = Provider (all medical providers – nurses, physicians, assistants) delivered the brief intervention. S= Specialist (selected mid-level professionals (nurses, health educators) delivered the BI on behalf of providers. Control – usual care **Randomisation:** Cluster **Stratification:** By practice / MCO **Data Collection:** 1. Surveys of providers and	**Participation:** As above. At risk drinkers receiving BI: P = 1,804 (57.1%) S = 1,645 (73.1%) **Main Results:** Both models are effective, depending on organizational and other factors. Some clinics reached a high level of screening whilst others never achieved a level that would provide adequate coverage of the at-risk population. Average % screened varied across sites from 12-26% in P-clinic, and from 15-56% in S-Clinic conditions. (significant advantage for S model when unadjusted for clustered data; increased interventions by 16% over what medical providers achieved on their own). Heterogeneity between 5 MCOs, with some sites	Some aspects, though not financial or factors relating to MCOs may be applicable to UK

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			Average monthly visits: P = 6,969 S = 6,031 Average screens per month: P = 1,302 S = 1,450	specialists completed prior to training, after training and at the end of operations (5 items) 2. Independent ratings by 2 research staff based on information recorded from regular technical assistance contacts and site visits (17 items). Four procedures carried out until 600 positive cases obtained (9-21 months; average 12 months): 1. HAS (Health appraisal Survey) 2. Screening by adapted version of AUDIT 3. BI protocol 4.Follow-up for more severe patients Positive scores on HAS led to AUDIT screening. Scores placed patients in one of 3 risk zones: 1. I (AUDIT ,16) 2. II (16-19) 3. III (20) Positive screening led to BI (3-5 mins) to encourage drinking reduction or abstinence. Patients in Zone III were referred for diagnostic assessment and possible treatment.	performing better with P-clinic approach and others with S-clinic approach. Classic interaction effect – differences between sites takes precedence over difference between conditions. Clinics in which providers were already familiar with alcohol screening and other preventive services seemed to be more successful. Absolute number of screens conducted by a clinic was significantly correlated with its prior frequency of asking about alcohol and educating patients about health risks. Proportion of patients screened related to practitioner lack of time, the influence of the MCO co-ordinator, and the involvement of clinic staff in implementation planning. Percentage of patients screened at each clinic was significantly related to amount of MCO support and the use of financial incentives. Number of interventions completed was significantly related to: Predisposing factors: prior asking about alcohol, prior frequency of educating patients, stable patient membership, and MCO instability. Enabling factors: Number of clinicians trained; competing organizational priorities, influential MCO co-ordinator, amount of technical assistance, and successful implementation of staff changes. Percentage of interventions completed with patients who screened positive significantly correlated with MCO instability, MCO support and financial incentives. Percentage of interventions was related to 6 enabling factors: Number of clinicians trained, practitioner lack of time, competing organizational priorities, the influence of the MCO co-ordinator, amount of technical assistance, and successful implementation of procedural changes.	

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					Barriers: Instability of MCO predisposing factor. Receptionists' lack of time Competing organizational priorities Implementation of staff changes (process evaluation): operations disrupted by organizational obstacles including the competing demands of patient registration, limitations on staff time and instability precipitated by leadership changes. Also, need for consent to study and data collection process meant that rates likely to be lower than in non-study conditions. Also, there were major economic changes taking place in the managed care industry that affected 10 sites at the time of implementation. Screening activity in some clinics too low to cover at-risk population Receptionist involvement in screening required changes in job responsibilities; difficult to accomplish. **Facilitators:** Stable patient membership was a significant predisposing factor. The number of clinicians trained at each clinic Influence of the MCO co-ordinator Amount of technical assistance used Having reception staff at all sites to initiate screening allowed patients to complete the screening in the waiting room without added time spent in examination rooms or adding another task for medical staff. Shows that organizational factors as important as the implementation model used.	

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Beich, 2002 Denmark	Qualitative; Focus Groups and interviews (+)	To establish the basis for deciding when to use a screening and BI programme by looking at aspects of excessive drinking; the validity of AUDIT questionnaire; real life effectiveness of BI for patients identified by screening; experiences of GPs implementing the programme; identifying relevant literature. Funding: Danish Ministry and Board of Health, the Association of County Councils in Denmark and quality development committees in four counties	Setting: General Practice; four counties N = 24 (15 and 4 in focus groups; 5 in interviews) Mean age: 48yrs Gender: 28% female Educational Level: Mean 13 years in general practice. Other characteristics: 25% in rural practices; mean patients screened during study period n=177	WHO strategy for implementing screening and BI in primary care for excessive alcohol use. Eight-week programme implemented by 39 GPs in 1997; screening by AUDIT offered to all eligible patients (7691); 6897 received screening (the rest refused); 15.8% shown to drink excessively (mean 13 units per week); 607 men and 299 women randomised to BI / control. 61% responded to 12 month follow-up.	**Barriers:** Large group of young people identified as hazardous drinkers – GPs did not see it as their job to screen or systematically interview young people about their drinking – that intervention should be earlier and from other quarters, such as at home or in the community. Perception by GPs that young people grow out of hazardous drinking. Those that thought it was important to deal with young people's drinking habits found it difficult to do so. Perception that some patients not honest in carrying out the screening questionnaire. Many heavy drinkers declined the AUDIT or gave poor excuses not to participate, or deliberately false answers. Some avoided attendance as word about screening got around the (small) communities. Negative reactions from minority number of patients – uneasiness, embarrassment, lying, finding another doctor. Reluctance of GPs to follow-up. Sense of wanting to leave patients alone a while following the intrusion into their private life. Screening conflicts with rapport (especially with middle and older age groups). Sets an agenda – GPs found it difficult often to generate rapport and ensure compliance with interventions re drinking, or to arrange follow-up consultations. Distracted from the original reason for attending the surgery. Interfered with patient-centred approach. GP perceptions that the tool was clinically insensitive, that they themselves lacked the right communication skills or attitude for the task. GP feeling that they had been part of a campaign and didn't feel comfortable with it. Feeling that screening questionnaire was like giving patients an exam with a score at the end, whilst they (GPs) sit	

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					in judgement. GPs felt it was only effective for a few patients – many patients lack interest needed to return for follow-up. Lack of time – addition to workload – 10 minutes several times a day to carry out screening and BI. This created stress which in turn affected the quality of the intervention. Took resources away from other practice work. Some GPs believed 10-15 minutes not enough time to deal with a complex issue. Lack of training in counselling skills and attitudes. **Facilitators:** Robust relationship between patient and GP. Patient understanding that screening carried out for the best reasons – concern for their health, and caring for well-being. GP attitude that counselling is an important part of their work. Positive response higher in motivated middle age and elderly patients	
Beich 2003 Denmark	Systematic review (+)	To determine the effectiveness of programmes of screening in general practice for excessive alcohol use and providing brief interventions. Funding: Alkoholpuljen, Alkoholpolitisk Kontaktudvalg (Danish Ministry and Borad of Health) and Forksningsfonden (Association of County Councils in Denmark).	Multi-national primary care. Patients screened for drinking behaviour. Not much information on populations. **Description of studies**: High percentage of + screened patients excluded by protocol, refused participation, or reasons unspecified. A few patients with severe alcohol problems or false positive results were excluded by protocol, or excluded due to low	SBI Range from 10 minute consultation to up to five consultations lasting 5-20 minutes. Protocols all included feedback on present drinking, education on risk and strategies for changing drinking, and practitioners' advice to cut down on drinking.	Change in drinking not significantly different between studies, despite some heterogeneity in inclusion and baseline prevalence ($\chi 2=8.9$, df=6, P=0.18). Pooled AR 10.5% (95%CI 7.1% to 13.9%). Pooled NNT =10 (7 to 14). NNTs of single studies ranged from 5 to 61 and all results favoured intervention to some degree. 2 studies had higher NNTs and the CIs of 5 studies include the possibility of harm. Screening: 9% patients (3.3% - 18% in individual studies) screened positive; further assessment identified 2.5% who were given brief interventions. **Barriers t**o attempt to encourage reduction in	Applicability not clear

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			compliance, or co-morbidity. **Meta-analysis**: Exclusion - 2 out of 19 studies did not report number screened to obtain participants for randomisation. Another 9 (of which 7 did not find significant differences on drinking outcome measures) failed to fulfil the fifth criteria by not reporting an event outcome measure. Inclusion- 8 of largest studies that all used general health or lifestyle questionnaires that included questions on alcohol consumption. Qs were provided on GP visit.. 4 also invited patients by mailing out qs, and 1 telephoned patients.		drinking: Assumed reason for exclusion and dropout after positive result on screening were similar to those of patient / practitioner choosing to undergo no further assessment or intervention – these being Having attempted to give advice in the past Non-compliance with advice Refusal to attend for intervention False positive screening result Have to consider possible alienation effects and effects of badly timed screening Time and workload: primary care physicians need 7.4 hours a day to carry out preventive work recommended by US Preventive Services Task Force. (Competition from screening demands for other conditions). GP may perceive, from theses results,that effort of screening is not worthwhile for small number of patients affected. **Facilitators** to attempts to encourage reduction in drinking: Screening could identify some cases of alcohol dependency not known to the doctor, and some of these might be willing to be referred for treatment..	
Berner 2007 Germany	Survey ++	To assess the proportion of detected and correctly referred patients in German primary care. To identify patient and practitioner characteristics that predict detection and correct referral.	Primary Care 58 practices (29 from each region) 3003 patients (min 24; max 106; median 52 per practice). 2940 patients screened (378 not included as AUDIT not	4 page structured health q and AUDIT. Follow-up at 3 months. Response Rate: 60.2%	Participation: 2940 (2562 analysed) 13% problem drinkers. Conformity with guidelines in 64.6% of GPs. **Barriers:** Low detection rates of problem drinkers (1 / 3) Female patients, younger people and those in good health more likely to be overlooked	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			completed adequately) **Ages** 16 minimum 12.5% were under 30; 53.4% 30-59; 34.1% over 60 **Gender:** 43.7% M; 56.3% F **Ethnicity:** 94.1% German **Educational Level:** 24% low; 61.2% medium; 14.8% high **Other characteristics:** 2% had high AUDIT scores (at least 16 points) 69.1% married or co-habiting.		**Facilitators:** GP qualification in addiction medicine (significant at p=<0.10).	
Best 2002 UK	Interviews (n=14); Qs (n=11); Survey (n=15) Analysis: None specified (-)	To explore possibility of British FMEs delivering BIs in custody suites Funder not specified	Probationary setting 14 Forensic Medical Examiners Interviewed (other methods; 11 Qs, 15 Police Officers surveyed). Information on this a bit confusing. **Ages**: Police Officers Mean 32.5 yrs (Mean age): **Gender**: 11 M; 3 F **Experience**: 20 working as GPs; average 116 hours a month as FME; on average 21 assessments a week (average 10-20 mins), of whom typically 6 under influence of alcohol	None specified	**Barriers:** Lack of knowledge Lack of patient motivation Time constraints Lack of opportunities Drunken state – lack of receptiveness Lack of ongoing contact with detainee Lack of training Role legitimacy Unsuitability of location Misunderstanding of FMEs re BIs (the importance of 'brief') **Facilitators:** FMEs in a position to 'strike while the iron is hot' Patient motivation Targeting certain groups that might benefit most – drink-drivers; young people; perpetrators of domestic violence	

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Brooker 1998 UK	In-depth Interviews (n=17); Content analysis; thematic description (+)	To train nurses in an ED in screening adults in order to identify problem drinkers to participate in an RCT comparing health education + BI or health education alone. The RCT was subsequently discontinued due to lack of response, and instead, nurses were interviewed about their views. **Funding:** Trent NHS Executive	Emergency Care Nurses delivering BI in primary care over 6 months to patients >18 years **Number**: 17 **Gender:** Majority female **Educational Level / Professional experience:** Majority qualified nurses	RCT abandoned; to compare screening with CAGE & health education vs helath ed only.	**Barriers:** • 50% nurses found it difficult to ask questions – judgemental • A&E as a stressful environment • Original clinical manager making decision to proceed, and then leaving • Extra work demanded by screening • Other issues to contend with – in this case building work and several upsetting cases in a short period as well as freeze on staff replacements (low morale) • Lack of extra funding • Inadequate training due to nurse staffing constraints • Nurses not regarding A&E as appropriate setting for this type of work • Discrepancies between attitude to research (in this case clinical nurse manager vs nurses carrying out the work) • Lack of motivation as no 'pay-off' **Facilitators:** • Divided opinions as to whether screening should take place in A&E despite support from clinical manager • 50% nurses thought screening was easier than anticipated • Importance of holistic care Potential: • Funding from research to cover extra resources required • Address training and motivational issues	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
Deehan 1998 UK	Survey ++	To examine how GPs manage alcohol-misusing patients Department of Health	**Number:** Database of 27,801 GPs; 20% random sample = 5560 GPs stratified by HA and no. of partners in each practice. **Ages:** 54% > 40 yrs **Gender:** 73% male **Educational Level / Relevant Experience:** 54% had received training in alcohol work **Other characteristics:** 66% in partnership practices	Questionnaire in 4 sections: 1) background information; 2) Practice policy on alcohol misuse; 3) clinical practice; 4) attitudinal data (15 statements – Likert scale based on AAPPQ) Data on prevalence of patients above 'sensible' drinking limits and details of consultation and management of last risk patient seen	**Participation:** 44% response rate **Main Results:** Alcohol work: Reporting of the dignosis (84%) and provision of advice and information (85%). Only 23% offered leaflets. Characteristics of last patients seen: 70% male; 54.4% > 40 yrs (8% > 60). Mainly dependant drinkers (44,6%), actual misusers (35.5%). 42.3% self-presented and 46% were diagnosed by the GP. Younger patients less likely to be treated for medical complications of alcohol misuse **Barriers** • Health promotion leaflets not widely used **Facilitators** • Respondents were attempting to manage alcohol misusers within PC settings and endeavoured to manage different levels of drinking problems differently. • Routine use of reporting diagnosis and provision of advice and information.	Transferable, though dated
Deehan 1998 UK	Survey ++	To examine the work of GPs in detecting alcohol misuse, and their attitudes toward the work. Department of Health	**Number:** Database of 27,801 GPs; 20% random sample = 5560 GPs stratified by HA and no. of partners in each practice. **Ages:** 54% > 40 yrs **Gender:** 73% male **Educational Level / Relevant Experience:** 54% had received training in alcohol work **Other characteristics:** 66% in partnership practices	Questionnaire in 4 sections: 1) background information; 2) Practice policy on alcohol misuse; 3) clinical practice; 4) attitudinal data (15 statements – Likert scale based on AAPPQ) Data on prevalence of patients above 'sensible' drinking limits and details of consultation and management of last risk patient seen	**Participation:** 44% response rate **Main Results:** Alcohol work: 78% had seen at least one patient regularly consuming alcohol above 'sensible' levels in previous 4 weeks. 15% had seen no such patients; 13% had seen more than 5. Mean of 3.3 per GP over 4 weeks. Characteristics of patients seen: 72,8% male, 45% > 40 yrs (7.9% > 60). 27.5% were in contact for first time about drinking. Characteristics of last patients seen: 7o% male; 54.4% > 40 yrs (8% > 60). Mainly dependant drinkers (44,6%), actual misusers (35.5%). 42.3% self-presented and 46% were dignosed by the GP.	Transferable, though dated

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					96% detected through interview, 68% through physical exam, or lab tests; 23% using screening questionnaires. Age significantly affected whether detected through lab tests; older females more likely to be sent for lab tests. **Barriers** • Physical exams and lab tests most likely to be carried out with older patients • Screening more likely with younger patients • Screening qs infrequently used regardless of drinking status but more likely with males • GPs view alcohol misusers as a difficult group with whom to work, taking up more time than other patients (77%), and unrewarding to treat (60%); presenting major management problems (69%). This attitude is more prevalent in untrained GPs. • Only 25% felt adequately trained in treating the problem • Not adequately supported by specialist services (only 35% felt supported) **Facilitators** • Patient self-motivation (92%) • Primary care seen as appropriate setting for detection and management of alcohol misuse (87%) • GP advice seen as effective method of reducing population –level alcohol consumption (less likely view of untrained group (14% / 27%). • 42% felt adequately trained in detecting the problem	

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					• Confidence in alcohol problem management is increased in those with training and feelings of support (56% / <10%)	
De Guzman 2006 US	Qualititative: Repeated SS interviews over 18 mths (+)	What influences the behavioural changes that participants make in their alcohol / drug use, parenting behaviours, coping skills, social support networks. Which elements of FF are most / less effective in engaging participants and fostering behaviour change, and reasons for these, e.g. context and motivation. Funding: National Institute on Alcohol Abuse and alcoholism	Setting: Not specified (RCT ? published) N= 118 trial sample total; 25 interviewed Mean age: 40.7 years Gender: female (Mothers) Ethnicity: 64% African – American; 32% Latina; 4% multi-racial Educational Level: Not specified Other characteristics: HIV (60%; mean no. of years diagnosis 9.7; AIDS 38.5%), or at risk of HIV infection. All 25 receiving Medicaid. 96% had used illicit drugs in addition to alcohol. All 25, whether diagnosed or not, reported poor physical and mental health. Not seeking treatment at time of screening.	Family First (FF) – multi-session (14), individual BI for problem alcohol / drug use (no details on how long the sessions last). Second set of sessions based on Bandura's Social Action Theory for self-efficacy. Comparator(s):One-session video-based motivational intervention (not involved in qualitative assessment) Comments: Practitioners were female, educated to Masters level and received training in counselling and psycho-therapy.	**Barriers: (to attendance)** Substance use; housing and financial problems; child-care responsibilities **Facilitators:** Strong therapeutic alliance Facilitator characteristics: Compassion, honesty, helpfulness, non-judgemental about participants' lifestyle. Willingness to listen, encouragement, support (diminishes fears and sense of isolation), attention to participants' roles as mothers (desire to improve relationship with children). Opportunity to share challenges they faced, free of judgement; contrast to personal relationships, which were often complex. Learning to deal with the stress of everyday life (relaxation techniques, examining how substances are used as coping mechanisms) Continuation of exercises in daily lives, especially in dealing with children Introduction of harm-reduction principles Persistence, intensive outreach by facilitators Flexibility in terms of attendance "Meeting clients where they are"	Potential applicability to UK
Desy 2008 US	Process Evaluation (+)	To evaluate emergency nurses training needs and identify barriers to, and enablers of SBIRT (Screening, Brief Intervention and Referral to Treatment) implementation. **Funder:** National Highway Traffic Administration (NHTSA)	**Emergency Care Number:** 2 nurses from each site received training. 3265 patients screened 678 (21%) identified as hazardous drinkers Of these, 393 (58%) received brief intervention.	**Interventions:** Eight hour nurse training sessions in 2005 based on D'Onofrio's 'Emergency Department Alcohol Education Project'. Screened and at-risk patients received: SBIRT: 3-5 minutes based on Miller and Rollnick readiness to change	**Main Results:** Process data varied considerably across sites due to discrepancies in implementation. Sites 1 and 5 – staff satisfaction improved from 'dissatisfied' to 'satisfied' between months 3 and 6 (no consent form). These sites contributed most to the study in terms of patients screened and referred, as well as information and views obtained from staff.	Potential applicability to UK; recent.

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			Ages: Patients >18	interview. Referral for follow-up **Screening:** NIAAA; CAGE Site co-ordinators surveyed at mid-point and end-point of 6 month data-collection period to capture information relative to perceived barriers and enablers to implementation. Conference call at 3-month point to discuss barriers. ED nurses surveyed on satisfaction with training using a 4-point Likert scale.	At site 4, staff remained 'very dissatisfied' throughout the study, mainly caused by delays in approval process that led to lack of training. Implementation period not long enough to measure at sites 2 and 3. Two sites decided to implement the SBIRT process permanently. **Barriers** **Reported by co-ordinators:** • Lengthy approval and consent process. • Competing priorities • Uncomfortable nature of topic • Subjective decisions (often inaccurate) regarding patient drinking behaviour based upon patient presentation (dress, etc,). • Lack of privacy for discussion with patients (crowding led to discussions in hallways; family members present). • Patients in acute pain • Short visits; lack of time, therefore lack of rapport. • Patient refusal • Inadequate administrative support • Psycho-social interventions are not the responsibility of emergency health care professionals • Low staff motivation • Doubt regarding efficacy and patient adherence • Limited access to alcohol treatment services in hospital or surrounding community deterred referrals. Some staff thought it unethical to begin a process that cannot be followed through. **Reported by patients to staff:**	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					• Language barriers • Prohibitive costs • Lack of openings for counselling and other services **Facilitators (potential):** • Use of DVD / computer programme for training • Computerised / self report screening with immediate results for nurses to act upon • Multi-disciplinary team to implement SBIRT	
Goldberg 1991 US	RCT (+)	Could a BSI be incorporated into the routine intake process performed by the clinic's nursing staff? If so, would allowing nurses to offer counselling appointments directly on the basis of screening (MAST) results increase the number of patients referred? Would patients briefly introduced to the alcohol counsellor at the time of referral be more likely to keep their first, formal appointments than patients scheduled in the usual manner? Were those patients who received counselling as a result of the screening programme demonstrably in need of such an intervention? Funding: Pew Charitable	Setting: Academic, general medicine clinic, divided into 3 'firms'. Aug 1989. **N =**1408 patients seen; 1328 final study sample (80 not randomised) By intervention 1,2,3: **Ages (Mean):** 1) 48.1; 2)48.8; 3) 49.1 **Gender (Male**): 1) 51.7; 2) 47.4; 3) 48.6 **Ethnicity:** White: 1) 53%; 2) 61.2%; 3) 53% Black 1) 36.6%; 2) 61.2%; 3) 53% Asian 1) 5.5%; 2) 5.3%; 3) 3.9% Other 1) 5%; 2) 5%; 3) 6.1% **Married:** 1) 17.9%; 2) 22.7%; 3) 22% **Diagnosis:** Hypertension 1) 33.1%; 2)	1.Standard Care (physician referral to counselling without knowledge of screening results) 2.Referral rate intervention (Referral to counsellor based on positive screening result) 3.Show-rate intervention (As above plus introductory meeting with counsellor at time of referral) **Comments:** Providers and patients in 3 'firms' are routinely randomised as they enter the system, providing an existing randomisation of both from which to study the effects of interventions.	**Participation:** Overall screening rate 90.4% (1. 90%, 2. 91.4%, 3. 90%). 5 patients declined, others missed by staff. **Main Results:** Screened: 1) 362 (90%); 2) 382 (91.4%); 3) 457 (90%) Screened positive 1) 133 (36.7%); 2) 141 (36.9%); 3) 154 (33.7%) Of these, Referred for counselling 1) 3 (2.3%); 2) 18 (12.8); 14 (9.1%) Of these, kept first appt 1) 2 (66.7%); 2) 11 (61.1%); 3) 7 (50%) Of these, given MAST 1) 2 (100%); 2) 11 (100%); 3) 6 (85.7%) MAST positive 1) 2 (100%); 2) 11 (100%); 3) 6 (100%) Non-significant **Barriers:** Despite willingness to admit drinking to nurses, most patients declined to see counsellor; reasons given: problem no longer exists, or is not sufficiently serious to seek professional intervention **Facilitators:**	Potentially applicable to UK

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		Trusts and the Rockefeller Foundation. Part grant from the National Institute of Drug Abuse.	29.9; 3) 30.9% Diabetes 1) 9.5%; 2) 6.9%; 3) 5.9 COPD 1) 3.2%; 2) 4.1; 3) 5.7%		Time costs seen as minimal by nurses Nurse satisfaction in expanded role of prevention Acceptable to patients	
Graham 2000 US	Survey Brief report -	To assess attitudes of emergency physicians to use of brief interventions in alcohol abuse and alcohol dependence Funded in part by grant from University of Michigan Medical School Biomedical Research Programme	Emergency Care 569 members of Michigan College of Emergency Physicians Ages: range 28-77 (Mean age): 42 Gender: 81.1% M Ethnicity: Educational Level / Professional Experience: Average year of Med School graduation 1980. 77.4% practised in teaching hospitals. 95% specialised in EM.	Questionnaire part developed by authors and part from validated Q. Approved by University of Michigan Inst. Review Board. Demographic information and Likert scaleQ.	**Barriers: (**items that were majority supported or statistically significant) Lack of time (91.6%) Treatment in ED would not be effective (p=0.001) ED inappropriate site for intervention (p<0.001) There is no patient demand for the service (p<0.001) **Facilitators:** The study found that the majority of members supported brief interventions in EDs.	
Heather 2004 UK	Delphi survey ++	To obtain a consensus of expert views on how best to implement screening and brief intervention for excessive drinkers in primary care. Funded by a grant from the Alcohol education and research council.	Primary Care N=79 Experts (health professionals, alcohol workers, researchers and academics)	Delphi Survey (tool in appendices)	Facilitators: Appropriate context of discussions. Use of specialist alcohol worker Use of negotiated discussion rather than prescriptive advice Interventions tailored to individual patients	
Heim 2004 UK	Survey +	To gather prevalence data regarding alcohol consumption and gauge perceptions of community responses to alcohol and service provision in a sample of Pakistani, Indian and Chinese young people in	**Sample:** Purposive; approached on the street, in sports centres, outside schools, colleges and universities at different times during the day and evening. **Number:**	10-point Likert scale for importance and activity of religion	**Main Results:** Men drink significantly more than women (p<0.05) Effect of ethnicity – Chinese drink significantly less than Pakistani respondents. Majority of Muslims report drinking no alcohol, but if they did, it was more than other religious	Small sample; results may not be generalisable

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
		Greater Glasgow. Funding: Greater Glasgow NHS Board	**By Gender and Ethnicity:** Pakistani (73): M 30, F 43 Indian (47): M26, F21 Chinese (54): M26, F28 **Educational Level / Relevant Experience:** **Other characteristics:** No. reporting alcohol consumption: Indian: 50% of males, 48% of females Pakistani: 30% of males, 5% of females Chinese: 75% of males, 20% of females		groups. Self-reported importance of religion was negatively associated with alcohol consumption. Respondents were more likely to drink if they had friends outside of their own ethnic group, or friends within the community that drink. Pakistani men were more likely to report that their level of alcohol consumption affects their relationship with parents (78.9%; 5 negative, 10 positive) and work (57.9%: 11 positive, 3 negative). Majority in all three groups preferred to maintain their current level of drinking, although 21.4% of Pakistani and 8% of Indian respondents would like to drink less, while 16% Of Indian , 14.3% of Pakistani and 4.7% Chinese would prefer to drink no alcohol. **Barriers** Pakistani respondents (<40%) were less likely to feel that their community dealt with drinking in the same way as the population at large, with 30% feeling that the problem was hidden or ignored. This compares with 70% and 6% of Indian and Chinese respondents respectively. For some (15%) Pakistani respondents, alcohol is forbidden because of religious constraints, which in their view prevented questions about drinking being asked. Extreme forms of potential control were suggested, such as violence or being sent back to Pakistan. 13% Indian respondents felt that their community was not very understanding of the possible problems associated with drinking. Lack of awareness of specialist alcohol services other than AA Division as to whether drinking might be better dealt with in own community or as part of mainstream provision	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					Facilitators Most Chinese respondents felt that their community was fairly open and informed about drinking, and that it wasn't really that much of concern.	
Huntley 2004 UK	Survey (++)	To identify attitudes to the detection of alcohol misuse in patients presenting to emergency departments	Emergency Care	The authors measured the relationships between these attitudes, screening behaviour, and doctor's own level of consumption. A questionnaire was given to 127 junior doctors over 5 years at morning training sessions. In addition, 26 SHOs were interviewed as part of a wider investigation of the impact of referral to an alcohol health worker on levels of alcohol consumption. Questions related to screening and brief intervention in the emergency department.	A majority (99%) agreed with the importance of early detection of alcohol misuse and judged the emergency department as an appropriate place to use the PAT (Paddington Alcohol Test). Most (97%) thought treatment could be successful, and that PAT was good for early detection (87%). Just over a quarter of junior doctors felt that PAT was over-inclusive of PAT-possible conditions, and 22% thought that the number of units specified were too low to test for misuse. Only 15% felt it was neglectful not to perform PAT on patients that present with one of the 'top ten' complaints. Lack of time was a limiting factor to usage; 81% stated that they could not always remember to apply the PAT and 68% only applied Pat if they had sufficient time. Self-assessment of misuse showed that 63% reported such behaviour at least once a month and 30% at least once a week. Overall, 39% reported achieving the minimum standard of screening (at least half of the PAT-possible patients they see). This was not associated with self-reported misuse.	Applicable to UK
Hutchings 2006 UK	Focus Groups (++)	To explore and compare health professionals' and patients' views on the acceptability and feasibility of screening and BI. Funded by the Alcohol Education and Research Council	Primary Care Four Primary Care teams Two GP and 2 nurse groups Six patient groups	Linked to Heather et al Delphi Study	Patients and professionals agree that BI is acceptable and feasible. Context of intervention important to patients, as well as who delivers intervention.	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
Johansson 2005 Sweden	Short Communication Qualitative study: Focus Groups (-)	To identify under what circumstances primary care nurses in Sweden are willing to engage in alcohol prevention. Funding: The County Council of Ostergotland, The Social Insurance Office in Ostergotland, and the memorial fund of Ester Johansson.	Primary Care (3 health centres; one in major city, two in small municipalities) N= 26 (All nurses in 3 centres invited) Ages: Not specified Gender: Not specified Ethnicity: Not specified Educational Level: Not specified Other characteristics: Nurses	Training course on alcohol screening and intervention delivered to all health centres in the country one year prior to study	**Barriers:** Nurse time; inconvenient to ask all patients even if desirable. Avoiding approaching patients about their drinking because staff perceive patient to lack self-efficacy, or because intervention with certain patients would be too time-consuming Disturbance of relationship with patient if drinking discussed (perceived from patient non-verbal signs); patient may wonder if it is any business of the nurses. Lack of understanding of nurses in relation to early-phase drinking problems Nurses lack of self-confidence in own self-efficacy despite training Sensitive topic for discussion with patients **Facilitators:** Course attendance – better knowledge about hazardous and harmful levels of consumption; better awareness that patients might be symptom-less despite high consumption; better screening skills Refresher courses may maintain competency (one nurses' view) **Other:** Nurses considered health care sector as having responsibility for alcohol in the community. Wanted to engage patients with harmful consumption rather than everyone unless part of obligation to research.	Potential applicability to UK
Johansson 2005 Sweden	Survey +	To explore to what extent people attending primary care in Sweden expect and receive advice regarding alcohol use in relation to other lifestyle advice (smoking, diet, exercise). Funded by the County council	Primary care 39 centres; 250 patients from each. (total 4862) **Ages** 1yr minimum Mean 54.4 M; 51.3 F **Gender**: 62% M; 38% F	Postal survey; 33 questions (demographics 12 q) including view of accessibility, availability, treatment, info, confidence, participation, med outcome, overall satisfaction. Expectations and receipt of advice. Response Rate: 69% after two reminders	Only 18% had received advice in at least one area. Alcohol was the rarest type of advice given (5%) compared to highest (16.3% exercise). Advice increased in a linear fashion with increasing age for all but alcohol. 62% of patients expecting alc advice received it. Males received more unexpected advice in all areas. **Barriers:** Advice is given less often than patients expect.	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
		of Ostergotland, Sweden, and the Ester Johansons memorial fund.			Alcohol advice is the least likely to be given. **Facilitators:** Male gender, poor health and scheduled appointments predicted more likely to receive advice.	
Kaner 1999 UK	RCT (+)	To evaluate the effectiveness and cost-effectiveness of different training and support strategies in promoting implementation of screening and brief alcohol intervention (SBI) by GPs. Funding: Ms Lock: Alcohol Education and Research Council (AERC). Dr. Kaner: a joint Medical Research Council / Northern & Region Special Training Fellowship in HSR held by Dr. Kaner.	Northern England GP practices N=128 (one GP per practice). £50 voucher as compensation to practice for extra work **Educational Level:** **Other characteristics:** GPs who agreed to use the 'drink-less' SBI programme in earlier study (#493 and #912)	Intervention: 'Drink-less' SBI. **Comparitor(s):** • 43 Controls • 43 training / no support • 42 training & support **Comments:** 'AUDIT' screening to identify eligible patients for 3 month period	Implementation rate: 73 (57%) GPs screened 11,007 patients of whom 3531 were 'risk' drinkers. 2048 (58%) given advice, 1020 (29%) given a booklet. Differences between comparitors: Significant (p=0.03). Controls 44% (19); Trained 56% (24); Trained and supported (30) **Barriers:** Supporting GPs increases likelihood of programme implementation but no more likely than other GPs to deliver advice to 'at risk' patients. Most GPs stopped implementation after trial completed; most likely due to structural and organisational barriers. Receptionists require support to encourage positive participation. **Facilitators:** Need to consider all players in the system and adjust dissemination and interventions to meet needs of each.	Applicable – trial based in UK
Kaner 1999 UK	Survey ++	To assess GPs recognition of, attitudes towards, and intervention for, excessive drinking problems among their patients.	Primary Care **N =** 430 **Mean age:** 43.7 **Gender:** M 76%; F 24% **Educational Level / Experience:** Mean length of practice 13 years; 34% had received 4-10hrs post-grad training, medical ed or supervision in alcohol-related	**Survey instruments:** Postal 132-item questionnaire developed as part of WHO Collaborative Project. Pre-tested and piloted on 160 GPs from 11 countries. Main study carried out May 1995 – May 1996. Ratings on 4-point scale on importance of reducing excessive drinking to promoting health, and their own perceived effectiveness in helping patients change their	**Barriers:** **Underactivity; 65% had managed 1-6 patients with hazardous drinking in last year** (at least 20% patients presenting to GPs likely to be excessive drinkers) 67% asked patients about alcohol consumption 'some of the time', 23% 'most of the time', 4% 'all of the time'. No difference by age, gender or rurality. GPs in solo practices asked more often than group practices (p<0.01). 36% asked typically in cases with physical,	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			problems. 10% had none at all. **Other characteristics:** 50% urban, 16% rural, 34% mixed **Participation:** 279 responses out of an eligible 411 (68%). No sig differences between response rates in 3 regions	behaviour, and preparedness to counsel patients. Two Case Vignettes to assess GPs diagnostic and management skills, and further action they might take. Extent to which GPs felt they should be involved in helping patients to change their behaviour, rated on a 4-point scale. GPs attitudes to working with excessive drinkers assessed by SAAPPQ which measures role legitimacy, adequacy, motivation, self-esteem and work satisfaction. Incentives and disincentives for BI work measured by GPs level of agreement with a range of barriers and facilitators relating to the work.	psychological and social symptoms, 31% physical and psychological, 12% physical, psychological and social, 11% physical only. 77% believed drinking moderately was important in health promotion. 83% were prepared for counselling. 21% felt effective at helping, though 58% felt they could be effective with adequate training. 90% reported that they obtained information on patients' drinking (32% always. 58% as indicated). Ratings for action in response to vignettes did not vary sig by age, gender, practice status, or rurality. Most frequent action for case A (89%) was to cut down on drinking, and for Case B to advise abstinence (74%). 95-96% indicated that they would ask further questions , and 99% related both problems to drinking. 88% felt that GPs should be involved in promoting non-hazardous drinking; 86% that they should be involved in providing information. 60% were less accepting of being involved in helping alcohol-dependent patients. Role legitimacy: Problem drinkers 87%; Dependent drinkers 86% Role adequacy: Problem drinkers 71%; Dependent drinkers 60% Motivation: Problem drinkers 23%; Dependent drinkers 23% Task-specific self-esteem: Problem drinkers 19%; Dependent drinkers 28% Role Satisfaction: Problem drinkers 13%; Dependent drinkers 8% Differences between role adequacy and work satisfaction sig higher for excessive drinkers ($p<0.001$) and Self-esteem sig higher for working with dependent rather than excessive drinkers ($p<0.001$). **Barriers:**	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					Too busy dealing with present problems of patients (72% agree) Not trained for counselling (62% agree) Government policies not support preventive medicine (56%) **Facilitators (hypothetically):** More readily available support services to refer patients to (85% agree) If early intervention proven to be successful (80% agree) If patients requested advice (77%) Less agreement that patients resent being asked about their drinking (21%)	
Kaner 2001 UK Same study as Lock 2004	Survey ++	To investigate patient-practitioner characteristics influencing brief intervention in primary care. Funded by the Alcohol education and research council and a joint MRC/Northern region Special Training fellowship in HSR held by EFSK.	Primary care **Number:** 84 GP practices; 12,814 completed AUDIT questionnaires from these practices. **Ages: GPs:** Mean age 42yrs Patients over 16 yrs. **Educational Level / Relevant Experience:** Mean time in gen practice = 12 yrs. 73% GPs had direct training in BI protocol and written guidelines. 27% had written guidelines only. **Other characteristics:** Group practices 87%; mean list size 1887 patients and 147 consultations per week. Mean consultation length 9.7 mins.	Screening of all patients >16 yrs using AUDIT over a 3 month period.	**Participation:** Mean 151 patients per practice (total = 12,814 screened). 3% declined to complete the q. **Main Results:** 4080 (32%) patients were risk drinkers. Of these, 2043 (50%) received brief intervention consisting of structured advice and/or alcohol-related literature. 6% of patients who were non-risk drinkers received BI. Breakdown in terms of risk drinkers who received BI: Sex: 58% males Occupation: 61% of unemployed; 38% of students; 52% of professionals; 39% of unskilled workers; 55% of technically trained; 46% of those in higher education. Delivery of BI: 26% increased odds of solo GP delivering BI than GP from a group practice. GPs receiving training and written guidelines had 76% increased odds of BI compared to those receiving written guidelines alone. GPs with longer mean consultation durations delivered more BI; a one-minute increase in consultation duration increased the odds by 12%.	Applicable to UK

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					Barriers: • Patient female • Patient employed (especially unskilled) • Patient a student **Facilitators:** • Patient Male • Patient unemployed • Solo GPs • GPs receiving training plus written guidelines Longer average consultation durations.	
Kaner 2003 UK	RCT (++)	To evaluate the clinical impact and cost-effectiveness of strategies promoting screening and brief alcohol intervention (SBI) by nurses in primary care. Funding: the Alcohol Education and Research Council and a joint Medical Research Council / Northern & Region Special Training Fellowship in HSR held by Dr. Kaner. Dr Kaner supported by an NHS Primary Care Career Scientist Award.	Primary Care centres, Northern and Yorkshire Region N=212 from 312 potential practices Mean age: 45 yrs Gender: Typically female Ethnicity: Not specified Professional Experience: Mean 11 years in practice; 64% less than 4h training in alcohol issues Other characteristics: Nurses in Primary Care (recruited by telephone).	Nurses required to use AUDIT screening on all patients >16 years, and SBI ('Drink-Less') for at-risk patients. Interventions: • Written guidelines only (Control) • Training alone (training) • Training plus ongoing telephone support (training plus support)	Applicable findings to this question: Risk drinkers - 17% total patients not receiving appropriate management; controls more likely to give appropriate management 10% risk drinkers had no SBI 7% non-risk had SBI Mean duration of BI = 8.6 minutes; mode / median duration = 5 minutes. **Barriers:** Trade off between extent and appropriateness of SBI with guidelines only Potential anxiety about misdirected advice In this study, training and support increased extent of advice but not appropriateness **Facilitators:** Assistance of receptionists (minority of practices) increased the rate of screening.	Applicable – trial based in UK
Kaner 2006 UK	Qualitative; Interviews (+)	To explore the role that GPs' drinking behaviour plays in their recognition of alcohol-related risk in patients. Funding: DH NHS Career Scientist	North of England Primary Care N =29 Ages: Not specified Gender: 14 male, 15 female Ethnicity: Not specified Educational Level: Not specified	Based on finding from authors' previous study, that GPs' health promotion behaviour in terms of alcohol may be affected by their own drinking behaviour.	**Barriers:** GPs' relationship with alcohol varied across the sample; 6 GPs would not discuss the topic, or deflected it to humour or third person discussion. Often an embarrassment, as other GPs admitted to drinking, or knowing other GPs that had had drink related problems. This has implications for how patient health promotion may be delivered.	Applicable; based in UK

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
		Award (EK); Grant from Alcohol Education and Research Council (TR); Personal Research Fellowship ERSC (CM);	Other characteristics: GPs		Distancing of own behaviour from that of patients – some GPs felt themselves to be 'different' from other people, whether they drank heavily or not (professional detachment). If not , there was a tendency toward judgement. Emotive issue for GPs who felt guilty or hypocritical about trying to reduce behaviour in others that they themselves engage with; embarrassed when they discover a patient is a heavy drinker, and troubled about the health and social implications of drinking. Frustration about the refractory nature of alcohol-related problems, especially in alcohol dependency. Drinking normalised by using own drinking behaviour as a benchmark – GPs might use their own experiences to bring the topic into conversation. Lack of facilities for GPs own drinking problems to be addressed. **Facilitators:** Shared empathy with patients, as GPs share this activity – socially sanctioned as legal. Confidence and directness in discussions.	
Littlejohn, 2006 UK	Systematic review (+)	To determine whether socioeconomic status (SES) has effects on i) willingness to participate in brief intervention research ii) attendance to receive BI once allocated iii) treatment outcome. Only data related to i) and ii) extracted in relation to this review question. Funding not reported	18 included in review. i) 12 reported numbers of positively screened participants ; average of 38% declined. 2 papers compared characteristics between attendees and decliners: For 2 studies presenting data according to i) and 4 studies for ii) Primary care. Setting of studies by country not reported by authors.	Brief interventions for non-dependent alcohol misuse. BI defined as intervention providing feedback and advice to change to non-dependent, non-treatment seeking alcohol drinkers, where intervener is generalist medical or nursing staff. Control (no further information)	1. Of 12 papers that reported on positively screened participants who declined to participate in BI, only 2 papers compared their characteristics: Aalto & Sillanaukee 2000 reported that older, heavier drinking males were more likely to participate. Differences in education and employment status did not affect likelihood of attendance; Senft et al., 1997 reported that educational status did not affect participation rates. 2. 12 papers reported on attendance rates of those randomly selected to BI condition. Range: Richmond et al., 1995 reported a	Potentially generalisable to UK

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			Non-dependent hazardous or harmful drinkers in primary care. SES defined as follows: by social class (no further information) (Scott & Anderson, 1990; Anderson & Scott, 1992), by employment (professional or technical-mechanical or labour-machine or retired or farm or sales-service or homemaker or unemployed) and education (high school or less / some college / college degree or more) (Fleming et al., 1997), and education only (as above) (Fleming et al, 1999). For 2 studies presenting data according to i) n= >516 (1 study n not reported) and for 4 studies presenting data according to ii): n= 2001		49% attendance, through to Ockene et al., 1999 reporting a 99% attendance. Of the 12, 4 papers compared characteristics of attendees and defaulters: Fleming et al., 1997 reported that variables such as employment or educational status did not account for attendance or non-attendance; Richmond et al., 1995 found that higher SES (employed / with further education) was associated with higher attendance: younger, less educated, heavier drinkers were most likely to default. 2 papers examined the effect of SES on follow-up rates: Senft et al., 1997 found that higher educational level increased the likelihood of follow-up attendance, while Curry et al., 2003 did not.	
Lock 2000 UK	RCT ++	To examine changes in receptionists' attitudes, with different levels of training and support, towards involvement in a general-practice based trial of screening and brief alcohol intervention. Funding: Alcohol Education and Research Council. (Part of Phase III WHO Collaborative Study on Implementing and supporting Early Intervention Strategies in Primary Health Care).	**Number:** 84 (one per practice) From sample of 141 (Control (n=47); Training (n=47); Training plus support (n=47) **Mean age:** 42 yrs **Gender:** Female **Educational Level:** Majority to 'O' level; average length of service 7 yrs **Other characteristics:** Receptionists in Primary Care who assisted GPs in implementing 'Drink-Less'	**Theoretical Framework / Concept / Interventions:** Receptionists as 'gatekeepers' to primary care Involvement of receptionists in SBI trial; Receptionists asked to hand out and explain AUDIT to all patients>16 years, keep a tally of non-completion, and copy completed questionnaires. **Comparitor(s):** Three training and support conditions: Written guidelines only (Control)	**Participation:** Control 27% (n=23); Training 32%(n=27); Training plus support 41% (n=34) Total = 84 practices / receptionists took part in study. Of these 74% (62) returned baseline Q; 56% (47) returned completed set of Qs Total of 12,814 patients screened (average 153 per practice. **Main Results:** 70% attitudes deteriorated over 3 mths; 25% improved; 5% stayed same. No significant difference between training and support conditions. • 54.5% attitude to value of intervention had deteriorated, 9% significantly.	Applicable – trial based in UK

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			SBI. 70% full-time; 90% in group practices; average list size = 7615 **Inclusions**: Receptionists in Primary Care (Northern and Yorks Region) who assisted GPs in implementing 'Drink-Less' SBI trial.	Training alone (training) Training plus ongoing telephone support (training plus support) Also brief word on comparing attitudes of receptionists with those of GPs. **Comments:** From 354 GPs who participated in SBI trial, requested the programme and were asked to implement it, 141 agreed that their receptionists would use it for a three month period.	• 61% attitude to their role in the practice deteriorated, 7.7% significantly. • 88% attitude to job deteriorated, 12,5% significantly. • 57% felt programme suitable for use in practice, compared with 62% GPs • 52% felt programme was demanding compared with 38% GPs • 56% thought they should be paid extra for this type of work, but 29% GPs reported being able to pay to run the programme. **Costs:** **Barriers:** • Receptionists attitudes to SBI programme, and their role in implementing it, can deteriorate over time • Negative attitudes to the implementation of SBI programme may have detrimental effects on actual practice **Facilitators:** • (potential) Involving receptionists in the research and intervention decision-making processes	
Lock, 2002 UK	Qualitative: SS interviews (++)	Why does BI not occur routinely in general practice, despite strong evidence for effectiveness? Funding: the Alcohol Education and Research Council and a joint Medical Research Council / Northern & Region Special Training Fellowship in HSR held by Dr.	Setting: GP practices, North-East England N =24 nurses from 20 practices Ages: 30-57 years Gender: Female Ethnicity: Not specified Educational Level: Experience 1-24 years in	Screening and BI tools not specified; based on BI trial – see Kaner, 1999; Lock, 1999)	**Barriers:** Nurses sometimes 'gloss over' the issue of alcohol and merely record consumption levels in notes. Negative reactions of patients when asked about drinking range from apathy, lack of interest, to embarrassment and aggression. Nurses find alcohol a highly emotive issue to discuss with patients because of possibility of upsetting them (one nurse had had a complaint made about her, which made her cautious).	Applicable; based in UK

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
		Kaner. Dr Kaner supported by an NHS Primary Care Career Scientist Award.	primary health care. Other characteristics: Practice nurses; practices already taken part in BI trial.		Nurses felt that patients were not always truthful about their consumption; this affects motivation for giving patients advice. Possibility that patients may not return for important check-ups if they become upset with questioning (one example of patient who subsequently died after DNAing a BP check). Another had had patients walk out after becoming abusive. Difficult to broach the subject with patients who are drunk on attendance, due to their unpredictable and potentially aggressive behaviour. Confusion around the issue for both staff and patients; standard drink units; home-based drinking; possible benefits of drinking, and recommended limits all make assessment and discussion difficult. Some nurses unsure what official guidelines (changed messages over years) are or where they come from (WHO or govt). Alcohol seen by nurses to have social and coping functions, and widespread acceptance, particularly in the study area; they also used and enjoyed alcohol themselves. Nurses may be lax with certain groups of at-risk drinkers; particularly those with similar characteristics to the nurse (middle class, married etc.) In older people drinking may be overlooked as it is perceived as 'too late' to be concerned about health damage at this stage. Lack of training in this particular area. **Facilitators:** Wealth of opportunities for nurses to screen and advise during new registration sessions, as well as in general health checks and well-person / specific clinics for hypertension etc. Nurses did not reject the idea of being involved; one nurse thought BI more of nurse role than doctors'. No problems with acceptability.	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					Nurses are aware of particular risky behaviour such as binge drinking, weekend drinking, regular heavy consumption and home drinking. Also risk groups such as older men and women, young people, students, middle class people, businessmen, unemployed.	
Lock 2004 UK	Focus Groups (++)	To explore patient's attitudes to and experiences of alcohol and BI in primary health care so that service can be developed that is more acceptable to patients. Funding: WHO Collaborative Project (Phase IV).	75 practices invited, 8 took part. 480 patients (random) invited, 43 responded. 31 took part. **Ages:** M 29-78; F 18-63 **Gender:** M 21; F 22 **Ethnicity:** **Educational Level / Professional experience:** 4 GCSE; 8 A level; 9 university, rest missing **Other characteristics:** **Drinking:** 6 non; 14 sensible; 10 heavy/binge; 1 binge	Focus Groups (6, based on age and sex) carried out in city centre community setting. Semi-structured topic guide, open-ended questions. One hour duration, audio-taped and transcribed. Patients presented with 5 cards each with name of a different health professional (GP, PN, Counsellor, lifestyle worker, alcohol worker) which they were asked to rank in order of preference in discussing alcohol-related issues. Reasons discussed. **Analysis:** NVivo; coding frame to analyse themes by age, gender and reported lifestyle behaviour.	Young women preferred PN and young men least likely to consult a counsellor. **Barriers:** Not wanting to waste doctor's time Poor relationship with doctor Unsure about GPs own drinking behaviour PNs might not be as 'serious' about issues Nurses may not be perceived as having sufficient training Stigma associated with seeing a counsellor or alcohol worker, especially if based in practice. Male patients mainly confused regarding recommended limits **Facilitators:** Positive response to lifestyle questions and advice when presented in appropriate context, e.g. well man clinic, new registration. Preferred health professionals (in order): GP; PN; C; AW; LW. Not sure what latter did or was for. PNs perceived to have more time than GP, and easier to talk to. Counsellor perceived as better trained, and able to address other issues as well as alcohol. Females more knowledgeable about drinking behaviours	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
Lock 2004 UK Same study as Kaner 2001	Survey ++	To investigate if patient characteristics, nurse characteristics and practice factors influence provision of a BI by practice nurses. Funded by the Alcohol education and research council and a joint MRC/Northern region Special Training fellowship in HSR held by EFSK.	Primary care 128 practice nurses	Copies of 5541 AUDIT questionnaires assessed after 3 month implementation	Patient risk is most predictive factor of BI delivery. Females less likely to receive intervention.	
McManus 2003 UK	Evaluation of service intervention +	To assess 1) whether a brief single session intervention could be established and delivered to medical patients with problem drinking by a nurse counsellor in a general hospital where no such service previously existed; 2) whether two counselling sessions would lead to greater improvement than one; 3) feasibility of training nurses to routinely detect alcohol problems. (Before and after design).The R&D Directorate of the North and west Regional Health authority; the R&D Directorate of the Central Manchester Healthcare Trust.	**Number:** 1360 consecutive patients, of whom, 177 drinking above cut-off (see below) **Mean ages:** Phase 1: 52.8; Phase 2: 48.8; Phase 3: 56.5 **Gender:** Male: 757 (148 / 13% at risk); Female 603 (29 / 4.8% at risk), Comparable between 3 groups. **Ethnicity:** **Educational Level / Relevant Experience:** **Other characteristics:** SES Comparable across 3 groups	**Interventions:** Educational programme for nurses; either group or one-to-one teaching. Aim to increase nurse understanding of importance of screening all patients for alcohol problems; to record accurately an alcohol history using the drinking diary; increasing clinical skills in responding to someone with a drink problem; gaining knowledge of available specialist alcohol services	**Main Results: Significant reduction in drinking at follow up after one counselling session** (Median 78 units down to 29 compared with 68.5 / 64 in controls and 70 / 22 after two sessions) No real additional benefit therefore from 2 sessions of BI over one. **Barriers** • Negative / sceptical attitudes of some nurses • Difficulty for staff of discussing drinking with patients **Facilitators** • Individuals in this setting are more likely to be contemplating behaviour change than a comparable group in the general population (therefore appropriate to target this group). • The nurse trainer was herself a nurse which helped her acceptance. • Support from senior nursing staff • Attitude of staff that alcohol work is important • Discussion of alcohol consumption as part of routine admission procedure lessened difficulty in asking patients	Transferable

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					about their drinking.	
Miller 2006 US	Survey (part of RCT) +	To provide detailed information on patient attitudes toward self-report and screening and to explore whether demographic variables were related to these attitudes. Funder not specified	Primary Care 166 (162 analysed) **Ages** 18 minimum Mean 39.4 **Gender**: 28% M; 72% F **Ethnicity:** 66% Black (53% F); 34% White (18% F) **Educational Level:** 40% high school or less; 60% some college or more **Other characteristics:** 28% had positive AUDIT-C scores (at least 16 points) 69.1% married or co-habiting.	AUDIT-C Likert scale patient opinion survey: How often do you have a drink containing alcohol? How many drinks containing alcohol doe you have on a typical day when you are drinking? How often do you have six or more drinks on one occasion?	Patients more positive to screening than anticipated. Those who drink more are less embarrassed about being asked about their drinking. **Facilitators:** Majority of patients positive about screening (especially black people and older people)	
Mukamal 2007 US	Survey +	To explore disparities in provision of alcohol counselling Funded in part by a grant from the National Institute on Alcohol Abuse and alcoholism	Primary care 15,498 (Routine Data) **Ages** Over 18yrs **Gender:** 9,176 F; 6,322 M **Ethnicity:** 12,447 white or non-Hispanic 2,077 black and non-Hispanic 599 Hispanic	1999 BRFSS telephone survey of 1 person per household. In terms of alcohol, the instrument gathers information on the number of days that at least 1 drink consumed in previous 30 days, and average number of drinks consumed. A drink = a can or bottle of beer, a glass of wine, a can or bottle of wine cooler, a single cocktail, a shot of liquor (around 11-14g ethanol). 7 questions address preventative services received in past 12 months, 3 years or more. This module distributed in 5 states – Louisiana, Missouri, S Carolina, Virginia,	13% reported receipt of counselling in past 3 years, 10% in past year. 16% risky drinking within last month (mainly at least 5 drinks on one occasion), 49% abstainers. Prevalence of counselling among risky drinking 21% ($p<0.001$). 70% reported routine check up within last year, 89% in last 5 years. Weighted prevalence of problem drinking: 16% among whites; 12% among blacks; 23% among Hispanics; 13% other race ($p=0.005$). Binge drinking not sig associated with race ($p=0.19$). **Barriers:** Odds ratio for counselling almost 2 fold (1.83) for black and Hispanic people; Hispanic (2.17) compared to white people. No gender differences.	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
				Wyoming (n=15,711) **Response Rate: 69.8%** Louisiana, 68% Missouri, 59.4% S Carolina, 66.5% Virginia, 65.9% Wyoming	Same effect in problem drinkers and abstainers. (suggesting that physicians may apply screening practices unsystematically – tied to race).	
Rapley 2006 UK	Qualitative Individual and group interviews (++)	Primary care North-East England; 11 inner city practice locations; 5 suburban, 4 affluent suburban, 4 small town, 5 rural To explore work of GPs with patients with alcohol-related issues. To discuss and challenge the findings with members of the primary care team. Funders: AERC and C May's ESRC Personal Fellowship.	**<u>Phase 1: Interviews</u>:** **Number**: 29 GPs interviews; **Gender:** 15F; 14M **Educational Level / Professional experience:** Varied experience from Registrar to newly qualified. 2 with special interest in alcohol. 3 police surgeons, 4 research active doctors, 7 doctors previously involved in RCT of alc BIs. **Other characteristics:** **<u>Phase 2: 3 Group interviews:</u>** **Number:** 7 GPs who had taken part in phase 1, (2 FGs) and 1 FG with 2 members of primary care team; 7 doctors, 1 PN, 1 HV, 1 Counsellor, 2 practice managers (total n=19)	Follows the work of Thom & Tellez (1986) on the difficulties of detecting and managing alcohol-related problems in general practice.	**Barriers:** Occasionally, patients react badly to being asked about their drinking Asking the question 'out of the blue' Difficulty picking up 'intuitively' patients that are just over the limit (requiring BI). Most of the sample didn't routinely screen all their patients, thinking it isn't viable. Don't see self as having legitimate role in supervising or directing lifestyle choices (particularly if heavy drinking may be transient). Working with *'multiple definitions of problematic drinking'* **Facilitators:** Asking about drinking as normal practice, especially when related to new patient registration, and also in many routine consultations Patients expecting to be asked about their drinking Framing alcohol-related questions within *'auspicious environment'*, e.g. embedded in other lifestyle behaviour questions, or insisting that the information is asked of every patient, or was required for keeping records.	
Rush 1995 Canada	Qualitative; Focus Groups and Interviews (++)	To elucidate family physicians' motivations concerning early intervention for alcohol use and their perceived barriers to such intervention. Funding: Addiction Research	Setting: Family Medical Practices, Ontario Focus groups: n=12; Interviews: n=12 Gender & age: Interviews: 2 males age 55 & 57, 10 females mean 34 years. Focus	Non-specific	**Barriers:** Despite asking patients about their alcohol use, physicians still find they are missing people who are at risk. Concern about the appropriateness of asking all adults (as recommended in training programme) about such a sensitive topic. Concern about introducing the topic into a	

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
		Foundation, Ontario	Groups: 2male, 10 female. (3 solo practice, 9 group practice). Ethnicity: Not specified. Educational Level: Focus groups: 3-39 years experience (mean 16) in general practice. Saw 90-200 patients per week (mean 130). Interviews: 4-32 years experience (mean 13 years).		consultation that was scheduled for another purpose. Time constraints – not practical to bring the topic up for each patient. Pessimism regarding being effectual – can't make people stop doing anything. Being female – dealing with male patients in this context. Cultural barriers. Health care system encourages health promotion but doesn't let doctors do it. Message that alcohol can be beneficial to health and is acceptable. Lack of tangible materials or a systematic strategy for patient identification and management. **Facilitators:** Tendency to prefer to treat patients within the practice rather than refer to specialist centres – patients see this referral as a rejection. Motivation – physicians wanted to learn the new approach in order to avoid crisis management, and to be able to transfer skills to different aspects of care. **Other:** Participants felt it was within their role to identify patients who use alcohol as part of holistic medicine and lifestyle issue discussion.	
Schermer 2002 US	Survey +	To assess the extent to which trauma surgeons support for implementing screening and brief intervention in trauma centres. **Funder:** Robert wood Johnson Foundation substance Abuse policy Research Program Grant 044119; National Institute on Alcohol Abuse and Alcoholism.	Emergency Care, 3 sites 711 Surgeons 54% response rate 315 surveys evaluated	Unspecified	**Barriers:** • Only 24 surgeons thought it too time consuming • 14% (44) thought it might compromise patient confidentiality • Language barriers • Severity of illness **Facilitators:** • Most patients accepted SBI (though variable across sites)	Screening and interventions carried out by researchers rather than clinical ED staff. Therefore limited applicability in real ED setting.

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
					• 50% of resistant patients became less resistant to change following intervention • 83% agreed that a trauma centre is appropriate to address harmful alcohol consumption • 86% agreed that it was important to address drinking with injured patients (higher percentage of alcohol misuse than general population) • Only one surgeon inaccurately described risk drinking limits • 25% used AUDIT or CAGE • 49% reported that they understood the concept of brief interventions • 25 thought that screening and counselling would significantly increase costs • 55% currently perform screening; 37% interventions • 88% supported screening; these surgeons were 6.2x more likely to believe that a trauma centre is appropriate setting to address alcohol disorders 72% supported BIs (7x less likely to think BI would increase costs too much	Insufficient information on design – need to track (order) a related article
Schermer 2002 US	Survey +	To assess the extent to which patients accept screening and brief intervention in trauma centres. **Funder:** National Institute on Alcohol Abuse and Alcoholism.	Trauma Centres **Number:** 150 consecutive trauma patients **Ages:** Mean 37 **Gender:** 70% male **Ethnicity:** 26% Native American; 2% African American; 40% Hispanic; 30% White non-Hispanic; 2% other	**Survey instruments:** 10-item; 4 items relating to offensiveness of physician or trauma team member discussing alcohol. 4 items about types of interventions. 7-point Likert scale Survey over 12 weeks with 150 consecutive trauma patients. 50 of these also asked dichotomous question of whether they believed	**Participation:** 163 patients admitted and discharged over 8 weeks; 114 (70%) screened with AUDIT of whom 45% positive. Those not screened: 14 did not speak English, 19 had severe injuries, and 16 were missed. One refusal. **Main Results:** Mean responses were: 5.86 for doctor discussing alcohol (OK) 5.72 for nurse or social worker discussing alcohol (OK) (correlation $p < 0.01$); Native American	Screening and interventions carried out by researchers rather than clinical ED staff. Therefore limited applicability in real ED setting.

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
				someone from the trauma team should ask about their drinking. **Analysis:** SPSS Two factor (race/ethnicity and gender) analysis of co-variance; Tukey's test for post-hoc comparisons of ethnicity Pearson correlations to explore answers regarding two types of providers Significance considered P<0.012	scores significantly lower (5.1). Concern about own drinking: Native Americans 4.4; Af Am 1.0; Hisp. 2.9; white 1.8 (p=0.002 for NA vs White). Overall, this question correlated highly with AUDIT score (p<0.001). Women found BI and reading materials more acceptable than men (p=0.006) though both genders had mean scores of 'OK' or above. No ethnic differences in this question. 94% of 50 patients asked rated a 'yes' for 'should someone from the trauma team talk to their patients about alcohol use'. **Barriers:** • Language barriers • Severe injury • Cultural differences may impede willingness to be asked about alcohol use, despite concern about own drinking; though in this study there was still acceptance, and interventions can be culturally tailored. **Facilitators:** • Most patients thought that they should be asked about alcohol use in the trauma centre • Patients found it acceptable to be asked by a doctor (higher score), or by another team member such as a nurse or social worker	
Williams 2005 UK	Evaluation (++)	To explore factors influencing effectiveness of screening and brief interventions for alcohol in emergency care	Data was collected on all ED patients that accepted an appointment to see an alcohol health worker (AHW) between January 1998 – 31 December 2001. All, the patients were identified as	None	A total of 1792 patients booked appointments; overall attendance was 34.7%. Factors that affected the rate of attendance include delay between the offer of appointment and appointment date (33% less attendance with a delay); whether the patient had requested a delayed appointment (mediates the delayed appointment effect); and	Applicable to UK

First author, date and country of corresponding author	Study Design & Quality (++/+/-)	Research Question & Funding	Setting & Study Population	Additional study details	Main findings	Comments
			'high risk' by staff, though not all potential high-risk patients were identified. The proportion of patients screening positive varied between 3% and 15% of the total number screened. Between 8% and 18% of screened patients accept the alcohol health worker (AHW) appointment.		frequency of clinics (a 6% drop in attendance when clinics fall in frequency from 5 to 3 mornings). The authors conclude that those patients requesting a delayed appointment (23%) were more likely to attend than those who do not. The rate of attendance declines steadily in the group that accept the next available appointment as the delay increases from 0 days to 5 days (77% of all appointments made). There is a 'half-life' of attendance at 2 days whereby the rate has dropped by half (from 65% on same day to 28% on day 2). Hence, there is an important 'same-day' or teachable moment aspect to the availability of AHWs to high risk patients, and delays are better kept to a minimum.	

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