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Screening and Clinical Detection of Alcohol Disorder in General Practice

Dr John McMenamin
Preface

The research reported in this thesis developed in the context of applying evidence-based screening in the author's general practice. Increasing awareness of the difficulties associated with opportunistic screening in practice encouraged the development of an organised screening programme. Adult patients registered with the practice were personally invited to attend a screening healthcheck which among other items included screening for alcohol risk and disorder. The increased detection of alcohol problems highlighted the importance of alcohol as an issue of concern in general practice. Although there is a considerable body of research on alcohol in the medical literature, there has been limited application of the findings in general practice to date. This thesis reports the author's attempt to implement key alcohol research findings in a general practice, with reference to both clinical and screening practice. The research is reported as a descriptive study including literature review, a practice audit and selected case reports. The thesis is solely the work of the author including the referenced literature review, practice audit and analysis, case reports and discussion of the findings. The healthcheck screen used in the study includes an alcohol questionnaire developed from research reported in the literature review.

Some aspects of the practice audit have been previously published (McMenamin 1992, 1994, 1997). No funding was obtained for the purposes of writing this thesis. There are no conflicts of interest. No patient identifying information is included and ethical approval has been obtained from the Wanganui-Manawatu Ethical Committee.
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Abstract

Aim: This thesis reports on the implementation of key alcohol research findings to the screening and clinical detection of alcohol risk and disorder in a general practice. It aims to provide a literature review which will explain the nature of alcohol risk and disorder, why alcohol screening is necessary, and how this screening could be undertaken in general practice using a model of screening by healthcheck. Alcohol risk is presented as the likelihood of an individual to develop alcohol-related complications. Definitions of alcohol disorder are discussed and the reasons for adopting the DSM11R criteria explained. A study is reported in which healthcheck screening is used to improve detection of alcohol risk and disorder in the author's general practice. Selected cases are presented to highlight particular issues relevant to alcohol in general practice. The study findings are discussed with reference to the literature review and recommendations on the use of the healthcheck screening model in general practice presented.

Method: All English language medical journals reporting alcohol-related research were identified by contents review (specialist alcohol and New Zealand journals), medline search (using keywords and related articles/author-specific searching) or cross-referencing from other reports. Other alcohol-related professional reports were identified from library searches or obtained from original sources. From the literature review, a format was developed for the healthcheck questionnaire which included a brief alcohol screen. This brief questionnaire included three questions on consumption of alcohol, and two questions identifying concern about alcohol use, modified from screening questionnaires available at the start of the study, particularly the Canterbury Alcoholism Screening Test (CAST) and the Self-Administered Alcoholism Screening Test (SAAST). Adult patients registered with the practice were offered a personal invitation by the doctor to attend a healthcheck appointment. Recruitment was undertaken over a 3 year period for 30-69 year olds (754 eligible patients), and a 5 year period for 18-29 year olds (339
eligible patients). Patients attending the healthcheck completed a self-administered questionnaire which was reviewed by the practice nurse, selected examination items performed, and the results were discussed with the patient by the doctor. Alcohol risk was assessed and laboratory tests arranged if appropriate with follow-up appointment offered to those requiring further alcohol assessment. Patients were classified at increased risk by reported consumption, and diagnosed with alcohol disorder by DSM111R criteria (alcohol abuse or dependence).

At the completion of each study period, the clinical notes of all patients in the study were reviewed to determine the screening rate and to review all recorded alcohol information including clinical indicators of alcohol disorder, alcohol risk for all screened patients, and the effect of screening on the prevalence of alcohol disorder.

Results: Alcohol information was obtained on 851 of 1093 study patients (78%). Screening increased the detection of alcohol disorder from 4% (44 patients) to 8% (84 patients).

Clinical detection of alcohol disorder was associated with physical, psychological and social factors. Clinical factors most commonly included abnormal liver function tests, gastrointestinal symptoms, hypertension, gout and mental health symptoms. Personal and relationship problems were also commonly linked to detection in a clinical context.

Recruitment for healthchecks was highest among women (78%) with a high level of screening in both 18-29 year old (80%) and 30-69 year old groups (76%). Recruitment of men (70%) was notably more successful in the 30-69 year old group (85%) than in the 18-29 year old group (44%). As a test for DSM111R alcohol use disorder, the brief alcohol questionnaire included in the healthcheck had a sensitivity of 0.93, a specificity of 0.85, a positive predictive value of 0.25, and a negative predictive value of 0.99. The questions on alcohol consumption were the most sensitive items, identifying increased risk (intermediate or high risk consumption) in 86% of patients with alcohol disorder. The remaining patients were identified by abnormal liver function tests. A positive screening test (consumption male>20, female >15 standard drinks/week) indicated a 1 in 4 likelihood of alcohol disorder, increasing to 1 in 2 if concern was reported on a screening question, or a liver function tests was abnormal.
The healthcheck screening programme increased the detected prevalence of alcohol disorder from 4% to 8%. DSM111R criteria identified 32 patients with alcohol dependence and 52 patients with alcohol abuse. ICD10 criteria identified 16 patients with alcohol dependence and 54 with harmful use. Nearly half of the patients meeting DSM criteria for disorder (48%) were not drinking at high risk levels (consumption male >50, female>35 standard drinks/week). Case examples drawn from the clinical notes indicated that alcohol information may come from multiple sources, and that classification of this information may be difficult, influenced not only by the completeness of the data available but also by medical interventions and other influences on patient alcohol use over time. Classification was also more difficult in some patients due to the complexity of the particular case. There were advantages identified in classifying disorder including enhanced therapeutic options, increased awareness of related issues and completeness of medical problem lists, although interventions in both risk and disorder were possible without formal diagnosis.

**Conclusion:** There is good evidence in the literature supporting the value of general practice screening for alcohol risk and disorder. This type of screening meets accepted criteria. The importance of alcohol as a health problem is supported by both the prevalence of alcohol-related problems in New Zealand, and the relationship between alcohol and morbidity and mortality. It is possible to recognise a latent or early symptomatic phase (risk or early abuse/dependence) and it proved possible in the study to collect this information on most patients using the healthcheck screen. There is evidence supporting the value of intervention in heavy drinking and it is reasonable to conclude that intervention in a pre-symptomatic or early symptomatic phase is of more value than waiting until more severe disorder is established. There are good screening tests available including consumption measures, patient questionnaires and laboratory tests. These are relatively inexpensive, generally easy to deliver, and provide sufficient information to determine which patients require further assessment of alcohol use. The use of the brief alcohol screening questionnaire as part of the healthcheck screen proved acceptable to patients in the study and was effective at detecting a high proportion of patients with alcohol disorder. The literature suggests that the AUDIT
questions have advantages as screening questions given its international acceptability and its use in several general practice-based New Zealand studies. Although the AUDIT was not available at the time the practice study commenced, it could be incorporated in the healthcheck questionnaire.

Laboratory screening has an established supportive role, particularly the selected use of liver function tests. The role of other laboratory tests including carbohydrate-deficient transferrin remains unclear and general practice research is required to determine if it has a place in screening and in which patient groups.

Positive screening tests require further assessment. As indicated in the case examples, this assessment may be undertaken gradually as patients attend the surgery. However, there is benefit if the assessment can be completed more fully. An alcohol assessment package for general practice would be useful. The involvement of practice nurses was essential to the successful delivery of healthcheck screening and this role could be further developed.

The practice study shows it was possible to implement evidence-based alcohol screening in a general practice. The healthcheck screening model was a successful method of providing screening though recruitment of younger men could be improved. Uptake of healthcheck screening by other New Zealand general practices would require attention to the organisational factors shown to limit screening and preventive health care delivery.
Chapter 1

Literature review: introduction and method
Literature review: introduction

Chapters 1 - 13 review the alcohol research relevant to screening and detection of alcohol disorder in general practice. The different models and classification systems which explain alcohol problems are reported as a background to how alcohol problems are approached in general practice. The evidence which supports the need for general practitioners to screen for alcohol risk and disorder is discussed including the evidence that screening for alcohol risk and disorder meets the accepted criteria (Wilson and Jungner 1968). The importance of alcohol as a health problem is supported by a review of the prevalence of alcohol-related problems in New Zealand, and the relationship between alcohol and morbidity and mortality. The possibility of recognition of a latent or early symptomatic phase is established in a discussion of the evidence defining the nature of alcohol as a health risk factor which also provides further background on the natural history and suitability of early intervention. The screening tests available for detecting alcohol risk and disorder are reviewed including consumption measures, patient questionnaires and laboratory tests, and factors which influence vulnerability to alcohol. The current evidence on the effectiveness of treatment is reported. The need for a cost-effective and continuing screening process is considered within the context of a description of the discipline of general practice and the role of GPs in preventive health care. Finally, the literature relevant to the health check model used in the study reported in section 2 of this thesis is reviewed.
The medical literature relating to screening and clinical detection of alcohol disorder was collated over the period of the study from a number of sources. Relevant studies reported in specialist alcohol journals were identified by contents review of these journals from 1987. The contents page of other journals relevant to alcohol studies were also available through several journal services (ALAC journal review service, SAM (substance abuse monthly on-line), RNZCGP journal review service). Studies relevant to New Zealand were identified during review of regular issues of New Zealand Medical Journal and New Zealand Family Physician. These sources were then supplemented by medline searches using keywords "alcohol "screening" "detection" "primary care/general practice" and subsequently by "related articles" search and author-specific searches. Other studies reported in reviewed papers were identified from the references. A number of relevant reports had been produced by professional bodies and government agencies. These were obtained from library searches and from original sources e.g. ALAC (Alcohol Liquor Advisory Council), RNZCGP (Royal New Zealand College of General Practice), MOH (Ministry of Health). Several authoritative books were identified from multiple references and obtained for review. All sources reviewed are listed in the reference section.
Chapter 2

Literature review: results
Models of alcohol use

A number of issues raise difficulties for the detection of alcohol risk and disorder in general practice. In part, these difficulties are inherent in the nature of alcohol use as a personal and social behaviour that may not be viewed by patients as appropriate to include in a medical assessment. Patients drinking within norms for their social group may not perceive alcohol-related health risks as important unless there is evidence of actual harm and may not accept enquiry into alcohol use in the absence of a link to symptoms.

Further difficulties arise out of the theoretical frameworks available for understanding the nature of alcohol disorders. It may be unclear what it is about alcohol use that general practitioners want to identify and some discussion of the models used to explain problems of alcohol use and the systems used to classify these problems may be helpful in clarifying these issues.

Alcohol studies have been an arena in which scientists of many different disciplines operate. A variety of approaches have been formulated from such a background with the development of often conflicting models. Two viewpoints tend to predominate in the current clinical literature. Although some consider these viewpoints to be different ways of looking at the same problem (Edwards 1989), the more common view is that they represent more or less incompatible approaches to alcohol use problems (Heather and Robertson 1985). The disease model (referring to the disease of alcoholism) is based on a description of genetic and pathophysiological features of a chronic progressive condition that is sometimes fatal unless treated. The alternative viewpoint defines alcohol use in terms of learning theory with the central concept of problem drinking as a learned behaviour. These approaches have considerable impact on the way in which general practitioners have dealt with alcohol use in practice. Other models have also been developed to understand and explain alcohol use. These models (functional, socio-cultural, post-modernist, cognitive) make useful contributions
to the field of alcohol studies but have had little evident impact on approaches to alcohol problems in general practice to date.

**Disease model**

Although there were references to alcohol problems as a disease in the 19th century (Trotter), most views prior to 1940s regarded these as a moral or character weakness, either a vice, a sin or crime (Glatt 1991). The disease concept of alcoholism ascribed primarily to the work of Jellinek (Jellinek 1942,1960) is promoted as a major development in understanding alcohol problems, identifying affected patients as sick rather than weak or bad. The disease model developed with parallel influence from Alcoholics Anonymous (AA), the essential features being the concept of alcoholism as a disease, loss of control over drinking, and the necessity for abstinence as the only treatment option or personal goal. There is considerable debate about the concept as understood by Jellinek (1960) who maintained that the disease model was not to be applied to all heavy drinking but only to drinking that caused damage. Further he only considered drinking with loss of control or with inability to abstain as a disease i.e. caused by physiopathological processes. Others have argued that whatever Jellinek's intentions, the disease model was applied widely to all heavy drinkers and in association with AA promoted the concept of lifelong abstinence as the only realistic goal (appendix 1). The consequence of the popularity of this model was that alcoholics were seen as a population apart from ordinary heavy drinkers. This remains a popular viewpoint especially in North America and is a common layperson's view in New Zealand. Alcoholics Anonymous still subscribe to this view and base the 12-step recovery programme on it (Miller and Kurtz 1994, Tonigan et al 1996). The implications for general practice include the expectations of patients and doctors that to be alcoholic is not only to be different from other drinkers but that successful treatment depends on acceptance of the disease label and abstinence. General Practitioners will likely have patients in their practice regularly attending AA meetings who endorse this view.
A number of publications have reviewed the evidence for alcoholism as a disease (Clark and Saunders 1988, Robinson, 1979). Critics point out that there is no identified biochemical defect which constitutes the disease, and that even among those classified as alcoholic, some have achieved control of drinking, challenging the two central tenants of the disease model (loss of control/necessity of abstinence). However, proponents of the disease model report some lines of investigation hold promise that markers for subsets of alcoholics may be identified (Begleiter and Porjesz 1999).

**Problem drinking model**

The focus on alcoholism as a discrete entity, a condition affecting a specific group of individuals who have a biological predisposition towards alcohol problems (Segal 1997), is contrasted with the other commonly used model of problem drinking which sees everyone's drinking as spread along a continuum from harm-free drinking at one end to harmful drinking at the other. An individual's drinking is learned and modified by experience and at any stage it is determined by a balance of the advantages and disadvantages and of the pleasures and harms of drinking. Everyone has the choice to move forward or backward along this continuum. This concept derives from learning theory. Drinking behaviour which is reinforced becomes habitual and described as resistant to extinction. The process is aided by conditioning where neutral stimuli such as the sights and sounds of the drinking environment, and other aspects of drinking rituals, take on emotionally positive connotations because of their associations with the rewarding outcomes of drinking. Mental constructs such as "real men drink brand X" further reinforce the process. Psychobiological responses to long term or heavy drinking such as tolerance and drinking to relieve withdrawal symptoms further develops the habit. As well as personal incentives and disincentives, social and cultural factors including relationships, family, costs etc will influence alcohol use. This model suggests that problem drinkers are not essentially any different from non-problem drinkers, it is just that the benefits of drinking outweigh the problems for this group. The development of
alcohol dependence is not seen as pre-determined but as a consequence of sustained or heavy drinking, a syndrome which could occur in any person who drinks heavily long term.

The concept of dependence

The concept of dependence is understood in a different way within each model. The disease model sees dependence as an inevitable feature of an alcoholic's drinking. If a person can drink without evidence of dependence then he or she is almost certainly not an alcoholic. Because loss of control is an essential feature of the disease, any person with the disease of alcoholism can only have abstinence as a goal. Any return to so-called normal drinking is considered impossible, and any person who can achieve social drinking is considered to have been misdiagnosed as alcoholic. This is commonly understood in AA by a truism for alcoholics: one drink - one drunk. The problem drinking model views dependence as a psychophysiological consequence of sustained or heavy drinking in some people. Although it requires treatment e.g. management of withdrawal, it is the behavioural aspects of the person's drinking which is the focus for intervention. Problems with control of drinking are understood as an impairment rather than total loss of control, and dependence may be further described as mild, moderate or severe. Provided that the physiological aspects of dependence such as withdrawal can be treated, it may be possible for the person to achieve controlled drinking. If controlled drinking fails, it is understood to be as a result of the perceived benefits of uncontrolled drinking for the person, not because of any inherent tendency towards dependence. Abstinence will still be the defined goal for many dependent drinkers within this model, not because of the AA one drink - one drunk concept, but because of an understanding that any return to drinking will reactivate the learned responses that led to the development of dependence in the first place.
Population models of alcohol use

As opposed to models which explain how alcohol affects individuals, other models have been developed which explain alcohol use on a population basis. The socio-cultural model explains how social and cultural norms concerning the use of alcohol influence the population towards moderate or excessive drinking. The consumption model is based on the finding that alcohol use is unimodal and continuous across a population without evidence for a normal group of social drinkers and an abnormal group of problem drinkers (Whitehead 1979). This model predicts that the level of problem drinking will be related to the total consumption in the population. Socio-cultural and environmental models predict that alcohol use in the population will be affected by a number of external factors that can be measured and influenced to alter consumption patterns. External influences include non-genetic familial factors (Rose et al 1999). An understanding of these factors is important for management of the individual as external influences may help explain a patient's continuing alcohol use contrary to personal intention.
Chapter 3

Literature review: classification issues
Classification issues

The systems used to classify alcohol problems relate to the different viewpoints inherent in these models. This has implications for general practice because different classification systems may yield different outcomes and may not be suited equally to the requirements of general practice. These requirements include the need to formulate diagnoses which have predictive and therapeutic implications, to provide a language for communication with other professionals, to provide a basis for audit and research, and the capacity for certifying morbidity and mortality. Both the model and the classification system may affect the way in which general practitioners approach detection and management of alcohol problems. Through legitimisation of a particular approach, the model and classification may not only describe how general practitioners diagnose patients with alcohol problems but may actually influence what they do for them. There are particular issues that are important in classifying alcohol problems in general practice arising out of the undifferentiated nature of what presents in primary care consultations. The types of classification systems available and how these relate to general practice are discussed below.

Classification systems: ICD and DSM

Dependence is the starting point for the classification of alcohol problems in the two internationally accepted systems, the International Classification of Disease (ICD) and the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM). These systems primarily categorise a defined group of drinkers as alcohol dependent, though they use slightly different criteria. The difference in criteria is important for general practice because not all patients classified as dependent under one system will achieve the same diagnosis under the other. This might lead to different management of the same patient depending on which system is used.
The differences between the ICD and DSM systems derive in part from the original purpose for developing them. The ICD has developed from its original classification of the causes of death through ten revisions to provide an international statistical system to code morbidity, and record mortality for specific diagnostic groups, whereas the DSM was developed as a nomenclature by the American Psychiatric Association primarily to provide a system for the diagnosis of disorders of mental health. There is considerable discussion in the literature about the issues that define each system and the difficulties in correlating diagnoses between systems (Grant 1993). The implications for general practice of using systems derived from non-primary care settings are discussed later.

Classification categories: alcohol dependence and abuse/harmful drinking

The dependent group is identified in both systems as having a detectable disorder with sufficiently common characteristics to define a discrete entity. Though no specific etiology is implied, fundamental to the diagnosis is the concept of psychobiological dependence on alcohol and the need to provide treatment within what is generally seen as an addictions model. Both classification systems include a second category for those whose drinking is causing problems but who do not meet the criteria for dependence. The DSM system classifies these drinkers into the alcohol abuse category and includes all those not meeting criteria for dependence who experience sustained physical, psychological, social or occupational problems related to alcohol use. The ICD system recognises the category of harmful use which includes those not meeting criteria for dependence whose drinking is causing actual physical or psychological harm. The criteria required for each classification are listed in appendix 2. The emphasis on dependence as the primary alcohol diagnosis is evident in the DSM conceptualisation of alcohol abuse as a "residual diagnosis reserved for those with mild disorder or those who are at an early point" in their alcohol use. The implication in this system is that dependence is a likely consequence of sustained problem alcohol use, and that if untreated, those in the abuse category will become dependent.
Limitations of DSM/ICD classification

The limitations of these classifications have been recognised (Grant 1993). It is possible that a drinker with only two dependence criteria (e.g. withdrawal symptoms and relief drinking) may miss the diagnosis of alcohol dependence because of insufficient criteria, but may have no evidence of actual harm from drinking and therefore not be able to be adequately categorised under these systems. More likely in general practice, patients may not be classified because insufficient information is available to meet the necessary criteria even though there is some evidence to indicate an alcohol-related diagnosis.

Typologies of problem alcohol use

It has long been recognised that a variety of patterns of problematic alcohol use are common both among patients meeting criteria for dependence and non-dependent problem drinkers. These different types or species have been applied to the concept of alcoholism (Jellinek 1960) which has been defined to include a typology of five categories: alpha alcoholism (excessive drinking for purely psychological reasons without evidence of tissue adaptation); beta alcoholism (excessive drinking which has led to tissue damage, but where there is no dependence on alcohol); gamma alcoholism: (excessive drinking where there is evidence of tolerance and withdrawal, fluctuating alcohol use, and marked loss of control); delta alcoholism (excessive drinking with evidence of tolerance and withdrawal, but with a steadier level of alcohol intake, and exhibition of inability to abstain rather than loss of control); and epsilon alcoholism (bout drinking) (Edwards et al 1997). These were not meant to be exhaustive categories and not all categories match the criteria for dependence. These types of problem drinking patterns would be recognised in most settings and individuals have been shown to shift their styles through different drinking typologies over time (Vaillant 1983). The Greek alphabetical terms may not be in common use but the underlying concept of patterns of
problem use may be useful in recognising alcohol use as a risk or disorder in different patients. Other typologies of alcoholism have been proposed on the basis of sex, family history, age of onset, primary or secondary nature, and early or late onset. The number of types has been seen as an indication of the complexity of patterns and presentations of alcohol use problems and their management (Edwards et al 1997).

Classification by risk and alcohol-related disability

As outlined above, it is necessary to classify alcohol problems in general practice for a variety of reasons, but primarily to help general practitioners and patients decide appropriate management. However, classification developed from research in specialist alcohol assessment/treatment settings may not adequately meet the needs of clinicians in general practice. In contrast to the ICD and DSM systems which identify defined groups with specific diagnostic criteria, the Royal College of General Practitioners (RCGP 1989) has proposed an approach to alcohol use in general practice patients that seeks to classify all patients according to level of risk and disability related to alcohol use. This system implies that alcohol use is a legitimate area of inquiry for all patients as a risk factor for health problems in the same way that general practitioners might identify cholesterol levels or blood pressures as risk factors for cardiovascular disease. The approach is based on an understanding that any person who drinks may experience alcohol-related problems given particular circumstances and that identifying alcohol use across the practice population is more useful than focusing on a specific category of drinkers. Alcohol risk is defined as light, intermediate, or heavy, and in general, alcohol problems seen as more likely to occur the more alcohol a person consumes. Problems are seen as physical, psychological or social though most problem drinkers will experience a cluster of inter-related problems. In this context, dependence is recognised as a problem or drinking consequence rather than as the primary feature of a specific group of drinkers. The emphasis in this approach is not on seeking to identify a
specific group of drinkers, but on assessing alcohol use in all patients. Alcohol consumption and drinking pattern is the primary measure of risk, but individual vulnerability to alcohol is recognised as an important influence.

**Other classification systems**

A slightly different framework for understanding problem drinking is the description of problems within three overlapping categories (Allsop 1988). Alcohol use may create problems related to intoxication, problems caused by sustained or regular use, and problems of dependence. Patients seldom present to their general practitioners intoxicated and so it is easy to overlook in the individual patient the possible impact of this aspect of alcohol use on domestic and other violence, and on accident risk. Some patients with problems in this category may be missed if classified within the DSM or ICD system because of the lack of evidence of drinking problems, or because the consequences are experienced by someone other than the drinker. The recognition that many problems occur in the regular alcohol use group is a reminder of what is described as the prevention paradox (Rose 1994) - the majority of problems tend to be found among the relatively large numbers of people at low - intermediate risk even though their individual risk is much less than that of the high risk group. The problems of dependence are seen within this model as related not just to difficulty with control or refraining from use, but problems that arise out of the increasing time devoted to drinking at the cost of other activities.

**Descriptions of alcohol use**

Apart from these accepted or proposed approaches to classification, various descriptive terms appear in alcohol research literature. Commonly used are the categories of hazardous, harmful and dependent drinking which draw on the systems described above and loosely
correlate with risk, harmful drinking or alcohol abuse, and alcohol dependence. Although these terms are helpful as descriptions of a person's drinking, they are often used in a loosely defined manner, and need to be specified to be acceptable as diagnostic categories. Similarly, the terms heavy or excessive drinker are descriptive but generally not otherwise quantified and therefore subject to differing interpretations. The following terms commonly used in the literature have been described as having overlapping meanings: "alcohol abuse", "alcoholism", "alcoholic", "problem drinking", "alcohol dependence", "alcohol problems", "alcohol-related harm", "alcohol-induced problems", "risk drinking", "harmful drinking habits" and "alcohol-related disabilities" (Nilssen and Cone 1994).

Patient-centred classification

There does appear to be agreement within the medical community that patient alcohol use is a legitimate area of concern for doctors with classification a requirement to enable diagnosis and management. There is little research on how patients react to classification labels and whether there is agreement between medical classification of patient drinking and the person's own assessment. The diagnosis of problem drinking may be an imposed label. From the drinker's perspective, alcohol may serve a purpose that actually prevents or minimises problems. A functional model of alcohol use may help clinicians understand the reasons for a person's drinking. Four common reasons identified include drinking to cope, to be sociable, to enhance social confidence and for enjoyment (Smith et al 1993). Many people change their drinking patterns and solve alcohol-related problems without ever being diagnosed into a category or risk group. A concept described as the transtheoretical stages of change model gives some insight into this process (Prochaska and DiClemente 1986). Those with drinking problems may be classified according to their readiness to change their drinking behaviour. The stages described in the change process include pre-contemplation (not thinking about alcohol use as a problem), contemplation (thinking about alcohol as a problem but ambivalent about making changes), determination (planning to abstain or moderate drinking), action
(actually bringing about this change) and maintenance (maintaining abstinence or moderate drinking). This model is presented as a "wheel of change" recognising the cycle the drinkers may pass through to achieve their goal, and also the reality of relapse which may require the process to be re-started. The central aspect of this model is the patient's concern about alcohol use and motivation to change. The technique of motivational interviewing as a means of preparing patients to change drinking behaviour (Miller and Rollnick 1991, Botelho et al 1999) has developed in association with the stages of change model. Although researched from an addictions treatment background, this patient-centred approach transfers readily to the general practice setting and provides an additional approach to the diagnosis of alcohol problems. Patients can be classified according to their own concern about alcohol use and their readiness to change. This personal classification may be a useful complement to the clinical assessment of risk, abuse or problem drinking, and dependence. It may be possible for general practitioners to help patients reframe their understanding of alcohol use without necessarily labelling the nature of that use as abuse or dependence.

Classification for the purposes of this study

It is evident that there are important differences among classification systems. For the purposes of this study, it was necessary to choose a system to describe the research findings. The DSM was chosen as the primary system for several reasons. This classification has been used in NZ for epidemiological surveys and allowed comparison of the practice findings with these studies. The DSM criteria for alcohol abuse specifies social as well as physical and psychological consequences of drinking which makes it less likely to exclude patients with non-clinical alcohol effects. The limitation of the DSM classification is its focus on established consequences of drinking which excludes any assessment of risk. In general practice, risk is an important part of health assessment and a relevant aspect of alcohol use to include. For the purposes of this study, patients were classified at-risk if they met the necessary criteria as outlined in the method, but did not have evidence of abuse or
dependence.

A walk around the octagon

An attempt to resolve the different models has been promoted which recognises that different perspectives on alcohol use and related problems will improve our understanding of these issues and promote collaboration between the disciplines involved (O'Hagan 1987). This concept uses an octagonal model, approaching alcohol use from eight sides: 1) the injurious agent 2) genetic vulnerability 3) physical and mental complications 4) psychiatric perspective 5) behavioural family dynamic model 6) moral perspective 7) social perspective and 8) political economic perspective. Each perspective is seen as offering a particular view on the study of alcohol issues and enabling the use of whichever approach is most effective for a particular situation. The clinical implication of this approach has been the increasing trend towards matching of treatment with particular patient need (Project MATCH Research group 1997).
Chapter 4

Literature review: screening for alcohol risk and disorder
Criteria for alcohol screening

A number of criteria have been proposed as necessary for screening (Anderson WHO regional publications, Wilson and Jungner 1968):

* The condition being screened for should be an important health problem.
* It should have a recognisable latent or early symptomatic stage.
* There should be a suitable screening test for detecting the condition at the early symptomatic stage.
* There should be agreement as to who is to be treated. The treatment should be generally available.
* Treatment at the pre-symptomatic or early symptomatic stage should favourably influence the course of the condition and the prognosis, and should therefore be preferable to no treatment.
* The cost of identifying, diagnosing and treating cases should be supportable within the budget for medical care as a whole.

These criteria are discussed under the following headings:

The importance of alcohol as a health problem
Early diagnosis: alcohol as a health risk
Screening tests
Factors which influence vulnerability to alcohol
Effectiveness of treatment
Screening recommendations
The importance of alcohol as a health problem:

The effect of alcohol on health can be defined in terms of its influence on mortality and morbidity, and in terms of its relationship to alcohol disorder. Mortality and morbidity related to alcohol use primarily shows a dose related effect (RCP 1987), (RCGP 1989). The relationship between alcohol consumption levels and alcohol use disorders (abuse/dependence) is less well defined. Clearly there is a correlation between consumption and alcohol disorder, but the presence of disorder in any individual may be variably related to consumption levels. An understanding of the nature of the relationship between consumption and alcohol-related complications is necessary in deciding what levels of alcohol use are considered safe and what levels should define a positive test when screening for alcohol risk or disorder. A number of measures of alcohol intake are used to relate consumption to the risk of complications. In general use are the terms standard drinks or units of alcohol which is a roughly standard measure of a can of beer, a glass of wine or a nip of spirits, more or less equivalent to 8 - 10 grams of alcohol. The New Zealand standard drink is based on a 10 gram measure (NHC 1999) which contrasts with the 8 gram unit in UK and 13 gram standard in North America.

Alcohol and mortality

The dose-effect relationship between alcohol use and mortality has long been recognised in cross-country analysis of death rates from cirrhosis of the liver which show close correlation with total alcohol consumption. (Office of Health Economics 1981). Men who consume between 28 and 42 units of alcohol per week have a risk of developing cirrhosis six times that of men drinking less than 14 units per week. The risk is increased to 14 times for men drinking between 42 and 56 units per week. (Pequignot 1978). The relationship between alcohol and cardiovascular and total mortality was initially highlighted in the Whitehall study where a reduced 10-year cardiovascular and total mortality was identified in light drinkers
(equivalent to 1 - 2 drinks per day) and increasing total mortality above about 3 drinks per day (Marmot et al 1981). This relationship of alcohol to mortality has been described as U-shaped or J-shaped reflecting the slightly higher mortality of abstainers/light drinkers than moderate drinkers, and the much higher mortality of heavy drinkers (Beaglehole and Jackson 1991, Poikolainen 1995). For example, in the US Physicians' Health Study of 22,071 apparently healthy men, consumption of 2 to 6 drinks per week had the most favourable overall mortality profile and 2 or more drinks per day the most unfavourable mortality profile (Camargo et al 1997, Albert et al 1999). The J-shape is considered to be the result of the combination of adverse and beneficial effects of alcohol consumption and is affected by the proportion of the population consuming alcohol at different levels, especially heavy consumption, and the prevalence of alcohol-affected diseases in the population. For example, regions with low prevalence of ischaemic cardiovascular disease show almost no benefit from alcohol consumption compared with regions where these diseases are more common (Rehm and Bondy 1998). The effect of alcohol on mortality in young men is another example. The low prevalence of coronary heart disease in young men reduced any overall benefit of alcohol on mortality in a follow-up of 49,618 Swedish military conscripts, with the beneficial effect of alcohol on coronary heart disease outweighed by the adverse effect of alcohol on other causes of mortality (Romelsjo and Leifman 1999). In a recent report from a prospective study of Scottish men with 21 years of follow up there was no clear evidence of any protective effect of moderate alcohol use. This study confirmed the unfavourable association between alcohol consumption and mortality for men drinking over 22 units a week (Hart et al 1999). The concept of a protective effect of alcohol on mortality has been extensively discussed in the literature particularly the interpretation of the J-curve and the recommendations that might be based on this information (Shaper 1990, Duffy 1995, Holman et al 1996).

Blood pressure has been shown in a US Kaiser-Permanente study of 83,947 patients to increase above 2 drinks per day (Klatsky et al 1977), the effect increasing up to 6 drinks per day. A positive association between alcohol intake and blood pressure was reported in a multi-phasic New Zealand survey involving 901 adults in Milton, most evident in heavy drinkers (over 300G/week), though this association was not identified for women (Paulin et al
A relationship was found between alcohol and blood pressure in an Auckland study in men, and in women over age 50 years, and described for men as curvilinear, with nondrinkers and heavy drinkers included in a U shaped risk stratification (Jackson et al 1987). A population attributable risk calculation identified 13.4% of hypertension in this male population due to alcohol. A change in this population from a heavy to a moderate/light category would produce a mean reduction on blood pressure of 4.8mm Hg in systolic blood pressure. This study also found that hypertension in 11% of the 50-64 year old females in this population was attributed to heavy drinking. A review of 30 cross-sectional studies reported a small but significant blood pressure elevation in those consuming 3 drinks or more per day in comparison with nondrinkers, and also the finding that a quarter of these studies reported elevation of blood pressure at lower levels of consumption (MacMahon 1987).

A dose-related increased risk effect for stroke was reported in the follow up of Swedish conscripts discussed above (Romelsjo and Leifman 1999), this risk being reported as increasing in men reporting drinking over two drinks and women over one drink per day (Camargo 1989). An editorial review of data obtained in men enrolled in the American Cancer Prospective Study reports an increase in accident, cancer and cerebrovascular mortality above 2 drinks per day, and all cause mortality above 3 drinks per day, the latter being influenced by the negative effect of alcohol on coronary heart disease mortality up to 6 drinks per day (Ellison 1990).

It also appears that the biological effects of alcohol depend not only on the quantity consumed but on the frequency. For example, in a case-control study of alcohol consumption and risk of major coronary event, the same weekly consumption reduced risk when taken in smaller amounts daily and increased risk when taken in larger amounts on two occasions through the week (McElduff and Dobson 1997).

It is often difficult to evaluate the causative role of alcohol in mortality, and statistics may not reflect the full effects of alcohol. For example, alcohol is not recorded in death certificates for many conditions known to be related to alcohol or where alcohol was a contributing cause of death (Gwynne 1990a,b). A high proportion of coronial autopsies for cases of unnatural death and sudden death from illness have alcohol-related causes, including motor vehicle
accidents, drownings, falls, house fires, gunshot and drug overdose deaths as well as other accidents, suicide, homicide, and alcoholic poisoning (Gwynne 1990a,b) and alcohol is known to be a factor in many illness-related deaths (RCP 1987, RCGP 1989) and sudden deaths (Regan 1990) where its contribution may not be recorded.

A review of mortality in middle-aged men in the Malmo preventive screening programme concluded that cardiac death unrelated to coronary heart disease was responsible for many sudden deaths in alcoholics (Petersson 1988) and suggested four ways in which it is possible to implicate alcohol as a cause of death. The subject might be registered as alcoholic or have information indicating an 'alcohol-positive history'; alcohol might be directly implicated in the chain of events causing death e.g. intoxication; post-mortem findings might demonstrate typical pathology e.g. cirrhosis; or alcohol might be demonstrated in the body post-mortem. In this study of mortality in middle-aged men, alcohol as a cause of premature death was found to be as common a cancer and more common than coronary heart disease (Petersson et al 1984).

Increased mortality among heavy drinkers has also been identified in New Zealand in two alcohol treatment clinic studies. Mortality in alcoholic patients nearly all of whom were under age 65 years was 60% higher than expected over the 8.5 year follow-up in Christchurch (Wells and Walker 1990) and a fourfold increase in mortality was reported among Wellington clinic alcoholic outpatients over a 1.5 year follow-up (Labia et al 1983). An estimation of the proportion of deaths caused or prevented by alcohol drinking in New Zealand shows an association with age. Alcohol is estimated to have caused 3% of all deaths in 0-14 year olds, 20.1% of deaths in 15-34 year olds, mostly from road injuries, and prevented 0.5% of all deaths in 35-64 year olds and 3.4% of deaths among 65 year olds and over due to the protective effect against coronary heart disease. The total number of person years lost due to alcohol was estimated at 9525 recognising the greater contribution of under 35 year olds to the calculation (Scragg 1995).

Other difficulties associated with relating consumption to mortality have been highlighted (Beaglehole and Jackson 1991). These include the validity of alcohol consumption data relying on individual reporting, daily intake being calculated from averages of weekly (or
longer) periods of quantity and frequency, uncertainty by participants concerning the alcoholic strength of their drinks, differing definitions of a standard drink, the lack of separation of lifelong abstainers from former drinkers, and the confounding bias of uncertainty about whether drinking or some other personal characteristic in light drinkers is affecting their mortality risk. It is recognised that much of the information about the relationship between alcohol and mortality comes from studies of middle-aged men and there is more limited data on women and the elderly. Women experience the minimum mortality risk at a level of intake which is lower than that associated with the minimum risk for men (Rehm and Bondy 1998). It is recognised that women develop liver disease after a shorter and lighter exposure to alcohol than men and at presentation seem to have more severe liver disease (Saunders 1981). Complications in women as compared to men include accelerated development of fatty liver, hepatitis and cirrhosis of liver, obesity, anaemia, malnutrition and gastrointestinal haemorrhage (Hill 1984). One proposed explanation for the gender different effects of alcohol suggests there is reduced gastric alcohol dehydrogenase activity and reduced first pass metabolism in women compared with men which results in higher blood alcohol levels and more alcohol-related damage (Gallant 1990). Gender differences in mental health complications have been noted including psychiatric co-morbidity, suicidal mortality and domestic violence (Hill 1995).

In general, it seems that alcohol consumption is not associated with any increased total mortality in men up to 2 - 3 drinks per day (Blackwelder et al 1980, Dyer et al 1980, Camacho et al 1987) and in women up to 1-2 drinks per day (Saunders et al 1981, Smith-Warner 1998). Safe drinking guidelines have been published by a number of authorities. The recommendation of the Royal College of Physicians is men no more than 21 units, women no more than 14 units per week with 2-3 days without any alcohol. (RCP 1987). The Royal College of General Practitioners gives a guide to risk at different levels of alcohol consumption emphasising the importance of individual susceptibility. Risk guidelines for weekly consumption measured in units of alcohol are defined as low (M<20 F<15), moderate or intermediate (M 21-50, F 16-35) and high (M>50 F>35). The implication in these levels is that those drinking into intermediate risk levels are already at substantial risk and those into
high risk levels are almost certainly already damaged though they may not realise it. The report stresses that these are guides and not a recommendation that any individual is necessarily safe from alcohol-related harm by drinking below the guidelines. The categories are helpful guides in what is really seen as a continuum of risk (RCGP 1989). New Zealand guidelines have been published. Using the 10 gram standard drink, the safe drinking limits are for men no more than 6 per session and 21 per week, and for women no more than 4 per session and 14 per week (ALAC). The general nature of these guidelines is also emphasised (NHC 1999), with the comment that these levels may not be safe for all people at all times, and that safe levels will be influenced by family history of alcoholism, various types of medication, current health status, pregnancy, age and weight.

The non-standard volume of containers and differences in strengths within types of alcoholic beverages both make the value of a standard drink only approximate in practice. The measurement of consumption is also affected by the bias inherent in self-reporting (Midanik 1982). These limitations to the accuracy of measuring consumption need to be considered in the use of safe drinking guidelines.

Alcohol and morbidity

The major physical consequences of heavy drinking are well recognised and include liver disease, gastritis, pancreatitis, hypertension, cardiomyopathy, cardiac arrhythmias, strokes, brain damage, cancer of mouth, larynx, oesophagus, a contribution to breast and colon cancer, nutritional deficiencies, obesity, diabetes, gout, myopathy, neuropathy, sexual dysfunction, infertility, fetal alcohol effects, haemopoetic toxicity and reactions with other drugs, intoxication-related problems such as acute alcohol poisoning, as well as accident and trauma-related consequences. The major psychological effects include anxiety, insomnia, depression and suicide, personality changes, amnesia and cognitive effects including dementia, withdrawal-related effects, and the association with other drug use and with gambling. Alcohol-related social problems are also multiple including domestic and other

The influence of alcohol on mortality and morbidity has been reviewed in 9057 twins age 18-67 in Sweden. Heavy alcohol intake was attributed as the cause of death among 11.3% of the male and 9.4% of the female deaths, as the cause of hospital admissions for 13.2% of the male and 1.1% of the female general hospital admissions, and 28.7% of the male and 7.2% of the female psychiatric admissions (Andreasson and Brandt 1997). In New Zealand, between 11% and 20% of adult patients in hospital have been reported to have alcohol problems (Applied Research Consultants 1984, Elvy 1984a, 1988). Many of these problems present in general practice (Skinner et al 1981). For example in one survey up to 11% of males and 5% of females in UK attending general practitioners had problems related to their drinking (Wallace and Haines 1988). Physical signs associated with chronic heavy alcohol use have been identified and these stigmata have been included in clinical screening or assessment packages, for example the LeGo grid in which clinical signs were found to correlate with evidence of physical consequences of drinking such as elevated GGT, and withdrawal symptoms (LeGo 1976) and the alcohol clinical index (Skinner et al 1986). These assessment packages are particularly useful for more chronic or severe excessive drinking. A clinical screen has been included in several screening systems including the AUDIT and CAST which are discussed below. Other physical consequences of drinking have been used to help clinicians to detect alcohol problems including trauma effects which have been shown to correlate with heavy drinking (Skinner et al 1984).

Prevalence of alcohol problems in New Zealand

Problems associated with alcohol use are common in New Zealand. A Christchurch epidemiology survey of 1498 persons age 18-64 years identified an overall six month prevalence of alcohol disorder (abuse or dependence) of 8.3% and a lifetime prevalence of 18.9% (Wells et al 1989). The male:female ratio was approximately 5:1 (6 month prevalence
male 14.1%, female 2.6%; lifetime prevalence male 32.0%, female 6.1%). Age differences in the six month prevalence of alcohol problems or disorder were small with the highest proportion of those meeting criteria for abuse and/or dependence in the 18-24 year old group. Of particular importance to general practice was the finding that only 10% of those with alcohol disorder had ever told a doctor about their drinking even though 66% had visited a doctor within the last six months. Over same period 35% had talked to a doctor about other mental health problems suggesting that they did perceive their doctor as an appropriate person with whom to discuss these aspects of health. This survey also identified that current abstinence is as a possible indicator of past dependence with 14% of those not drinking alcohol over the last six months meeting criteria for past dependence.

Further evidence of the widespread nature of alcohol problems in New Zealand is shown in two national surveys of 14-65 year olds. The surveys sampled 1680 people in 1988 and 4232 people in 1995 (Wyllie and Casswell 1989, Wyllie et al 1995). Problems related to alcohol use were commonly reported. In 1988, 57% of men and 39% of women reported at least one type of problem or harmful effect as a result of their own drinking in the last 12 months. Harmful effects of others' drinking were experienced by 39% of men and 38% of women, most commonly in the areas of friendship and social life effects. Included as a result of someone else's drinking was the finding that 7% of men and women had been a victim of physical assault, 4% of men and 3% women had been in a motor vehicle accident, and 2% of men and 3% of women had experienced injury in other types of accident. Similar findings were reported in the 1995 survey where 37% of men and 40% of women reported harmful effects from someone else's drinking. Concern about alcohol use was also common. More than one in four people in the 1988 survey had cut down on drinking in the last year and this was associated with a per capita decrease in consumption over the previous two years. In 1995 also, a reduction in drinking over the last year was reported by 34% of those surveyed, compared with 16% who were drinking more. The top 10% of drinkers in 1995 accounted for almost half of the alcohol consumed and half the problems relating to own use. These heavy drinkers consumed at least the equivalent of 31 cans of beer per week. It is important to note that the other half of problems reported therefore occurred in drinkers who were not in this top
heavy drinking group. The 1995 survey included 516 Maori respondents (Dacey 1997) who reported some level of harmful effect in the previous 12 months in 42% of the men and 27% of the women. One in five of these men reported a medium to large harmful alcohol effect on health, and a similar proportion for effect on home life and financial position. At least three harmful problems were experienced by 37% of the men and 21% of the women in the last year. Serious argument after drinking was common affecting 24% of Maori men and 13% Maori women. Over half of the men (51%) and women (54%) reported others' drinking had a harmful effect on at least one of home life, friendships/social life or financial position. Physical assault because of someone else’s drinking in the last 12 months was reported by 15% of men and 12% of women, and sexual harassment by someone who had been drinking by 14% women and 7% of men. Limited data is available for other cultures in New Zealand. An overview of the place of alcohol in the lives of people from Tokelau, Fiji, Niue, Tonga, Cook Islands and Samoa living in New Zealand by interviews with subjects from these ethnic groups indicated that there was little awareness of the effects of alcohol on health. Rather, participants reported a greater concern about the effect of alcohol on social behaviour than physical health (ALAC 1997).

Cost of alcohol to New Zealand

Several studies have addressed the issue of costs of alcohol-related health care in New Zealand (Ashton and Casswell 1984, Ryner and Chetwynd 1987, Devlin et al 1997) with some critical comment (Woodfield 1988). The effect of alcohol on work absenteeism has also been addressed (Casswell et al 1988). This research indicates that alcohol abuse creates a substantial demand on health resources as well as creating major costs in regard to lost production, crime, accidents, and fires.
Under-recognised effects of alcohol in New Zealand: fetal alcohol syndrome

Fetal alcohol syndrome (FAS) is an example of the effects of alcohol being under-recognised in New Zealand. The reported prevalence of FAS in New Zealand is relatively low by international estimates (Leversha and Marks 1995) given that a high proportion (80%) of women drink alcohol, and that 12% of women drink daily (Wyllie and Casswell 1989). It is likely that FAS is under-reported in New Zealand.
Chapter 5

Literature review: early diagnosis
Relationship between consumption and alcohol disorder

The majority of alcohol-related problems are contributed by the relatively large numbers of light and moderate drinkers, although only a small proportion of them have alcohol problems. This concept is similar to that for problems relating to hypertension or cholesterol and is the basis for the prevention paradox i.e. reducing consumption in light and moderate drinkers has a greater impact on overall problems than reducing consumption in heavy drinkers (Krietman 1986).

The relationship between consumption and alcohol-related problems has been controversial. Encouraging the view that problems deriving from alcohol misuse are people-related and not problems inherent in the product, the Licensed Beverage Industry has quoted epidemiological data showing there is no clear predictable relationship between overall consumption in a population and the number of problem drinkers (Licensed Beverage Industries 1985, quotes Chick 1982). Emphasising the benefits of moderate drinking as indicated in the Whitehall civil service study (Marmot et al 1981), the industry presents the view that drinking is essentially without problems except for the group who abuse alcohol. The implication of this position is that more people could drink moderately without any increase in problems, and that if abusers could be identified and treated there would be no problems. This view contrasts with evidence that increased consumption in a population increases the problem rate overall and not just in those who abuse. One example of this is an Edinburgh study showing taxation-induced reduction in consumption in a population sample resulted in subsequent reduction in alcohol-related problems (Kendall et al 1983). The WHO collaborative study showed that alcohol dependence and alcohol-related problems positively correlated with consumption in a six country cross-cultural study (Hall et al 1993), and an analysis of all-cause mortality in Europe over the period 1982-1990 showed that increases (or decreases) in per capita consumption of alcohol were associated with increases (or decreases) in all cause mortality (Her and Rehm 1998).
The difficulty arises in defining the relationship between consumption and alcohol-related problems and dependence. There is a reasonably clear relationship between consumption and physical health consequences e.g. mortality from cirrhosis of the liver where the risk of the disease increases with consumption (Office of Health Economics 1981). However, the relationship between consumption and dependence is less clear-cut. A number of studies have shown that although heavy drinkers are more likely to become dependent, many people with alcohol dependence drink at intermediate or even low levels of consumption. For example, in a US general population survey, 7% of those with dependence were drinking in the low intake group, 25% in the intermediate group and only 68% in high intake group. (Grant and Harford 1990). The authors commented that although alcohol consumption is a necessary pre-condition of alcohol dependence, once established the disorder itself may affect consumption. Dependent persons may for example require less alcohol than during the period leading up to dependence. The relationship between consumption and dependence was not affected by variables such as sex, education, ethnicity or marital status but was affected by age. The alcohol-dependence association was stronger among younger people which the authors concluded may be related to different drinking patterns and social controls. The indirect relationship between consumption and problems is also a common finding in population studies. A New Zealand review showed only 35% of those with recent disorder came from the high risk consumption group. Also of interest was the finding that 13% of those with recent alcohol disorder came from the group who had drunk in the last 6 months but not at all in last week. Even those meeting criteria for alcohol abuse or dependence may not be drinking in any particular week (Bushnell et al 1994). Another national survey in New Zealand showed half of all problems were reported in those not in the high risk group (Wyllie et al 1995). Although there is a relationship between heavy drinking and alcohol-related problems, the lack of a direct dose-related effect suggests that the detection of disorder requires more information than consumption measures. This is the basis for including items other than consumption measures in an alcohol screen. To a certain extent therefore, alcohol disorder or problem drinking needs to be screened for independently of alcohol consumption, recognising the considerable overlap identified between those at risk from heavier consumption and those
The nature of alcohol risk

Although there is a clear relationship between alcohol consumption and risk of certain physical effects, the risk varies for individuals over both short and long term periods according to circumstances affecting their lives. This was shown in a study of British men who regularly drank 21 or 28 units per week but whose diary records showed nearly all subjects exceeded daily limits at least once over 4 weeks and three-quarters of subjects met criteria for at least one > 8 units/day binge (Wright and Cameron 1997). Drinkers who usually consume within recommended safe weekly drinking levels may be at risk on occasions when they drink considerably more than usual and drinkers may go through periods of light, moderate, or heavy drinking at different times. The change in consumption over time is reflected in epidemiological surveys which tend to show decreasing consumption through increasing age groups from young adulthood (Wells et al 1989). Risk assessment therefore requires not only information about regular consumption levels but also about the pattern of alcohol use. Both the cumulative total of alcohol consumed over a period and the amount taken on each occasion carry a risk level which although overlapping may independently affect risk. As discussed above, the risk of a coronary event is higher in men drinking the same weekly amount in one or two sessions than when spread evenly over a week (McElduff and Dobson 1997). In contrast, blood pressure has been shown in a US study to be increased more by the frequency of consumption than by the quantity consumed on any one occasion (Russell et al 1991). Although the risk levels for weekly consumption are generally agreed, the specific nature of the relationship between daily consumption and risk is not clear. This uncertainty about what actually constitutes risk drinking per session is reflected in a lack of consensus in a survey of ten representative experts in alcohol research and treatment (Hays and Ellikson 1996). The difficulty with defining risk is also seen in the terminology used in the literature where heavy drinking is variably reported from 2 - 5 drinks per day and moderate drinking...
covering the same range in reverse from 5 - 2 drinks per day (Abel et al 1998). However, a
survey of Michigan physicians showed considerable agreement in informal operational
definitions describing the number of drinks in each category: light drinking at 1.2 drinks/day,
moderate 2.2 drinks /day, and heavy 3.5 drinks/day. The public definitions in Michigan
showed only slightly higher operational definitions (light = 1.4 - 2.4 drinks/ day, moderate =
2.5 -3.6 drinks/day and heavy = 3.7drinks or more/day) though males and older respondents
reported higher thresholds (Abel and Kruger 1995). Population surveys have used definitions
of heavy drinking which give some guide to opinion about risk related to the pattern of
drinking. The cut-off of 6 drinks or more taken on at least 2-3 occasions or more during the
last month classified heavy drinking in a national longitudinal US survey (Harford 1994), and
this cut-off level has been included in the widely used AUDIT screening instrument (Saunders
et al 1993a,b). An Australian risk factor prevalence study identified that 18.7% of men and
5.5% of women drank 5 or more drinks on a usual drinking occasion, and 4.3% of men (only
0.2% women) drank over 8 drinks at a usual drinking occasion (National Heart Foundation
1989). Defining a cut-off level for risk per drinking occasion has the potential to include or
exclude a large number of people.
The other factor affecting risk besides consumption levels and pattern of drinking is individual
susceptibility which is influenced by age, sex, family history, chronic illness (e.g. diabetes,
hypertension, epilepsy, some gastro-intestinal conditions), psychological conditions (anxiety,
depression, cognitive and psychotic disorders), some medications, and in individuals where
alcohol use adversely affects other lifestyle factors including poor diet, heavy smoking,
obesity. Again, individual susceptibility may change over a period of time or even according to
the drinking-related circumstances. Genetic factors which affect susceptibility are discussed in
more detail below.
Safe drinking guidelines are generalised from population data and not necessarily directly
transferable to individuals. Screening for alcohol risk therefore requires measurement of both
consumption and pattern of drinking and the opportunity to relate this information to a specific
individual.
Chapter 6

Literature review: screening by consumption measures
Screening using consumption measurements

Alcohol consumption can be estimated by either direct or indirect measures. Direct measures are suited to assessment of immediate recent drinking, for example in accident and emergency departments where blood or breath alcohol measurements are practicable and sometimes necessary to identify alcohol use (Cherpitel et al 1992). However, in the assessment of drinking patterns and consumption over a period of time, it is necessary to use indirect measures. The most accessible measure is self-reported consumption. Although this is often assessed during an interview in a clinical situation, in general lower consumption levels are reported face to face than by self-administered questionnaire. This has been attributed to what is called the social desirability effect where respondents tend to give answers in an interview that are more socially acceptable (Isacsson 1987). A similar effect may account for denial of alcohol use in emergency department settings in relationship to motor vehicle accidents and injuries related to violence (Cherpitel et al 1992). In general it seems that higher levels of consumption are reported when contact with an interviewer is reduced. For example, computer-based questionnaires increase self-reported consumption levels (Lucas et al 1977, Skinner et al 1985). Given the general tendency for people to under-report their alcohol use (Midanik 1982), methods which result in increased consumption measures are more likely reflect actual drinking practices. Screening by direct interview is therefore likely to underestimate patient consumption and likely to fail to identify some patients drinking at levels of risk or harm. However, direct questioning may be a necessary component of screening to validate the questionnaire responses. Consumption measured by self-administered questionnaire may still underestimate alcohol use. In a study which analysed reported alcohol use in the Norwegian island of Spitzbergen, self-reported volume accounted for only 40% of the known sales volume (Hoyer 1995).

Consumption can be measured by a variety of methods (Wyllie 1994), most commonly used for screening being the quantity/frequency measure where consumption is calculated from the
frequency of drinking days x the amount consumed per day. This type of assessment has
high test/retest reliability (the same patient will report consistent responses over time) and
correlates adequately with more complete data collected by diary records (Poikolainen and
Karkkainen 1985), although the tendency to under-report the frequency of drinking and over-
estimate the amount consumed per session has been noted (Crawford 1987b, Duffy and
Waterton 1984). Some reports indicate that consumption reported by quantity/frequency is on
average lower than that recorded in diaries (Uchalik 1979, Williams et al 1985) this being
largely related to the differences for heavier drinkers (Cooke and Allan 1983, Webb et al
1991). This lack of correlation at higher consumption levels is less important in the
consideration of screening in general practice where the purpose of the screen is to identify
patients who may be drinking at risk or with problems. Modest under-reporting of heavy
drinkers is unlikely to exclude them from returning a positive screen.

Heavy drinkers may under-report consumption if the questionnaire does not allow the option
of recording a high intake (Poikolainen and Karkkainen 1985) and the accuracy of data
collected by quantity/frequency measurement can be improved by including questions on
occasions with heavy drinking. Heavy drinking questions improved the accuracy of data
collected in a study of registered sales in Malmö over a one month period (Goransson and
Hanson 1994). The inclusion of heavy drinking questions has become a routine addition to
quantity/frequency questionnaires. The quantity/frequency/variability method of assessment is
considered a valid method for collecting alcohol information (Streissguth et al 1976) with self-
reporting of heavy consumption likely to indicate the presence of an alcohol problem
(Kristenson and Trell 1982).

The nature of the questionnaire choices has been shown to affect the reported consumption.
Allowing more response options for frequent drinking (with fewer choices for less frequent
drinking) has been shown to increase significantly the mean consumption reported in a US
college study (Hughes and Dodder 1988). Although this is not necessarily a generalisable
finding, it is evident that the layout of the measuring instrument can affect the reported
consumption and this tends to support the use of choices weighted towards more frequent
drinking e.g. daily, 3-4 days/week, 1-2 days/week, 1-2 days/month, never; rather than daily.
1-2 days/week, 1-2 days/month, few days/year, never. This paper also commented that the choice of wording needs to be consistent in any follow-up assessment. The accuracy of the quantity/frequency questions can be enhanced further by the addition of beverage specific questions which ask for consumption for beer, wine and spirits (Russell et al 1991). Several reasons are given for this effect: an inventory of questions reminds respondents of extra occasions of alcohol use, it avoids the need for patient to report heavy drinking by breaking it down into reduced amounts per type and hence minimises under-reporting and it makes reporting easier for people who drink more than one beverage.

Similar findings were reported in the analysis of another US population survey showing global quantity/frequency reports lower levels than beverage-specific consumption. (Williams et al 1994). This study also reported that adding drink size further increases the accuracy of the consumption measure.

Other details may also improve accuracy and tend to give higher consumption measures. For example, the addition of locality of drinking increases consumption reported (Wyllie et al 1994) and somewhat related, the inclusion of specific social contexts of drinking (Single and Wortley 1994). It seems that reminding people about all their main drinking locations and situations may assist the recall of drinking occasions, although there may be a tendency to overstate consumption with these extra details by confusing the respondents with too much detail.

Apart from the issues of forgetting drinking occasions, other issues that may result in under-reporting have been identified (Skog 1992) including slip of the pen (presumably meaning ticking the wrong response choice), misunderstanding, and conscious lies. The two former issues will be picked up if questionnaire responses are routinely cross-checked at interview. The last issue will only be identified if other screening tests are positive (e.g. a positive concern questionnaire or abnormal laboratory test) or in a general practice setting if collateral information is available.

An unexpected cause of under-reporting of heavier drinking was found on analysis of a longitudinal US population study where a reported reduction in consumption over a one year period was attributed to a change in the order of questions related to heavier drinking. The
finding of reduced consumption was inconsistent with other national trend data. In the years when the questions identifying heavy drinking preceded the questions of frequency/quantity, the prevalence of heavier drinking was consistently reported within the range reflecting the national trend (gradual reduction from 32% in 1982 to 24% in 1989). When in 1985 the frequency/quantity questions inadvertently preceded the heavier drinking questions, the reported prevalence of heavy drinking was inconsistently much lower than the trend at 17%. It appears that the order of questions affected the reporting of heavier drinking with this part of the information attenuated by the requirements of the frequency/quantity questions (Harford 1994). This finding may have been related to the number of questions asked and has implications for how many questions should be included in a screening questionnaire. Increasing the number of questions improves the amount of information available, but respondents may have a limit to the number they are prepared to think about and answer with care.

The requirements for screening in general practice are somewhat different from those of population surveys. The choice of questions required on a general practice screening questionnaire must balance the increased accuracy obtained from detailed items with the requirements of space on the questionnaire, patient willingness to complete the questions, and time to verify the accuracy of the information provided. Including frequency questions with response options weighted towards choices for more frequent use and quantity/drink size responses allowing an option for each common beverage should provide acceptably accurate consumption measures, with a question asking about frequency of heavy drinking to complete the consumption-related screen. Given the uncertainty about what actually constitutes increased risk per drinking occasion, and the correlation between self-reported heavy drinking and likelihood of problems, it may be better to ask directly about heavy drinking. Rather than asking how often the respondent had consumed six or more drinks on one occasion, the questionnaire could ask how often the patient engages in bouts of heavy drinking. Further research is required to determine the best wording of a heavy drinking question.

The quantity/frequency questionnaire provides limited information about alcohol use, and a more detailed interview and/or diary recording is required to establish the drinking pattern and
to complete an alcohol assessment. In an interview assessment, a patient's reconstruction of use over the last six months is considered fairly accurate (Grant et al 1997) It may be possible to classify patients with positive consumption screens on the basis of a subsequent interview, although as discussed below, in the general practice setting, the collection of sufficient information to complete an assessment may take some time.

Setting a cut-off for screening

A key issue in deciding what should be the cut-off level of consumption in a general practice setting is the intention of the screening process. The primary purpose of screening in general practice is to exclude those in whom an alcohol disorder is unlikely and to include those who may be at risk or have current alcohol problems. The assessment of the nature and extent of risk or problems is secondary to the screening process although the need to verify the self-administered responses to check accuracy readily leads into this assessment process. For this reason, a screening instrument measuring consumption needs to be fairly sensitive so as not to miss possible risk or problems while relying on the subsequent assessment to confirm the diagnosis.

The sensitivity of the screen can be increased to ensure fewer patients with alcohol disorder are missed or lowered to reduce the number of patients requiring further assessment. Analysis of the distribution of alcohol consumed in the previous week in UK for example shows 17% of men drinking in the 11-20 units/week group and 13% in the 21-35 units/week group. Shifting the positive screening cut-off point within this range has the potential to affect up to 30% of drinkers (Wilson 1986). In the developmental phase of the WHO collaborative project which trialled the AUDIT among primary health care patients, the group of recruited alcoholics included 3% abstinent for the previous 6 months with the range of daily consumption for the remainder from 5G and 800G. Of this known alcoholic group, 10% had consumption below 40G/day for men and 20G/day for women (Saunders 1993a).

Risk of alcohol-related complications increases with consumption with a relatively defined
increase from low to intermediate risk above 20 standard drinks/week for men and 15 standard drinks/week for women. Screening by quantity/frequency questions has been shown to be sufficiently sensitive to identify those in the increased risk group. In general it appears that patients will tend to underestimate their drinking in this type of questionnaire (Midanik 1982). Setting the cut-off for a positive consumption screen yields two groups of positive responders - those whose drinking is clearly above the cut-off, and those who are borderline. The former group can be considered at increased risk and require further assessment to determine whether they may have alcohol problems or dependence. The borderline responders are an important group to consider. The accuracy of recorded consumption is subject to some degree of error both in self-reporting and calculating weekly consumption. It is not possible to determine precise levels of consumption because patients vary in their weekly consumption and the strength and measure of alcohol reported may be inaccurate. The error inherent in determining weekly consumption from self-reported quantity/frequency measurement implies that the screening cut-off should be set at a relatively sensitive level, with the understanding that borderline results will require further assessment.

Some of the difficulties setting an exact cut-off level are reduced by the addition of supplementary screening tests including questionnaire and/or laboratory screening. It is likely that using a higher cut-off point for consumption would make the questions about concern regarding alcohol use more necessary to detect disorder. As discussed above, screening for consumption and for concern about drinking will identify two overlapping groups - those who are drinking at increased risk levels some of whom will be without concern about their alcohol use, and those with concern about their drinking, some of whom will be drinking less than the screening cut-off level (Wallace et al 1987b). There appears to be a requirement to screen with both consumption and concern questions, with the cut-off for a positive screen at the level when risk begins to increase and some concern about alcohol use likely to be experienced.
Chapter 7

Literature review: questionnaire screening tests
Questionnaire screening

It is evident that screening for consumption provides useful information about risk and the possibility of problems relating to alcohol use. It cannot however readily classify respondents into those with problems and/or dependence and those without. A number of screening questionnaires have been developed to achieve this purpose. The first published screening instrument was reported in 1946 in which a questionnaire was used with possible alcoholics to detect alcoholism (Jellinek 1946). Since then there have been several major developments in screening questionnaires. These are discussed below.

CAGE

Widely used and extensively reported has been the CAGE questionnaire, a 4-item instrument with easily remembered questions that can be included in an interview or self-report questionnaire. (Mayfield et al 1974, Ewing 1984, King, 1986, Appendix 3). The CAGE screens for lifetime alcohol use problems using the following questions:

1) Have you ever felt you should cut down on your drinking?
2) Have you ever felt annoyed by criticism of your drinking?
3) Have you ever felt guilty about your drinking?
4) Did you ever take a morning eye opener?

Some idea of the relative usefulness of each question can be determined from a Canadian population survey of 703 drinkers aged 18 and over. Item 1 was the most common response with 18.9% positive, item 3 next with 12.6% positive, then item 2 with 7.7% and item 4 with 5.6% positive responses. (Smart et al 1991.) The screening performance characteristics of the test can vary according to the cut-off required for a positive result. Its use in a US medical outpatient clinic identified decreasing sensitivity of the test as the number of positive items required increased. Requiring a CAGE score of 1 had a sensitivity of 89%, a score of 2, 74%, a score of 3, 44% and a score of 4, 25%. The specificity of the CAGE increased with number of items required for a positive test. A CAGE score of 1 had a specificity of 81%, a score of 2, 91%, a score of 3, 98% and a score of 4, 100%. (Buchsbaum et al 1991) These authors also
found the CAGE performed well in accurately distinguishing elderly patients with a history of serious drinking problems in an outpatient medical practice at an urban university teaching hospital in Richmond Virginia. (Buchsbbaum et al 1992). They reported an overall sensitivity of 80% and specificity 85% for a cut-off of two positive CAGE items. They endorsed the use of CAGE because of its ease of administration and its ability to identify the majority of alcoholics. The use of different cut-off scores allows the test to be either an indication of possible alcohol problems or almost diagnostic of alcoholism. They note that it does not distinguish active from inactive patients and comment that its power resides in its ability to effectively stratify patients for more in-depth interviewing. In the original validation of the CAGE a score of two or more was found to correlate 0.89 with a clinical diagnosis of alcoholism (Mayfield et al 1974.) Similar endorsement of the CAGE as a screen for dependence is made in another US hospital clinic setting (Liskow et al 1995) The sensitivity for dependence was found to decrease from 86% - 26% with 1 - 4 items required, and the specificity to increase from 93-100% 1 - 4 items positive. The authors note its value as a screen in that setting for dependence but recognise its limitation for hazardous or harmful use. In the diagnosis of alcoholism, a Spanish study (Girela et al 1994) reported very high sensitivity (96%) and specificity (92%) for the CAGE such that a further laboratory screen provided no additional discriminating power in the diagnosis of alcoholism. Again, item 1 "Have you ever felt you should cut down on your drinking?" was identified as the most sensitive test. In contrast to the 10% in the Canadian population survey above, this question identified 95% of alcoholics. The value in other settings is less clear. In a UK community study the sensitivity of the CAGE was reported identifying only half of known alcoholics and problem drinkers (Saunders and Kershaw 1980). Reliance of the CAGE questions alone appears to miss a number of drinkers likely to have problems. The Canadian population survey discussed above found 11.9% of Ontario drinkers to be drinking above safe levels (4 or more drinks per day). The CAGE identified a similar proportion of patients scoring 2 or more (10.9%), but these were not necessarily the same group of patients (Smart et al 1991.) Similarly, a large UK general practice study identified two overlapping groups of patients positive for CAGE and drinking heavily (Wallace et al 198b). Reliance on the CAGE questions alone would have missed a
large part of the group whose consumption placed them at risk. This finding was repeated with the use of the first 3 questions CAG in an Australian hospital study in which 54.8% of excessive drinkers scored one or no positive questions suggesting that the use of these screening questions alone is insufficient to indicate at risk drinking (Bell et al 1994). In a college student setting, the CAGE was not considered useful because it tended to miss excessive drinkers not concerned about their drinking. (Heck and Williams 1995). The combination of CAGE and drinking measures proved very acceptable to patients in a Canadian family practice study (McIntosh et al 1994). The authors concluded that the CAGE was of value because it indicated patient awareness of the effect of drinking on themselves and others and the consumption measures provided a way of determining whether patients were currently drinking hazardously. This study found that in general, those drinking more scored higher on CAGE but that some patients reported low consumption but had concerns about their alcohol use (which have caused the reduction to current safe levels), and some patients had hazardous use but reported no concern. The high acceptance of this questionnaire may in part be related to its brevity considering it required completion while patients waited for their appointment. An issue not explored in this report was the capacity of the doctor to deal with positive items recorded by the patient who was attending in fact for an unrelated reason. A further concern expressed about the CAGE questions is the lifetime focus of the use of ever. This will tend to over-estimate the prevalence of current problems although in a general practice setting the indication of past problems may provide useful information. In summary, the CAGE is considered useful because it is short, easy to remember and administer, and can be used with low cutoff as an indication of possible problems or with a high cutoff as a highly specific screen for alcoholism. It is limited in its ability to detect hazardous or harmful drinking, and when used alone with its usual cutoff of 2 will fail to identify up to a quarter of those with alcohol problems in hospital settings and a higher proportion in the community. Because it is brief, the CAGE provides relatively little information about the person's drinking. However, three questions focus on the person's perception of his or her own drinking which provides a useful starting point for further evaluation. The use of ever includes past problems which may no longer be relevant. The
CAGE or similar questionnaire would seem to have a place in general practice screening to identify the group with lower consumption but concern about their drinking.

Longer questionnaires:

Questionnaires developed since the CAGE have included more questions in an attempt to improve sensitivity and specificity for alcohol problems.

MAST

The most widely reported longer screening questionnaire is the Michigan Alcoholism Screening Test (MAST) and the shorter self-administered version (SMAST) (Selzer 1971, Selzer et al 1975). The MAST is a structured interview of 25 questions, and the SMAST is a self-administered questionnaire of 13 questions relating to self-appraisal of drinking habits and social, vocational and familial problems associated with excessive drinking (appendix 3). Like the CAGE, the MAST questionnaires asks about problems with drinking ever and is screening for current or past alcohol problems. This tends to limit the tests ability to detect early problem drinkers (Magruder-Habib et al 1991). It is considered more useful for persons at later stages of their drinking career and least suited to those who wish to be secretive about their drinking. It does not assess the severity or scope of a problem. (Screening Workshop Report 1986). Self-identified alcoholics score higher than those not identifying themselves as alcoholic (Kaplan et al 1974).

The MAST has been modified in other setting also. A shortened version called the brief MAST has been developed from the 10 most discriminating items (Pokorney et al 1972). These questions included those most direct in alcohol focus. A version modified to emphasise questions about attitudes and customs (Mm-MAST) was found to result in improved sensitivity of the test in the community in Malmo, Sweden (Kristenson and Trell 1982).

The sensitivity of the MAST has been found to vary with population under study. It had a 98% detection rate for US hospitalised alcoholics (More 1972) and a 55% detection rate in a community study (Saunders and Kershaw 1980). In general, the test's sensitivity ranges from
86% to 98% and specificity from 81% to 95% for detection of alcoholism (a MAST score of 7 or more indicating alcoholism, and score 5-6 considered borderline (Nilssen and Cone 1994). There have been several reports of the use of the MAST in general practice (Hotch et al 1983, Nicol and Ford 1986) though its focus on established problems makes it less suitable for risk assessment and early identification. The MAST can be expanded to include consumption questions to improve risk assessment and early diagnosis (Fleming 1993).

In summary, the MAST has a focus on alcoholism with best results achieved in groups with established alcohol problems and self-acceptance of their problem. The longer versions are reported to be most reliable (Gibbs 1983).

SAAST
The SAAST (Self-administered alcoholism screening test) was created from the MAST by addition of items and modification of the format so that the scale could be self-administered. (Wenson and Morse 1975, Hurt 1980). It consists of 35 items (originally developed with 37 items) that relate to drinking behaviour and the social, economic, marital and medical consequences of drinking, developed originally with US medical patients and subsequently tested in a cross cultural study involving patients in US and Mexico (Davis et al 1989). A score of less than 7 positive items indicates the absence of a significant problem with alcohol, a score of 7-9 indicates possible alcoholism, and a score of 10 or greater indicates probable alcoholism. The full version of the test has reported sensitivity of 90% and specificity of 96.4% for alcoholism. A nine-item version was further derived which had sensitivity of 95% and specificity of 99.4%, results which supported its use as a screening test for alcoholism in a medical patient population (Davis et al 1987). Of particular interest in the nine-item format was the finding that a patient could be classified reasonably accurately as alcoholic with the response to each of two key items, similar to those in the CAGE test (Do close relatives ever worry or complain about your drinking? and Have you ever felt the need to cut down on your drinking?). These two items correctly classified 80.9% of alcoholics and 96.4% of non-alcoholics and were shown to have the greatest predictive power for alcoholism in the cross-cultural study (Davis et al 1989).
CAST

The Canterbury Alcoholism Screening Test (CAST) was developed in New Zealand in Christchurch based on information collected in this hospital setting from approximately 3000 patients (Elvy 1984b). The CAST includes questions on consumption and a clinical assessment as well as the 24 questions indicating dependence and problems related to alcohol use. It was thought by reviewers to have high reliability, and because it was developed in New Zealand to be applicable to the NZ population, though the lower Maori and other Polynesian populations in Christchurch may affect its generalisability to other centres. It is suited to hospital settings but its usefulness in general practice is uncertain as it has not been validated in this setting and is considered to detect primarily self-perceived problems (Screening Workshop Report 1986).

AUDIT

The issue of screening for hazardous, harmful and dependent drinkers in primary care settings has been addressed by the development of the AUDIT screen (Saunders 1986a,b). The development of the AUDIT reflected a shift in focus away from attempts to detect and improve treatments for the established alcoholic to early detection of the problem drinker followed by relatively brief intervention. Development of an instrument for detection of risk and early problems reflected an increasing awareness that there are considerably more problems in the community related to alcohol use than accounted for by those identified as alcoholics.

In 1980 a WHO Expert Committee reviewed treatment approaches and concluded that "there is a need for exploration of methods of detecting persons with harmful alcohol consumption before health and social consequences become serious and irreversible... and to develop intervention strategies that can be applied to primary control settings" (WHO 1980).

In 1982 an international group of investigators was asked by the World Health Organisation to develop a simple screening instrument to identify persons with early alcohol problems using procedures that were suitable for health workers to use in both developing and developed
countries. Unlike previous screening tests, the new instrument was intended for the early identification of harmful drinking rather than alcoholism. However, the AUDIT as developed will also identify alcoholism. (Babor et al 1989a).

The main screening instrument is the 10-item core questionnaire called AUDIT (Alcohol Use Disorder identification Test) which contains 3 questions on quantity and frequency of drinking, 3 questions on dependence and 4 questions on problems caused by alcohol (Appendix 3). The questions were derived from an original 150 item general lifestyle questionnaire on the basis of statistical factors, usefulness as a focal point for therapy and achieving adequate coverage of the major conceptual domains of consumption, dependence and alcohol related problems. For medical settings where patients may be defensive or uncooperative, a disguised screening procedure was developed called the Clinical Screening Procedure, consisting of 2 questions about traumatic injury, 5 items on clinical examination and a blood test, serum GGT. The Clinical Screening Procedure is an indirect test of alcohol problems. The AUDIT focus is on recent alcohol use and classifies patients into hazardous, harmful and dependent use consistent with ICD10. As expected with its focus on early alcohol problems, the AUDIT core questions have been shown superior to the MAST and the Clinical Screening Procedure in discriminating hazardous from non-hazardous drinkers, and superior to the Clinical Screening Procedure in discriminating harmful from non-harmful use. (Bohn et al 1995) The AUDIT core questions are useful for early detection of hazardous/harmful use while the Clinical Screening Procedure is better applied to identification/confirmation of alcohol dependence.

The AUDIT is designed to be used as a brief structured interview or self-report questionnaire that can be incorporated into a general health interview, lifestyle questionnaire or medical history. The AUDIT clinical procedure is designed to complement the questionnaire particularly where alcohol consumption and problems are minimised. The AUDIT has been validated as a screening instrument for early identification of alcohol problems in cross-cultural studies involving six countries, Norway, Australia, Kenya, Bulgaria, Mexico and United States (Babor et al 1989a).

A positive screen includes a score of 8 or more out of a possible 40 on the ten core questions.
High scores on items 1 - 3 with low scores on the other questions indicates hazardous use. Elevated scores on items 4 - 6 indicate dependence and on items 7 - 10 harmful use. The choice of a positive cut-off score affects the sensitivity and specificity of the test and to a certain extent needs to be chosen according to the setting (and therefore intention) of screening. For example, a cut-off score of 22 best discriminates for liver disease or gastrointestinal bleeding, a score of 12 for social problems related to alcohol and a score of 7 for possible or probable alcohol-related medical disorder. The cut-off score of 8 is considered to best approximation to the optimal for a variety of endpoints. (Conigrave et al 1995).

The 10 CORE questions were found to have a sensitivity of 80% and a specificity of 89% for hazardous drinking against the criteria of daily consumption M>40 grams F>20 grams. The positive predictive value of a positive AUDIT questionnaire for hazardous use ranged from 42% - 81% (mean 60%) and negative predictive value from 91% - 97% (mean 95%) across 6 countries. (Saunders 1986) The Clinical Screening Test when used as a screen for hazardous use performed poorly with sensitivity 41% and specificity 92%. In a collaborative international six centre study in primary care settings, the AUDIT with a positive cut-off score of 8 out of a maximum of 40 diagnosed hazardous or harmful use with a sensitivity of 92% and a specificity of 94% (Saunders et al 1993b).

A review of studies using AUDIT suggests a cut-off of 10 will provide a sensitivity of around 80% and specificity up to 98% (Bohn et al 1995). The predictive value of the AUDIT was assessed over a 2-3 year follow-up with 61% of those with an AUDIT score of 8 or more experiencing alcohol-related social problems over this period compared with 10% at lower scores. They also had a significantly greater experience of alcohol-related medical disorders and hospitalisation. (Conigrave et al 1995).

The AUDIT has been judged a useful instrument in a variety of settings including routine health examination of long-term unemployed (Claussen and Aasland 1993), cross-cultural primary care screening in US (Volk et al 1997), and a US college sample in US (Fleming et al 1991). In this younger student group the sensitivity/specificity was reported at 84% / 71% for a cut-off score of 11, and 94% / 29% for a cut-off score of 7. These lower performance characteristics reflected the use of the AUDIT as a screen for alcohol misuse measured by
the alcohol subscale of the Diagnostic Interview Schedule (DIS) to meet DSM111 criteria for alcohol disorder.

The AUDIT questionnaire was used as part of a WHO collaborative multi-centred trial in New Zealand general practice testing the Drink-less intervention package (Lightfoot et al 1998). A positive score ('risky drinking' 8 or more, 'problematic or dependent drinking 13 or more) was returned by 15% of participants, with approximately 30% of young people under age 25 years identified drinking either at risk or at problem/dependent levels. Of note was the finding that that positive screens were returned in over one third of participants in some practices reflecting disproportionately more young patients and indicating that different practices may have different needs with regard to screening and intervention resources.

The benefit of the AUDIT in a general practice setting is its ability to discriminate hazardous, harmful and dependent use in the one questionnaire thereby allowing matching each category with defined interventions. In practice, the information obtained by the AUDIT screen still requires further assessment before classification into hazardous, harmful or dependent drinking can be confirmed though the weighting of scores in each section should help this process. The main advantage of the AUDIT over other questionnaires in its suitability for primary care is its emphasis on early problem identification, and its cross-cultural validity which should encourage confidence in its use in different general practice settings. The ability of the AUDIT to yield a total score may also be of value in supporting patient information sharing and education given the predictive value of a positive AUDIT screen for increased risk of social and medical problems, and hospitalisation (Conigrave et al 1995). The disadvantage of the AUDIT is that there are 10 questions to include in the screening instrument. When developed, being a short questionnaire compared with the MAST and CAST was considered desirable to allow it to be embedded within general health and lifestyle questionnaires without making them unwieldy or upsetting their balance, thereby also providing an element of disguise which may be useful in some settings (Saunders et al 1993b). However, the inclusion of ten questions on alcohol in a health and lifestyle screening questionnaire results in a heavy weighting of this particular aspect of lifestyle screening in comparison with the number of questions required to ask about other health and lifestyle issues and the format of
the AUDIT is inconsistent with the style of question layout developed in screening questionnaires like the HSS. This did not appear to influence patient response to screening in an emergency department setting where the AUDIT questions were as acceptable as the HSS questionnaire, although this study did not include the AUDIT questions as such with other health lifestyle questions (Adams and Stevens 1994). The inclusion of the 24 question MAST among other lifestyle risk assessment was successful in identifying alcoholics admitted to a community hospital in Vermont but the screen required delivery by a nurse taking up to 20 minutes (Graham 1991).

In summary, the AUDIT has been validated across a number of cultures (though not including Maori in New Zealand), has been designed to detect hazardous and harmful use as well as dependent use, and has been used in general practice as a research tool. Currently there are no reports of its acceptability in routine general practice, and its length is a disadvantage for inclusion among other health screening items.

**Screening for previous trauma as an indicator of alcohol**

As well as the questionnaires which include trauma questions among other items, a history of previous trauma can be used as a screen to identify problem drinking. A study involving 42 primary care practices in a single US city asked 15,686 patients four alcohol-neutral trauma questions in the reception area with the physicians asking about alcohol use and alcohol-related problems only to patients with previous trauma. The study reported that this method identified 62-85% of the expected number of problem drinkers in this population (Israel et al. 1996).

**Computer screening**

Computerised screening questionnaires have a number of theoretical advantages over pen and paper formats especially by providing the opportunity to deliver immediate assessment
questions to those indicating positive screening responses. Not only does this result in a larger amount of information at the initial screen, but increases the likelihood that a diagnosis will be possible. A computer version of the SAAST has been shown to result in equivalent decisions to those made from the pen and paper format, and this study showed the use of the computerised format was feasible in a medical setting (Davis and Morse 1991). The reliability of a computer elicited alcohol history has been shown within normal inter-rater standards (Bernadt et al 1989), and its value in correcting for deliberate under-reporting has been identified and explained on the basis of a reduced tendency for respondents to produce socially desirable answers (Duffy and Waterton 1984). The development of an Australian computerised health check which includes alcohol questions has been described. (Litt 1990) and a commercially available computerised lifestyle screen developed in Canada has been extensively trialled in a variety of settings including general practice (Skinner 1994). A model for use with adolescents has been described (Paperny and Hedberg 1999). The cost advantages of screening by computer include the non-use of clinical time both for the screening interview and summary of the results. Research into the use of computerised screening in New Zealand has identified a number of important issues affecting the use of computerised screening in general practice including the potential for disruptions to the appointment system, difficulties faced by receptionists in setting up the computer checks, and software problems/computer breakdowns - all essentially problems to do with disrupted practice routines. Nevertheless, the value of the computer checks were also identified and included the quick and efficient method of assessment, the relevance of immediate feedback and capacity for calculation of health risks, and the non-use of clinical time (Adams et al 1997). The recommendation for inclusion of a computerised version of the AUDIT was one outcome from a feasibility study involving Auckland general practitioners (Lightfoot et al 1998).
Chapter 8

Literature review: biochemical screening tests
Biochemical tests are very useful as indicators of heavy drinking and may be helpful in screening for alcohol disorder. Tests which give some indication of the current state of the person being tested are known as state markers (Whitfield 1991). Current state markers may indicate possible hazardous use e.g. gamma-glutamyltransferase (GGT) or erythrocyte mean cell volume (MCV), or provide evidence of physical harm e.g. aspartate transaminase (AST), alanine transaminase (ALT) or amylase as markers of liver or pancreatic damage. These tests may indicate risk or harmful drinking but are not specific for alcohol disorder. Currently there are no state markers for alcohol dependence. Tests which indicate susceptibility to future problems are known as trait markers. Genetic markers, particularly for the alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH) enzyme systems which are principally involved in the processing of alcohol in the liver, may be useful as indicators of future alcohol disorder. Iso-enzymes of ADH and ALDH are encoded on a number of gene loci and certain subtypes of these enzymes are associated with increased or reduced risk of alcoholism (Coutelle et al 1998). This genetic vulnerability is discussed further below.

Very recent consumption can be assessed directly by blood alcohol measurement, a value in excess of 300mg per 100ml at any time or in excess of 100mg per 100mls at a routine check a strong indicator of alcoholism (Chan 1991). Blood alcohol testing may be particularly useful in certain settings e.g. accident and emergency departments but is little value in general practice.

Only a limited number of laboratory tests are in common use as indicators of risk or harmful drinking. The liver function tests GGT, AST and ALT and erythrocyte MCV are most widely used. These tests have proven valuable in a number of clinical contexts. An abnormal GGT has been identified as a significant risk factor for mortality in a study of middle-aged urban men, more so in fact than serum cholesterol (Trell et al 1985). An elevated GGT in a heavy drinker can reasonably support the diagnosis of risk drinking and may reflect harmful drinking in some patients, often associated with elevated AST which is a biopsy proven indicator of liver damage (Whitfield 1991). Laboratory tests may be useful in providing information to
patients about their drinking. Biochemical evidence of the negative effect of alcohol use on health can have a significant effect on patient motivation to reduce harmful consumption (Miller and Rollnick 1991). These tests are also useful in surveillance and validation of self-reported changes in alcohol use. Abstinence or reduced consumption should result in improvement in abnormal biochemistry, and the use of GGT as feedback to patients has been shown to result in significant reduction in illness-related work absenteeism, hospitalisation and mortality over long term follow-up (Kristensen 1983).

Much of the research on biochemical tests has been to improve the understanding of their usefulness as screening tests. A number of biochemical markers other than liver function tests and MCV have been studied in the search for an improved screening test for alcohol disorder. More recent tests researched for screening include carbohydrate-deficient transferrin (CDT) and urine and serum hexosaminidase (UHEX, SHEX). No single test has been found diagnostic of risk or harmful drinking and abnormal screening tests still require clinical assessment to evaluate drinking status. The proportion of heavy drinkers with abnormal laboratory results varies according to the population under review and is affected by age, sex and pattern of alcohol consumption. For example, elevation of GGT levels in heavy drinkers has been reported varying from 30% to 85% (Chan 1991). Some of the more researched tests are discussed below.

Liver function tests

Liver function tests (LFT) in common use as screening tests and markers for alcohol consumption include gamma-glutamyltransferase (GGT), aspartate transaminase (AST) and alanine transaminase (ALT). Gamma-glutamyltransferase is a membrane-bound enzyme found in the sinusoidal membranes of the liver cell. An increased GGT level in heavy drinkers is thought in part to be due to enzyme induction, possibly as a protective effect on the liver and also to reflect liver toxicity (Whitfield 1991). Liver biopsy in patients with elevated GGT may show evidence of liver damage, and elevated GGT shows an association with elevated
AST (Helander et al 1997) suggesting some of the abnormality may reflect actual liver damage. Alcohol exposure may cause the liver cell membrane to leak resulting in the release of GGT and other liver enzymes into the bloodstream, and liver cell death associated with chronic consumption may result in release of GGT (Rosman and Lieber 1990). The association of elevated GGT with increased mortality in middle-aged men has also been considered supportive of GGT as a marker of damage (Petersson et al 1980, Trell et al 1985), as has the finding that GGT is predictive of increased alcohol-related morbidity over a 3 - 5 year period following screening (Conigrave et al 1993). A contrary view is that GGT acts to protect the liver against damage by maintaining a supply of metabolic precursors (glutathione) to cells and raised GGT helps maintain these precursor reserves which protects the liver cell against oxidative stress.

Elevated GGT may be useful not only as an indicator of heavy drinking and possible liver damage but also of toxic effects of alcohol on systems which cannot be so easily measured. For example, in comparison with normal levels of GGT, the top decile GGT level has been associated with other measures of harm including 4 - 6 times more fractures and 6 - 13 times more surgical consultations as well as correlation with sick absenteeism (Kristenson and Johnell 1986), and markedly increased GGT has been associated with neuropsychologic impairment (Irwin et al 1989, Richardson et al 1991).

Reported sensitivity of GGT for heavy drinking varies widely with one authority quoting GGT elevation across a range of 34 - 85% of heavy drinkers (Salaspuro 1986). The range in sensitivities reported for GGT as a screening test in part reflects differences in the characteristics of the samples under study. The response of GGT to alcohol use appears to be non-uniform across age groups with lower levels found among heavy drinkers under age 30 years (Whitfield 1978), making the test less sensitive as a screen for alcohol risk or harm in this age group. It is also less sensitive in women even though it is generally accepted that women sustain damage at lower levels of alcohol use (Whitfield 1991).

The sensitivity of GGT also varies according to the intention of screening. Higher sensitivity is reported when the test is used to detect alcoholism. In a Spanish study where those in the alcoholic group were consuming a minimum of 80 grams/day for men and 60 grams/day for...
women for at least a year, GGT sensitivity for detecting alcoholism was 72% (Girela et al 1994). In a study in Norway, the sensitivity of GGT for detecting alcoholism was 71% (using GGT males >50u/L females >40u/L (Bell and Steensland 1987). Much lower sensitivities for GGT have been reported but these vary with the cut-off point for abnormal GGT and with the definition of heavy or problem drinking under detection (Nilssen et al 1992). In general, as the sensitivity of a screening test increases its specificity falls. The relationship between these values can be adjusted by changing the cut-off for a positive test. The lower the GGT value chosen for a positive test, the more sensitive but less specific the test becomes as a screen for heavy drinking. One of the reasons studies report varying levels of sensitivity of GGT as a screen for heavy drinking is because the test can be adjusted to be more or less specific. It is really possible to compare reported sensitivity levels when adjusted for a pre-defined specificity. It has been suggested that use of a specificity of 95% would prevent confusion in comparison of sensitivity reported in different studies (Whitfield, 1991). The reference range considered normal may vary according to the number of heavy drinkers in the population and the definition of elevated GGT may vary between study groups. The top GGT percentiles have been used in some studies. In one study, 72% of patients in the top 25th percentile for GGT were moderate to heavy drinkers (Kristenson and Johnell 1986). Using values above the 95th percentile for nondrinkers, the sensitivity of GGT identifying men drinking 8 or more drinks per day is reported at 35-45% (Whitfield 1991). In an Australian community study, the performance of GGT as a screening test for high alcohol intake (288-935G/week) in a sample of men age 33-66 years was analysed for cut-off ranging from 30 to 50u/L. The highest sensitivity was using a GGT value of 30u/L as a cut-off for a positive test which yielded a sensitivity of 69% but at this level the specificity was poor at 72%. A cut-off of 40u/L and 50u/L were considered. The sensitivity of GGT at 40u/L was much higher at 51% than the 36% obtained at a cut-off of 50u/L, but the specificity at both these levels was similar (88% and 91%). The authors concluded that a cut-off of 40u/L gave the best screening point yielding a positive predictive value (PPV) of 47%, virtually identical to the PPV at cut-off 50u/L. Using 40u/L as a screening point for GGT would identify just over half of the patients in the high consumption group. For every two of men in this sample population returning a
positive test, one would be subsequently assessed as a heavy drinker (Vanclay et al 1991).

Other than related to alcohol, GGT may be elevated in other hepatic disorders and by some drugs especially anticonvulsants and analgesics. Increasing age and chronic illness (e.g. rheumatoid arthritis) also affect GGT levels. The specificity of GGT for alcohol may be improved if other causes can be eliminated but elevated GGT may sometimes occur without obvious explanation. Although the GGT level cannot reliably identify heavy drinkers, when elevated in drinkers in the absence of other known causes it is likely to be alcohol related. It is a useful though limited screening test for alcohol disorder.

Elevated AST and ALT levels are also non-specific markers of hepatocyte injury. In the absence of other causes of liver damage, these enzymes are useful indicators of heavy drinking and may be used with GGT and other biochemical markers as screening tests as discussed below. AST is also released from skeletal and cardiac muscle and it has been observed that in alcoholics a significant proportion of the increased AST comes from these non-hepatic sources (Konttinen 1970). The ratio of these enzyme levels has been found in hospital in-patients to be likely to indicate alcoholic etiology if the ratio AST:ALT is greater than 1 and very likely if AST:ALT is greater than 2 (Cohen and Kaplan 1979, Kawachi et al 1990). Of interest regarding the use of liver enzymes in screening for alcohol disorder is the finding that other substance use may impact on these markers, in particular that cannabis has been reported associated with lower AST values in patients admitted for alcoholism treatment (Chang 1990).

The effect of reduced consumption or abstinence may help verify the relationship between liver function tests and alcohol use. The half-life of GGT has been calculated to be 26 days (Orrigo 1985). On average in a clinical setting, GGT has been found to return to normal over about a month, increasing with relapse to heavy drinking within about 2 weeks (Salaspuro 1986). AST and ALT return to normal more slowly, according to age, sex and degree of liver damage. One authority has recommended measurements of AST and ALT about every 2 months in the follow-up of treated alcoholics (Keso and Salaspuro 1990). One study has reported the relationship of GGT and MCV to alcohol consumption in 135 problem drinkers over two years concluding there was a significant though moderate correlation between self-
reported consumption and GGT on all follow-up occasions, and similar though more variable changes in MCV. Both markers seemed more useful in detecting decreases than increases in consumption. Specificity of these tests as measures of change in consumption was much higher than sensitivity i.e. a changed marker indicated a similar change in consumption whereas a change in consumption did not necessarily lead to a change in markers. The authors comment that for example even a single new intake of alcohol might affect GGT thereby masking an overall reduction in a person generally reducing consumption. They conclude that GGT and MCV should be used with caution in connection with counselling individuals (Duckert 1992).

Macrocytosis

Alcohol and its metabolic derivative acetaldehyde exert toxic effects on the bone marrow affecting erythropoiesis. A number of mechanisms have been proposed for the resulting effect on haematological parameters, including disturbed protein synthesis, prolonged developmental phase, and effects on the erythrocyte cell membrane (Seppa et al 1992) The major impact of alcohol recognised in the automated laboratory analysis is the increased mean cell volume which is unrelated to B12 or folate deficiency (a problem which may also occur in some heavy drinkers). Other abnormalities occur in relationship to alcohol use (high reticulocyte and leucocyte counts and low platelet counts) but these are generally less reliable as routine markers. One abnormality sometimes reported on haematological analysis is anisocytosis, variability in red cell size, which is partly related to the effect of alcohol causing macrocytosis. Periods of abstinence for example may allow some normal red cell development thereby resulting in more variability in red cell size. However, this finding has not been validated in the same way as macrocytosis as a useful marker for heavy alcohol use in clinical practice.

The definition of macrocytosis varies slightly in different studies from MCV > 96fl (Seppa et al 1992) to MCV > 98fl or 100fl in studies discussed below. A mean cell volume > 98fl has
been reported in 23 - 32% of heavy drinkers but up to 5% of normal drinkers have increased MCV in the absence of known causes (Chick et al. 1981). Several general practice studies have been reported in Finland investigating macrocytosis. A study of 300 consecutive patients with MCV > 100fl identified 84% of these men and 34% of the women with alcohol abuse (Seppa et al. 1991). A general practice study at a Health Centre in Finland reported MCV > 100 in 3% of 9527 blood counts. Alcohol abuse was the most common diagnosis in those assessed for macrocytosis although it was common for this finding to be overlooked with no investigation in 58% of men and 64% of women and the possible contribution of alcohol thereby missed in these patients (Seppa et al. 1996) The exact limit defining macrocytosis is probably not important in clinical practice. For example, the probability of consumption > 6 drinks per day is reported to increase from 20 - 60% as MCV increases from 90 - 100fl (Salaspuro 1986).

The MCV appears to be a useful supporting test in a laboratory screen for heavy drinking particularly if other causes can be excluded (Vitamin B12 and folate deficiency, some drugs e.g. anticonvulsants, the effect of age and possibly smoking). Changes in MCV values with reduction in alcohol consumption occur slowly reflecting the long degradation period for red cells and the relatively prolonged phase of new red cell development.

Other state markers

Several more recently developed tests of alcohol consumption have been reported in the literature. Most frequently reported are carbohydrate-deficient transferrin (CDT) and beta-hexosaminidase (B-HEX). A large number of other markers have been studied in an attempt to find tests with improved sensitivity and specificity (Tang 1991), but none are currently of practical use in general practice.
Carbohydrate-deficient transferrin

Transferrin is a blood protein that functions in the transport of iron throughout the bloodstream. Carbohydrate-deficient transferrin (CDT) is an abnormal variant of transferrin which has been found in increased amounts in persons abusing alcohol (Stibler 1991). Possible mechanisms responsible for CDT generation include alcohol-induced deficiencies in the glycosylation of transferrin in the liver (hence the term carbohydrate-deficient) and/or increased enzymatic activity of glycosidases in the serum (Bean 1994). CDT has a half-life of approximately 2 - 3 weeks (Salaspuro 1994, Helander et al. 1997).

Studies have supported the finding that CDT seems to be reliable for detecting heavy consumption. In a study of 81 patients age 20-85 years consecutively attending a medical out-patient clinic in UK, CDT sensitivity was 69% and specificity 81% with a positive predictive value of 41% for detecting heavy drinking >400G/week. The test correlated with the CAGE score but not with diary consumption records (Aithal et al 1998). However, the study concluded that CDT had limited screening value for lower levels of consumption. Similar results were found in other studies conducted in medical departments. In a study of 502 patients admitted to a medical department in Norway with CDT sensitivity reported at 69% for detection of alcohol consumption > 50G daily and a specificity of 92%. (Bell et al 1994). Another study reported sensitivity in hazardous drinkers at 62% and dependent drinkers at 67%, with elevated CDT levels found in 5% of controls (Godsell et al 1995). A study of 199 patients admitted to an Austrian Department of Medicine reported sensitivity of CDT 70% and specificity 84%. In another study of the usefulness of CDT, the test identified 83.9% of DSMIV dependent patients who had normal GGT. In this study levels fell 36% after 15 days withdrawal with the conclusion that CDT is useful for the diagnosis and follow-up of alcoholics with normal GGT. However, cost issues were cited as a reason for relegating CDT to a second line test (Reynaud et al 1998). Lower sensitivities are reported for non-hospital populations. In a collaborative WHO Study (Sweden/USA) assessment of biochemical markers in 120 subjects from non-hospital populations, GGT AST and CDT all gave sensitivities in the range 33-40% and specificities 85-94% as markers of heavy drinking.
Although GGT and AST levels correlated, GGT and CDT did not, suggesting they are independently associated with alcohol consumption. This study also concluded that CDT was more useful in heavy drinkers (Helander et al 1997). The sensitivity of CDT has been found to vary with the group of patients screened. In a Norwegian study of an unselected population, CDT sensitivity did not exceed 26%, though specificity in detection of consumption >30G/day was over 90% (Nilssen et al 1992). However, in alcohol dependent patients admitted to acute surgery, CDT sensitivity was 50%, and in patients hospitalised for detoxification, 75%. CDT levels correlated with self-reported consumption for both these groups with sensitivity increasing with higher consumption in contrast to the findings of the previous study of an unselected Norwegian population. CDT was most sensitive in the 36-50 year old group (whereas GGT was more sensitive in older patients). The authors recommended CDT be used as a supplementary test (Huseby 1997). In another study looking at screening for alcohol dependency in surgical in-patients these authors found a combination of CDT and GGT more sensitive than either test alone, reporting however that this combination was ineffective in patients under age 51 years (Huseby et al 1997). A study of CDT in heavy drinking university students in Finland reported a sensitivity of 22% and a specificity of 96% in male students. The test performed poorly in female students. Although the sensitivity of CDT in this student group was low, the authors pointed out that CDT had much better correlation with drinking than other tests (Nystrom et al 1992) No change in CDT was identified in a study of short term heavy use in previously abstinent healthy male subjects suggesting the test is not useful in the absence of sustained drinking (Lesch et al 1996). The effect of chronic disease on CDT levels in general practice patients has been studied in 524 men from 7 general practices in The Netherlands. These patients had one or more of hypertension, asthma/bronchitis, diabetes mellitus, lipid metabolism disorder, angina pectoris, depression or diseases of the digestive tract - none of these or accompanying drugs influenced the 92% specificity of the CDT (Meerkerk et al 1998), though CDT has been shown to be affected by liver disease in other studies including chronic viral hepatitis (Peret et al 1997) and primary biliary cirrhosis and liver cancer (Stauber et al 1995). The effect of age and duration of abstinence on CDT was tested in 162 subjects (62 alcoholics and 100 controls) with a
sensitivity of at least 60% reported in patients over age 40 years though the test was poorly sensitive under this age except on the first day of abstinence. The authors concluded that CDT was a marker of chronic alcohol consumption and that younger patients either had a shorter history of alcohol use or recovered more quickly (Agelink et al 1998). In one review of a large number of studies, CDT is assessed against an "ideal marker" of alcohol consumption (Allen et al 1994) The studies reviewed support the value of CDT in distinguishing abstainers/very light social drinkers from heavily consuming alcoholics but identify the lower accuracy in detecting high consumers in heterogeneous drinking populations. The review concludes that CDT provides a valuable aid to measuring problem drinking rather than being an ideal marker. The way in which CDT sensitivity varies according to population or patient groups has been studied in some detail as part of an Australian twin study (Whitfield et al 1998). The dose response relationship between alcohol intake and CDT concentrations in 1400 men and women in a community-based twin register was studied showing that mean CDT increases with increasing reported alcohol consumption even within the range of alcohol use considered to be non-hazardous. Significant effects on the alcohol - CDT dose-response curve were found for sex, age, smoking, previous alcohol dependence, body mass index, and diastolic hypertension. The authors report that these variables either affect test sensitivity or require adjustment of reference intervals.

In summary, CDT appears to have similar or better sensitivity and specificity than GGT, AST and MCV and to perform better as a screening test for heavy consumption (>400 grams/day) and long term use. It appears to be relatively less useful in younger patients though this may be related to uncertainty about the appropriate reference range for this group and other factors which may need consideration for individual interpretation of the result. CDT has had the drawback of elaborate laboratory requirements and cost in comparison with other alcohol tests but discussion in the literature has suggested commercially available test kits might reduce cost and increase the availability of the test, (Allen et al 1994) and the development of laboratory assays capable of some degree of automation for analysing large numbers of samples has been endorsed. (Conigrave, Saunders and Whitfield 1994). Considerable progress in this regard has been made with commercial laboratory kits currently available.
(Bean 1997), though cost reductions may await bulk use.

**B-hexosaminidase**

B-hexosaminidase (B-Hex) is an enzyme (acid lysosomal glycosidase, also called N-acetyl-B-D-glucosaminidase) found in most tissues especially the kidneys (Karkkainen 1990). It is increased in urinary concentration in urinary tract infections, hypertension, diabetes and with nephrotoxic drugs, and increased in serum levels in liver disease, hypertension, diabetes, and thyrotoxicosis. It is fairly readily measured by enzyme immunoassay technique and less expensive than CDT to perform. A number of possible explanations on how alcohol affects this enzyme have been proposed with abnormal SHEX levels essentially reflecting liver damage (Hultberg 1991).

Serum B-hexosaminidase (SHEX) has been shown to be most sensitive as a marker of recent consumption. The sensitivity of SHEX has been reported between 68% and 85% in detection of alcoholism and heavy drinking (Karkkainen 1990) which was similar to GGT in this patient group. The sensitivity of SHEX after a week of abstinence was only 37.5%, lower than that for GGT at the same time (66%). However, urinary hexosaminidase (UHEX), a different isoenzyme, proved a more sensitive marker at 81% for detection of heavy drinking on admission to detoxification and persisted with a sensitivity of 72% one week later. The authors concluded UHEX to be a superior test on the basis of increased sensitivity and sustained elevation after abstinence of one week. Serum B-hexosaminidase was found elevated in all patients admitted for detoxification in a study in Sweden (Hultberg et al 1991) but in contrast a study of young university students found SHEX a poor indicator of heavy drinking with no correlation found with other measures of alcohol consumption (Nystrom et al 1991). A number of studies have reported comparative performance characteristics for alcohol screening tests which include B-Hex. A New Zealand study of 53 subjects (18 alcoholic drinkers > 60 grams/day, 20 moderate drinkers < 60 grams/day and 15 non-drinkers) compared MCV, LFTs, CDT and serum B-hexosaminidase concluding that B-hex alone performed best as an individual test, and that an either/or combination of GGT and B-hex improved sensitivity to
100% with specificity of 83% (Stowell et al 1997).

This research suggests that B-hexosaminidase appears to be useful as a screening test for heavy or alcoholic drinkers in older age groups but may be less useful in younger persons. UHEX appears to be a better choice given its persisting sensitivity over a longer period of abstinence. As with GGT (but not CDT) other causes of abnormal B-hexosaminidase would need to be excluded.

**Combination screening tests**

The use of combination lab screening has been endorsed as a method to improve the probability of identifying alcohol disorder. The combination of MCV, liver function tests and CDT are most commonly recommended. A study testing 329 males and 136 females in primary care clinics in Finland found at least one marker elevated in 75% of male and 78% of female heavy drinkers. Individual sensitivities were CDT 39%, MCV 28%, AST 12%, ALT 28%, and GGT 33% for men, and CDT 29%, MCV 40%, AST 20%, ALT 29%, and GGT 34% for women. The best triple combination - CDT or MCV or GGT gave a sensitivity of 69% for men and 70% women (Sillanaukee 1998). Similar results were found in the use of a combination of CDT, GGT and MCV in screening for patients drinking > 400 grams alcohol per week. Any two markers gave a sensitivity of 85% and a specificity of 88% with a positive predictive value of 61% for heavy drinking (Aithal et al 1998). Similar performance characteristics were found using a combination of GGT, MCV and blood alcohol in trauma patients (Nilssen et al 1996).

The sensitivity of laboratory screening for alcohol disorder can be improved by 'either/or' combinations which improve the likelihood that alcohol disorder will be identified, and the specificity improved by 'both/and' combinations which is important if confidence in the diagnosis is necessary (Stowell et a. 1997). An alternative form of combination testing is discriminant function screening which combines a number of laboratory and sometimes other measures into a formula which improves predictive value. Using biochemical and
haematological parameters combined with smoking status, weight and systolic blood pressure, this approach improved the likelihood of detecting high alcohol consumption considerably (Vanclay et al 1991). Sensitivity of the discriminant test for high alcohol consumption improved over GGT alone from 51% to 78%, specificity remained equally high at 87%, and the positive predictive value improved from 47% to 57%. Not only did discriminant analysis increase the chance of detection but it also improved the likelihood that those detected were in the high consumption group. The parameters required to use the test as a screen were all readily available by common laboratory testing or clinical assessment, but the values obtained require a calculation indicating a need for laboratory or desk-top programming. Similar findings were reported in another Australian study using a combination of biochemical and haematologic tests analysed from the logistic function using variables selected in stepwise regression (Burke 1992). Using logistic regression analysis of four variables (apo A-1, plasma GGT, plasma uric acid and MCV) the screen had 68% sensitivity and 75% specificity with a predictive value of 70% in discriminating those subjects regularly drinking at least 3 drinks per day. The authors conclude this approach is may be useful in screening populations for ‘at-risk’ drinking, identifying patients with alcohol-related diseases and in monitoring change in alcohol intake.

Summary of laboratory measures

Biochemical screening tests can be useful in detection of alcohol disorders. An ‘either/or’ abnormal MCV or liver function test (GGT, AST, ALT) improves the likelihood of detection. Some improvement in detection would be likely with the ready availability of newer tests including CDT and B-Hex but the additional benefit attributable to these tests is unlikely to surpass the advantage of other screening methods e.g. questionnaires. Confidence in a diagnosis of an alcohol disorder increases with the number of abnormal tests (‘both/and’) and the value of additional tests to those routinely available is evident in the assessment of positive alcohol screening tests as well as likely to be useful for patient feedback and surveillance.
Chapter 9

Literature review: vulnerability to alcohol
Factors which influence vulnerability to alcohol

Although risk of alcohol complications is related to consumption levels, it is evident that some individuals may develop pathology with relatively low intake while others seem to drink heavily without any apparent serious damage. Both environmental and genetic factors affect the likelihood of alcohol disorder and a family history of affected relatives may indicate increased vulnerability from both these aspects. A number of studies support a genetic risk in the development of alcohol disorder (Kendler et al 1972, Cloninger et al 1981, Pickens et al 1991) with research to date indicating a multigenic effect, incomplete penetrance, and the necessity for environmental contribution for expression of the phenotype. The genes presently known to affect alcohol dependence, for example, exert their influence by producing variation in alcohol metabolism but it is likely that other genes which affect personality or susceptibility to intoxication are also significant although so far reproducible evidence is scanty (Whitfield et al 1998, Hill 1995b). One model proposed to explain predisposition to the development of alcoholism (physical dependence) is based on research which has identified altered neuroelectric features in brain responses in abstinent alcoholics and non-alcoholics with a high-risk family history. These blunted neuroelectric responses are associated with reduced central nervous system (CNS) disinhibition and hyperexcitability and are hypothesised to predispose to the development of dependence. Alcohol temporarily normalises CNS hyperexcitability but is required in increasing amounts to maintain this change, leading to tolerance and increased likelihood of withdrawal effects. The blunted neuroelectric brain response has been proposed as a marker (endophenotype) of a genetic basis for alcoholism (genotype), although the genetic loci underpinning the marker has been only partially identified (Begleiter and Porjesz 1999).

There are several existing potential biological markers for susceptibility to alcohol disorder which are associated with variation in alcohol metabolism, particularly the alcohol dehydrogenase (ADH) and aldehyde dehydrogenase (ALDH) enzyme systems. Ingested alcohol is metabolised principally in the liver, where it is oxidised to acetaldehyde by several enzymatic systems, the main one being ADH. Most of the acetaldehyde is further metabolised
to acetate by ALDH. These two enzymes are present in multiple isozymic forms, for example the enzyme ADH is coded for by at least five different gene loci. The frequency of isoenzymes of ADH and ALDH vary across population groups, contributing to differences in alcohol and acetaldehyde degradation via different kinetic properties, hence contributing to variable responses to alcohol and differential vulnerability to alcohol-related harm. It is considered for example that ADH genotypes may explain high rates of alcohol-related disabilities in Native Americans (Wall et al. 1997) and ADH iso-enzymes have been identified as genetic factors predisposing to alcohol-linked pathology in France (Coutelle et al. 1998). An atypical ALDH iso-enzyme, present in a high proportion of Japanese, contributes to alcohol intolerance (e.g. facial flushing) and by its deterrent effect may be protective against the development of alcohol disorder (Murayama et al. 1998). A direct correlation was found in Oriental males born in North America between the genotype which renders the enzyme aldehyde dehydrogenase inactive and reduced alcohol consumption (Tu and Israel 1995). Oriental males with the inactive ALDH2(-) gene drank two-thirds less alcohol, showed one-third the prevalence of binge drinking and were three times more likely to be abstainers than Oriental ALDH2(+) males carrying the gene for the active enzyme. The authors concluded that a single mutation of ALDH2 gene predicts two-thirds of the alcohol consumption and excessive alcohol use by Oriental males born in North America. The exact relationship between genetic intolerance of alcohol and the development of alcohol disorder is somewhat unclear. ADH iso-enzymes associated with alcohol intolerance may reduce the risk of alcohol dependence but in those affected who choose to drink the pathological consequences of altered ADH function may be more marked (Whitfield 1997). A study of 5831 Australian twins which reported moderate heritability of adverse reactions to alcohol found that individuals who experienced adverse reactions after drinking small amounts of alcohol drank less often and slightly less per drinking occasion than those who did not experience adverse reactions. However, those who experienced adverse reactions were more likely to have symptoms of alcoholism and to report a parental history of alcohol problems. The authors concluded that self-reported alcohol-related flushing is not a protective factor for alcoholism in Caucasians and may be a risk factor. (Slutske et al. 1995). Further
research on trait markers may clarify the situation with the possible development of tests that will prove helpful in identifying individuals at increase risk of alcohol-related problems. Currently, these markers are not available but the family history may provide some indication of genetic risk. The lack of consistent terminology describing alcohol problems and the secrecy surrounding alcohol-related pathology in some families may limit the sensitivity of questions seeking family history information. In one study for example, family history diagnosis was validated against direct interview, with the finding that family history diagnosis of alcohol dependence was highly specific (98%), but relatively insensitive (39%) with a positive predictive value of 45% (Rice et al 1995). This suggests that a family history may provide information helpful in assessing individual susceptibility to alcohol disorder, but that this information may not be detected by self-administered questionnaire unless checked by further interview.
Chapter 10

Literature review: effectiveness of treatment
Effectiveness of treatment

Over recent years the emphasis on primary care intervention has shifted from referral of problem or dependent drinkers to early intervention with particular emphasis on brief intervention methods (Heather 1988, Saunders and Foulds, 1992). Research has supported the effectiveness of brief versus extended intervention methods (Edwards et al 1977, Chick et al 1987), and the evidence for the efficacy of intervention has increased (Kristenson et al 1983, Chick 1985, Heather 1987, Antti-Poika 1988, Wallace et al 1988, Scott and Anderson 1990, Anderson and Scott 1992, Babor et al 1994, Richmond et al 1995, Israel et al 1996, WHO 1996, McIntosh et al 1997, Fleming et al 1997). The evidence has undergone several reviews (Anderson 1993, Bien et al 1993, Kahan et al 1995, Wilk et al 1997, Reid et al 1999) and these reviews have themselves been subject to audit via the Cochrane collaborative (Cochrane Library 1997). In general, trials support the use of brief interventions by physicians for patients with heavy or problem drinking. In reviewing the results of intervention trials, the National Health Committee in its New Zealand Guidelines for Recognising, Assessing and Treating Alcohol and Cannabis Abuse in Primary Care calculated that seven heavy drinkers required treatment with a brief intervention before one heavy drinker would reduce alcohol consumption (NHC 1999). The most recent Cochrane review in 1997 states that although further studies are needed to determine the effect of brief interventions by physicians on morbidity and mortality, the public health impact of such interventions is potentially enormous. Further research is needed to determine which patients are best suited for brief interventions. In particular, the utility of brief interventions for women with drinking problems needs to be established. Moreover, the optimal intensity of treatment and the most effective components of brief interventions need to be demonstrated. Other critical assessments of the research have advised the need for caution in interpreting what the evidence means in practice (Heather 1995, Drummond 1997, Edwards 1997), particularly identifying the differences between individual patients, and the difference between research conditions and those in everyday practice. A recent meta-analysis found brief interventions to be effective sometimes
but not always and that the average could not be reliably estimated, advising that the reasons for lack of uniform effectiveness should be explored. This review also highlighted the difference between different types of brief interventions, in particular very brief (5-20 minute interventions) and extended (several visits) brief interventions (Poikolainen 1999). An important issue is the period of time required for follow-up to provide evidence of sustained changes in drinking. The Christchurch psychiatric epidemiology study showed that for people ever meeting the criteria for alcohol disorder the median time from first to last symptom is at least 10 years, with some groups much longer (Wells et al 1989). Interventions in alcohol disorder may require evidence of changes sustained over a more prolonged period of follow-up than that required for risk drinking. For example, the Christchurch survey defined stopping as having no symptom for the last 3 years. Over shorter follow-up periods, other measures of intervention effectiveness might be required such as changes in the 'readiness to change' status (Miller and Rollnick 1991).

It is reasonable to conclude that the weight of evidence shows a benefit of brief methods of intervention current research focusing on best methods for use in general practice (Gomel et al 1994, Lightfoot et al 1998).
Chapter 11

Literature review: screening recommendations
Screening recommendations

Several authorities have reviewed the international evidence for screening and published recommendations. The Canadian Task Force on the Periodic Health Examination has reviewed evidence from 1989-1993 to make recommendations about routine screening and counselling for 'problem drinking' behaviour in Canadian men and women, commenting that the focus was problem drinking or mild to moderate alcohol dependency. They concluded that there was fair evidence to include in the periodic health examination routine detection using standardised questionnaires and/or patient enquiry, and brief counselling for those identified with 'problem drinking'. The use of biomarkers for screening purposes was not recommended (Haggarty 1994). The US Preventive Services Task Force also recommended that screening to detect problem drinking should be included for all adult and adolescent patients, involving a careful history of alcohol use and/or the use of standardised screening questionnaires.

Routine measurement of biochemical markers was not recommended in asymptomatic persons (US Preventive Services Task Force 1996).

The National Health Committee has recently published New Zealand alcohol screening recommendations in Guidelines for Recognising, Assessing and Treating Alcohol and Cannabis Abuse in Primary Care (NHC 1999). This publication encourages primary care screening and brief interventions for hazardous and harmful drinking, with a recommendation to include screening in the context of a general health review.
Chapter 12

Literature review: alcohol and general practice
Issues affecting alcohol in general practice

Much of the change in understanding of alcohol problems and the associated development of screening and intervention methods has been developed within the addictions research framework and has only recently started to filter through into clinical general practice. While the delay in these newer ideas impacting on general practice in part just reflects their origin in another discipline, the nature of general practice requires more than a simple transfer of concepts and models from one discipline to another. General Practice as a discipline within which alcohol problems can be detected and managed differs not only from non-medical disciplines but also in a number of important characteristics from other medical disciplines. A brief discussion about what makes general practice different can clarify the issues affecting detection and management of alcohol problems by general practitioners.

The nature of general practice

As McWhinney (1989) has outlined, a frame of reference appropriate for patients with well-defined or serious diseases in later stages may not be appropriate for general practice. It may not be possible to collect data in a detailed fashion, assess the information and classify into specific disorder because of time constraints, or because the patient may be unwilling to provide information in this way, or because information may be collected in bits over time. General practitioners therefore tend to make an hypothesis about the problem based on available information and test it against what further selective data can be obtained within the limits discussed above. Limited information on a patient's alcohol use may indicate the need for further assessment. It may be possible to arrange for a patient to attend for a detailed assessment but often bits of information must be added over time, supplemented by laboratory data and collateral information from other sources including hospital/emergency reports and other family members. The general practitioner makes the best diagnosis.
possible, modifying the classification over time. It may prove difficult to assign a classification or diagnosis because of incomplete data, or atypical cases, and often a general practitioner may need to go from data to management without diagnosis or classification. Patients may present with complex mixture of physical, psychological and social elements that include alcohol and other problems which will not be adequately classified. Finally, the way in which problems are presented in general practice generally require GPs to focus on problem solving and decision making and the solution to a patient's problems may sometimes have little to do with the fact that a diagnosis has been made.

Models of alcohol use in New Zealand general practice

The variety of models and classifications of alcohol problems is evident in the findings of research into New Zealand general practitioner attitudes to alcohol problems. Two surveys of GP attitudes to drinking problems (Casswell 1984, Wainwright et al 1985) show a generally positive response to the need to enquire about alcohol use and to the value of identifying alcohol problems. Most survey respondents approached the perceived alcoholic patient within a medical model by taking a medical history and tests, advising reduction or cessation of alcohol use and offering referral to a treatment centre. A number of respondents expressed a need to maintain openness to the patient and to involve the patient in the decision making in line with commonly accepted principles of general practice. However, predominant was a generally reported confrontational style with the emphasis on the need for the alcoholic patient to accept there was a problem and to engage in the process of recovery. In spite of a mostly positive approach to intervention of this sort, the expectation of successful treatment was generally negative. The responses of some participants indicates they approached alcohol problems within the framework of the disease of alcoholism model though some modified the confrontational challenge to the patient recognising the particular opportunities inherent in ongoing contact with the patient in the general practice setting. Some individual responses in these surveys indicate awareness that alternative approaches were possible
including presenting information about alcohol use and test results to the patient for non-confrontational discussion and negotiating options of management with the patient. In general the predominant model underpinning the responses in these surveys appears to be the disease model of alcoholism. The concept of alcohol as a risk factor does not seem evident. More recent assessment of doctors’ attitudes to alcohol issues in general practice show some degree of shift in conceptual understanding. A 1995 ALAC-initiated market research assessed doctors’ attitudes to alcohol abuse in a group which included eight general practitioners (CM Research 1995). Their focus on alcohol was described in terms of consequences of drinking including behavioural, physical and social effects. Moderate drinking was perceived as the lack of these consequences and the general belief was that intervention was not possible or that treatment would not succeed until the patient accepted there was a problem and committed to treatment. In this focus group research, the concept of alcohol as a risk was not evident. This contrasts with general practitioner’s reported awareness of alcohol-related risk in pregnancy, with 84% of GPs surveyed reporting they felt sufficiently knowledgeable to inform people of the risks of alcohol consumption in pregnancy, although only 40% actually routinely inquired about alcohol use at the first antenatal contact (Leversha 1995). In their discussion of alcohol use in pregnancy, the authors explicitly state that drinking is a learned behaviour, and an individual woman’s use of alcohol during or just before pregnancy cannot be separated from an understanding of her use of alcohol at other times. It is not clear whether the view of alcohol use as learned behaviour is endorsed by the doctors surveyed, although in the context of pregnancy, alcohol is perceived more in terms of risk to the unborn baby than the consequences or problems for the mother.

An ALAC funded Handbook on Alcohol and Drug Problems (O’Hagan 1993b) has been widely distributed in New Zealand. This book presents a framework for approaching alcohol problems including identifying risk (hazardous use), problems (problem drinking) and dependence. This resource book has been available for general practitioners but the extent of its influence on changing approaches to alcohol problems is unclear.
New Zealand general practitioners' understanding of alcohol problems

There is a paucity of research on what NZ general practitioners actually understand about the nature of alcohol problems. The limited information available suggests the major influence has been the disease model of alcoholism, but there is increasing impact from the learning theory model of problem drinking. There is however no evidence of a consistent primary care model. The more traditional view has been that alcoholism is a disease which can be identified when advanced and which is unlikely to respond to GP-based interventions, resulting in management options being limited to referral to in-patient programmes. This contrasts with a shift away from the disease concept of alcoholism towards the learning theory problem drinking model that is evident in research literature and that has resulted in the development of screening methods to encourage early identification of patients at-risk or with alcohol problems and a growing focus of treatment options for early intervention rather than intensive management of more severe dependence. General practice is in a unique position with regard to patient alcohol use, capable of providing a medical framework for understanding the impact of alcohol on health, and a socio-cultural and environmental framework for understanding how alcohol functions within that person's life. The relationship between different concepts and the ways in which this influences our understanding has been described as a post-modern model and an important part of the experience of general practice (Mathers and Rowland 1997). The recently published NHC Guidelines for Recognising, Assessing and Treating Alcohol and Cannabis Abuse in Primary Care (NHC 1999) encourages primary care screening and brief interventions for hazardous and harmful drinking. While not specifically referring to models of alcohol use, the Guidelines recommend assessment of alcohol use/circumstances, likelihood of drinking problem, and motivation to change which implies a risk assessment and problem drinking model consistent with current research trends and international advice (RCGP 1989, Litt et al 1992, RACGP 1996). Dependence is assessed within this framework with referral to specialist services a consideration. DSM IV criteria are given for formal diagnosis of abuse or dependence.
Alcohol use and the role of General Practitioners

The role of general practitioners in identifying and treating alcohol problems has been endorsed by patients in UK (Wallace and Haines 1984), Australia (Slama et al 1989), and Canada (Skinner et al 1988) though this contrasts with what has been happening in practice. For example, the UK general practice study on lifestyle and health found that only 10% of women and 17% of men who drank excessively recalled having received advice about alcohol consumption from their general practitioner. (Wallace et al 1987). In New Zealand, it appears that the presentation of alcohol problems by patients to their GP is probably uncommon (McAvoy et al 1994). There is however potential for screening to identify unpresented problems in New Zealand general practice as reported in a study involving 15,670 patients registered with 96 Auckland GPs which used the AUDIT questions as a screening instrument (McCormick 1999). In the author's general practice, a screening programme included 85% of men and 78% of women in the age group 30-69 years (McMenamin 1994). The opportunity for contact with drinkers is reflected in high patient attendance rates in New Zealand general practice (Statistics New Zealand 1993) and attendance rates are generally considered to be higher for heavy drinkers (Rush and Brennan 1990). The Christchurch Psychiatric Epidemiology Study identified that 49% of those with alcohol disorder had attended their GP within the last 6 months identifying general practitioners as a potentially suitable group for secondary prevention for alcohol problems. However, the study showed that only 10% of those with an alcohol diagnosis ever told a doctor about their drinking problem. (Wells et al 1991). Although the 1991-2 WaiMedCa study of NZ general practitioner behaviour showed 4.4% of consultations were categorised as psychological, alcohol problems were not specifically identified as reasons for patient encounters with GPs(McAvoy et al 1994). In part the low rate of management of alcohol problems in general practice reflects their under-diagnosis. How the changes in general practice over the last decade have affected the patient presentation patterns or general practice responses regarding alcohol issues is unclear, reflecting the lack of published data since the Waimedca study.
Identified training needs for general practice

An editorial in 1951 (Dent 1951) discussed the finding that only 10% of alcoholics in UK were known by GPs, and the belief that lack of training was significant factor in this situation has been long recognised by those working in the addiction field. (Glatt 1997). The continuing lack of detection of alcohol problems has been identified in a number of studies since (Rydon et al 1992, Gomel et al 1994), including considerable discrepancy between perceived and actual detection success (Reid et al 1986), although this problem is recognised as generalised throughout the medical profession (Hamilton and Menkes 1992, Hamilton et al 1994). Some of the difficulty in detection is uncertainty about the diagnosis of alcohol problems (Brown et al 1987, Coulehan et al 1987), as well as a traditional reluctance to treat alcohol problems (Richards 1988, Skinner and Holt 1983). In spite of the lack of a consistent model, many New Zealand GPs have long identified an active role for themselves in the detection of alcohol problems (Casswell and McPherson 1982). More recently the need for improved resources and training, and a greater role endorsement has been recognised (Adams et al 1997) along with encouragement for New Zealand GPs to develop systematic screening approaches (O'Hagan 1993, McCormick 1997, NHC 1999).

Barriers to detection and management in general practice

Some of the barriers to effective general practice detection and management of alcohol problems have been identified. Possible barriers identified in an Australian working document (NSW Medical Education Project 1990) included lack of knowledge, skills, and attitudes, and role legitimacy. This report comments on the lack of information about general practitioners knowledge of alcohol issues. What research is available indicates that although knowledge
levels appear reasonably good, this is not correlated with frequency of treatment or referral of alcohol patients. (Mowbray and Kessel 1986, Warburg et al 1987). Recent research with New Zealand general practitioners suggests that knowledge is not a key factor in improving intervention in alcohol problems. The responses of a majority of 136 surveyed GPs indicated that knowledge of alcohol problem management was consistent with best practice guidelines. (Adams et al, 1997). The area of skills has long been identified as important in improving the management of alcohol issues in general practice (Rohman et al 1987, Clark 1981). In a 1982 survey in NZ, general practitioners frequently requested training rather than factual knowledge (Caswell and McPherson 1982), and lack of training was identified as one of the main disincentives for alcohol intervention in NZ general practitioners in 1997(Adams et al 1997). A UK review exploring the background to the belief that primary care is suitable as a setting for the health promotional activity needed to reduce the general population's alcohol consumption reported that while research points to GP interventions being effective, more training and support from local services was needed if primary care was to meet its rich potential (Deehan et al 1998), a viewpoint supported by a UK GP survey which showed the largest difference between current and potential involvement in health promotion and lifestyle counselling related to reducing alcohol consumption (McAvoy et al 1999, Kaner et al 1999). Skills training also has a value in improving self-efficacy in the management of alcohol problems (Gottlieb et al1987) where expectation of effectiveness is often low (Thom and Trellez 1986). Attitudes to patients with alcohol problems has been identified as an important issue with professional satisfaction also commonly reported as low in this area (Anderson 1985, Clement 1986). However, the 1997 study of New Zealand general practitioners cited above found a positive viewpoint towards alcohol problems among New Zealand GPs with self-rated negative attitudes scoring the lowest on the list of barriers to intervention (Adams et al 1997). However, a positive attitude towards dealing with alcohol problems does not necessarily indicate a change in general practitioner behaviour (Crawford 1987) and the most important determinants of positive therapeutic attitudes towards patients with drug and alcohol related problems have been identified as direct patient experience and provision of professional support (Clement 1986, Thom and Trellez 1986, Warburg et al1987). The shifting
emphasis in general practice which has allowed the development of health promotion and related activities to become part of routine practice has fostered role legitimacy in the area of lifestyle risk intervention which includes the area of alcohol management. New Zealand general practitioners have been shown to have strong role legitimacy in these areas yet report low actual involvement with alcohol problems. Apart from competency and skills training, role endorsement was identified as a critical factor by NZ GPs, reflecting inadequate time and reimbursement working in a system generally not supportive of preventive activities (Adams et al 1997). It appears that the discrepancy between general practitioners willingness to work in this area of preventive medicine and their low actual involvement reflects a lack of skills training and the lack of system support for preventive activities. Government policy changes and financial incentives have been tagged as necessary to achieve behavioural change towards increased alcohol intervention in New Zealand general practice. The organisation of medical care in general practice has not been researched in New Zealand to determine factors that influence delivery of preventive activities. List size has been shown in UK to affect preventive activities (Fleming et al 1985), this effect in part being related to the length of consultations. Insufficient time to deal with alcohol problems has been suggested as an important barrier to health promotion activities in Australia (NSW Medical Education Project 1990). Lack of time was identified as important in a market research report which assessed GP attitudes towards detection and treatment of alcohol over-use (CM Research 1995). However, many other areas of clinical practice require extended use of time ranging from formal examinations for insurance reports to reviews of chronic disease patients. Although a survey of New Zealand GPs found 60% of doctors agreed that they were just too busy dealing with patient's presenting problems, nevertheless time constraints were not identified as a specific barrier to involvement in this area (Adams et al 1997). It is possible that perceived lack of time is related to a lack of practice organisation. The most effective organisational structures required to provide preventive activities including alcohol services is not known. An important contribution to New Zealand general practice is made by the practice nurse who provides a role which is inadequately researched in relation to the provision of alcohol services. In the WaiMedCa study, the occupational profile of practice nurses showed
they were an accepted and essential part of primary health care in New Zealand, but that their potential is probably underdeveloped (Lightfoot et al 1999). Issues identified for nurses affecting intervention in alcohol abuse include personal attitude barriers, role legitimacy, inadequate undergraduate teaching and inadequate support in the workplace (Lightfoot 1998). Further training in communication skills was identified as an important requirement by practice nurses involved in a pilot study on providing computerised substance use screening for adolescent patients in general practice (McMenamin 2000). These issues are essentially the same as those discussed above as barriers to effective involvement for doctors.

A few reports of successful nurse involvement have been reported, including screening in hospital settings (Graham 1991), nurse-based alcohol counselling in primary care in US (Israel et al 1996), and in Sweden (Tomson et al 1998). In the practice study reviewed in this thesis, the practice nurse was involved in alcohol screening as part of the healthcheck programme (McMenamin 1994, 1997).

**Current research directions**

There is growing expectation that GPs will provide advice on lifestyle issues including alcohol (RCGP 1986, Litt et al 1992, NHC 1999). Considerable research supports the use of screening instruments to help identify alcohol risk and problems including the AUDIT which in New Zealand is being used as part of the ongoing WHO collaborative study (Lightfoot et al 1998). Research into the most effective ways of supporting general practitioners in the task of screening and management of alcohol risk has been recommended (Anderson 1993) and current general practice research in New Zealand focuses on this aspect. The requirement for research findings to reach general practice and be implemented has been recognised in a study looking at marketing screening and early intervention to NZ GPs (McCormick et al 1999) which found that personal marketing will encourage more GPs than will direct mail to receive a new intervention such as screening and brief intervention package for problem use of alcohol and that telemarketing is the most cost-effective marketing strategy.
The implementation of these changes in primary care requires not only an understanding of how GPs can become motivational practitioners (Botelho and Skinner 2000a) but also of the importance of organisational change (Botelho and Skinner 2000b). Current research on motivational and health behaviour change is shifting from the clinical encounter – that is, how practitioners work with individual patients – to an organisational level – that is, how to encourage the appropriate use of managerial and information systems to support the recognition of at-risk patients in healthcare settings (Botelho and Richmond 1996).

Changing approaches to primary care services in New Zealand

General Practice in New Zealand, as in other countries, is in a continually changing discipline, subject to scientific, social and political influences. Although definitions of general practice content may change (RNZCGP 2000), the underlying principles have remained constant for some years. McWhinney (1989) has defined these to include:

Commitment to the person rather than a particular body of knowledge, group of diseases or special technique.

Understanding of the context of illness.

Opportunistic health promotion.

The practice as a population at risk.

Networking of practice with other healthcare and community agencies.

Awareness of local community.

Involvement with patients in different settings.

Recognition of importance of subjective aspects of medicine.

Careful management of resources.

The Royal New Zealand College of General Practitioners has defined the role of a general practitioner as a medical graduate with particular skills to provide primary, community based, comprehensive and continuing patient centred care to individuals, families/whanau and their
community (RNZCGP 2001). This description includes an emphasis on health promotion and prevention or early intervention, and an understanding of the relationship between the disease, the patient's illness experience and the 'self' of the doctor.

There has been a gradual recognition of the importance of health promotion, early intervention and disease prevention over the last few years in New Zealand culminating with recommendations from the National Health Committee (NHC 2000) for the Government to support a broad primary health care approach and the publication of the Primary Health Care Strategy (Ministry of Health 2001). This shift in emphasis on the delivery of 'first-line' services will likely bring changes to general practice. Although there has been an expansion of practice nursing within general practice over the last decade, the emphasis of the primary health care strategy is on the promotion of team approaches which will include other health professionals with the aim of sharing different knowledge and skills for the benefit of individuals and communities (NHC 2000). A number of practitioners including alcohol counsellors, social workers, and mental health specialists who are currently employed largely in community or secondary health care services may contribute to the development of primary care as a result of these changes with consequent effect on general practice as a discipline and on the management of alcohol issues within general practice in particular.
Chapter 13

Literature review: the healthcheck screening model
Some of the identified barriers to detection and management of alcohol problems in general practice can be addressed within the framework of the periodic health check. Although opportunistic screening appears effective for simple items such as blood pressure recording (Chan et al 1988), more complex screening requirements are less likely to be completed during unrelated consultations (Rosser et al 1991). International guidelines have recommended offering preventive services including screening during a periodic health examination (Canadian Task Force 1979, US Task Force 1989, 1996).

The use of health checks have been encouraged over the last decade in the UK by legislative requirements for general practice. The OXCHECK study (1995) was designed to determine the effectiveness of nurse-based health checks concluding that the main effects were to promote dietary change and reduce cholesterol concentrations. There was no evidence that nurse health checks affected excessive alcohol use over a three year period from 1989-90 to 1992-3. Similarly in another UK study, there was no beneficial change in alcohol consumption from attending a health check over a two year follow up (Dowell et al 1996). It is evident from the OXCHECK experience that alcohol screening can be delivered during health checks.

There is also now an accumulation of evidence verifying the benefit of interventions in alcohol use (Chapter 10). The lack of proven benefit from alcohol screening during UK health checks indicates a need for research to focus on how to ensure effective interventions can be applied in general practice. The use of motivational techniques is likely to form the basis of successful interventions, particularly with New Zealand research verifying the effectiveness of this approach in alcohol counseling (Sellman 2001).

A lack of system support has been identified as one of the barriers to effective preventive care in New Zealand general practice. The periodic health check approach bypasses the need to rely on specific outside funding or support for screening by re-organising the delivery of preventive services within the practice using the existing resources of general practitioner and practice nurse and having the service funded directly by patients. The time saved in
reduced opportunistic involvement in preventive care is spent on planned health screening using an organised approach which provides a comprehensive screening package in a cost-effective way. The Royal New Zealand College of General Practitioners has provided some resource support for practices to review current approaches to screening and prevention as part of its Quality Assurance programme (RNZCGP 2001).

One concern about re-organising practice delivery of preventive care in a way that relies of patient funding is that the inverse care law may apply – that those who most need the service may be least able to afford it (Tudor Hart 2000). This concern may not be realised in practice, but if screening by healthcheck can be shown to be an effective means of screening and initiating interventions in New Zealand, alternative funding options may become available as part of the change towards population-based funding (Ministry of Health 2001).

There is some debate about which groups in general practice should be screened. One recommended approach is targeted screening with interventions provided for those most likely to benefit (Lightfoot et al 1998). An aspect of screening emphasised in this NZ feasibility report is the need to keep primary care personnel motivated. The boredom factor inherent in screening programmes which apply routine tests to large numbers of patients with small numbers of positive results is an important consideration (Elwood 1990), and targeted screening tends to ensure a much higher return for the commitment involved. Targeted screening could focus on the highest risk group of younger men for example, or on clinical presentations that might indicate alcohol involvement e.g. trauma. This targeted approach contrasts with the UK recommendations for general practice (RCGP 1989) which encourage assessment of all patients’ alcohol consumption by systematic enquiry on an opportunistic basis or according to the presenting complaint. This recommendation is based in part on the high practice attendance rates in general practice recognising the potential in each consultation for opportunistic health promotion (Stott and Davis 1979). However, as a means of identifying alcohol problems, opportunistic screening is generally considered less satisfactory (McCormick and Adams 1997). Time constraints and the clinical focus of patient-initiated consultations limit the usefulness of an opportunistic approach which may adversely change the structure of the consultation (Mandel et al 1985) when alcohol is not related to the
patient's presenting problems. An alternative to an opportunistic approach is the periodic health check which has been a traditional component of practice in North America (Battista et al 1984). The evidence on which items to include in these checks has been reported in several comprehensive reviews (Canadian Task Force on the Periodic Health Examination 1979, US Preventive Services Task Force 1989, 1996), along with recommendations for clinical practice. Australian general practice guidelines are supportive of recalling patients for approved preventive care at appropriate intervals (RACGP 1996). No formal guidelines for periodic health checks have been developed in New Zealand, though the national cervical cancer screening programme recommends a baseline 3-yearly screening interval which is commonly used as an opportunity to deliver other preventive services. The National Heart Foundation recommends that it is desirable for all adults to know their lipid levels which should be measured as part of an overall cardiovascular disease risk assessment though no screening interval has been advised (NHF 1996). The New Zealand NHC Guidelines recommend alcohol screening questions are included within the context of a general health review to make them more acceptable to patients (NHC 1999), the report commenting that this was the preferred option for the majority of GPs who participated in the evaluation study of the WHO 'Drink-less' brief intervention package (Lightfoot et al 1998). The healthcheck as an opportunity for alcohol screening has several advantages. Patients are attending a check which has a preventive focus and alcohol assessment is acceptable within this context (Wallace and Haines 1984). The screening information can be collected by self-administered questionnaire with planned time available for assessment and if necessary a brief intervention. An invitation for a healthcheck can be offered systematically to all adult patients (McMenamin 1992), linked to existing screening checks (e.g. cervical cancer, ante-natal screening), or to medical checks (e.g. insurance, driving, travel or work medicals), or targeted to particular groups (e.g. young men, ante-natal patients) as time and resources allow. The healthcheck provides an opportunity for an integrated approach resolving the practice organisational factors that have been identified as inhibiting the practice of preventive medicine (Powell et al 1996). Attendance at a healthcheck gives tacit permission to discuss alcohol issues that may be perceived as an intrusion in other contexts.
The combination of alcohol screening questions with other lifestyle questions has been developed over some years (Wilkins 1974). The Health Screening Instrument developed in UK general practice combined quantity/frequency questions with the CAGE questions (Wallace and Haines 1985) and was used in a large survey of 47 UK group general practices identify excessive consumption and concern about alcohol use (Wallace et al 1987). The Health Screening Survey (HSS) was developed in Wisconsin from this instrument with the addition of a previously developed accident scale (Skinner et al 1984). The alcohol subscales in the HSS included CAGE, and questions on alcohol-related consumption, trauma, medical advice, past and present problems. The sensitivity and specificity of the HSS in known alcoholics was 96% and 95%, and in a community primary care sample 78% and 71% (Fleming and Barry 1991).

The alcohol screening questions used in the study reported in this thesis were included in a healthcheck questionnaire (appendix 4) derived from international recommendations (Canadian Task Force 1979, Frame 1986, Couch 1989, US Task Force 1989, 1996) using the format developed from the Health Screening Instrument. Alcohol questions include quantity/frequency/heavy drinking assessment of consumption (Elvy 1984b) and the two questions identified in the research literature as likely to be most sensitive to concern about drinking (Davis et al 1987,1989). Details of the development of the questionnaire are reported in the method section of the practice study report.
Chapter 14

The practice study: screening and clinical detection of alcohol disorder in a general practice

Introduction, methods and demographic data
The practice study: introduction

This section reports on a study of screening and clinical detection of alcohol risk and disorder in the author's general practice. The characteristics of the practice are described, and the constitution of the study group reported. The screening method is described including the development of the alcohol questionnaire and the criteria for a positive screen. The findings of the practice study are reported including information on alcohol use available prior to screening, results of the screening programme and the combined effect of clinical and screening detection on alcohol diagnoses within the study group.

The practice study: method

The study was undertaken in the author's Wanganui general practice over a period of eight years from 1987. Approximately 11,000 patients were registered with the Wicksteed House Medical Centre group of five associate general practitioners, of whom an average of 2500 patients were registered with the author's practice. The Medical Centre draws patients primarily from the 41,000 residents of Wanganui, a provincial New Zealand town, and some from the local non-urban region. Demographic data was drawn from the practice register (medtech 16) and checked against the central register of all Wanganui patients held by the Wanganui Independent Practitioner Association (IPA), Progressive Health Incorporated (PHI).

The sample was derived from the age/sex register of practice patients in two groups. The first group consisted of patients aged 30-69 years during the three year period from July 1987 (figure 1a), the second group aged 18-29 years during the five year period from July 1990 (figure 1b). To be considered registered patients, the patient or family member must have attended within three years and the patient must have remained in the practice for a minimum of one year.

The study group was drawn from this sample but excluded patients in the 30-69 year old
group who had routine health screening elsewhere.

The screening group discussed in this thesis comprised those patients in the study group who were screened for alcohol use over the study period of three years for the 30-69 year old group and five years for the 18-29 year old group.

Recruitment of the 30 – 69 year old group for screening

Patients in the 30-69 year group were recruited for screening by a personal invitation to attend a healthcheck appointment. This invitation was extended by the doctor (the author) during a routine visit. Patients were invited to attend for a healthcheck appointment at a time unrelated to management of the original presenting problems. The doctor was prompted by a computerised reminder which indicated the patient's current screening status. The invitation was timed to allow the healthcheck to coincide with any anticipated checks including cervical smears that were due, or anticipated medicals for insurance, travel or driving.

Recruitment of the 18 – 29 year old group for screening

Initial experience with arranging healthchecks for men in the 18-29 year old group proved less successful and this approach was augmented with opportunistic screening when possible and also by linking healthchecks with routine follow-up appointments. Planned screening was not the same problem for women in this age group because healthchecks were offered to coincide with cervical screening requirements and also with some ante-natal appointments.
**Figure 1a. Study period patients age 30-69 years 1987 - 1990**

- **Registered patients**: 376 men 409 women
  - Excluded from study (see text): 36 men 16 women
  - **Study group**: 345 men 409 women
    - **Screened group**: 294 men 317 women

**Figure 1b. Study period patients age 18-29 years 1990 - 1995**

- **Registered patients**: 192 men 147 women
  - No exclusions
  - **Study group**: 192 men 147 women
    - Not screened: 108 men 29 women
    - **Screened group**: 84 men 118 women
Patient charges

Patients were charged a usual consultation fee for the healthcheck subsidised according to community services card (CSC) status. Where the healthcheck was linked with other reasons for attendance (cervical cancer screening, linked to follow up), no extra charge was made.

The alcohol questionnaire

The alcohol section of the healthcheck questionnaire was developed from screening tests in use prior to 1987 (Screening Workshop 1986). The consumption questions were drawn from the New Zealand developed Canterbury Alcoholism Screening Test (CAST) (Elvy 1984b) and allowed calculation of weekly consumption based on frequency of drinking and quantity by specific beverage use. A question was added to complete the consumption screen enquiring about frequency of heavy drinking as a face valid recognition of this pattern of alcohol use in New Zealand (Wyllie and Casswell 1989, Wyllie et al 1995, Dacey 1997). The style of the healthcheck questionnaire (modelled on the general format of the Health Screening Instrument (Wallace and Haines 1985) and the Health Screening Survey (Skinner et al 1984, Fleming and Barry 1991) allowed space for only two further questions and all existing screening questionnaires in common use e.g. CAGE, MAST, SAAST, CAST (see Chapter 7) were considered too lengthy for inclusion. The most sensitive questions in the available questionnaires enquired about the patient’s concern about alcohol use and the concern of others about the person’s drinking. Two particular questions were chosen from the MAST-derived SAAST as representative of these areas of enquiry as these questions had been shown to be most accurate in distinguishing alcoholic from non-alcoholic drinking (Davis et al 1987, 1989). These questions were Have you ever felt the need to cut down on your drinking? and Do close relatives ever worry or complain about your drinking? The five alcohol items were included in the healthcheck questionnaire to be answered by respondents who replied yes to the lead-in question Do you sometime drink alcohol?
Patients attending a healthcheck appointment completed the self-administered questionnaire which included these screening questions for alcohol use (appendix 4). Alcohol consumption was estimated from quantity/frequency information, and concern about alcohol use from the other questions. Liver function tests were arranged selectively, sometimes at the healthcheck in response to the information obtained and sometimes prior to the check as part of other screening tests.

Patients screened positive if they met any of these criteria:

1) weekly consumption in standard drinks (10G alcohol) of M > 20 and F > 15 or episodic heavy drinking calculated from the quantity/frequency questions.
2) concern about drinking indicated by any positive response to the concern questions
3) abnormal liver function tests (GGT>50u/L, AST>40u/L, ALT>40u/L) with no alternative explanation.

The questionnaire choices were evaluated by the nurse, to verify the information recorded and to exclude inappropriate responses. Alcohol screening information was assessed within the context of the healthcheck screen. Positive responses were assessed during the check where this was appropriate for the patient. At other times the assessment was arranged for a review appointment, often with laboratory screening in the interim. If appropriate for the patient, a detailed alcohol interview was arranged to assess alcohol use and provide the basis for diagnosis. Where it was not appropriate to arrange a specific interview, information on alcohol use was collected on an opportunistic basis over time. Patients with problems relating to alcohol use were classified using DSM111R criteria into alcohol abuse or dependence categories (appendices1 and 2). Patients screening positive but not meeting criteria for alcohol use disorder were classified at-risk.
The clinical records of study participants were reviewed at the end of each study period (after 3 years for patients age 30-69 years and after 5 years for patients age 18-29 years) including the healthcheck screening questionnaires and the computerised patient records. Information was available on the computer record in the problem list, laboratory file and by scrolling through the computerised records reviewing each entry.

The following information was obtained:

(1) Information on alcohol use prior to the study, the prevalence of alcohol risk and disorder detected clinically, and the factors associated with the clinical detection of alcohol disorder.

(2) Information collected through the screening programme, including recruitment for screening, the classification of screened patients, the effect of screening on the detection of alcohol risk and disorder, risk assessment in screened patients, the relationship between risk assessment and diagnosis of alcohol disorder, and the performance of the screening tests.

(3) A summary of screening and clinical information available at completion of the study, including the prevalence of alcohol risk and disorder for the study group, the classification of patients in the study group including the number of patients meeting DSM111R criteria for alcohol dependence/abuse and ICD10 alcohol dependence/harmful use, and collateral support for alcohol diagnoses.
The practice study: demographic data

Figures 2a and 2b show socio-economic data for the study practice and for Wanganui City general practices by age group and Community Services Card (CSC) status.

**Figure 2a. Practice register by age group and CSC status**

![Bar chart showing practice register by age group and CSC status](image)

**Figure 2b. Registered patients for all Wanganui general practices by age/CSC status**

![Bar chart showing registered patients by age/CSC status](image)

(*Source: PHI patient registration data Wanganui*)
The study group was drawn from the sample of registered patients but excluded patients in the 30-69 year old group who had routine health screening elsewhere e.g. annual employment medicals, pilot medicals (3 men and 1 woman), patients in whom screening was considered inappropriate because of other serious health problems (21 men, 9 women), and patients who could not participate in the screening programme because of severe psychiatric or intellectual disabilities (7 men, 6 women). All registered patients age 18-29 years were included in the study group. The study group comprised 1093 patients (537 men and 556 women), of whom 813 patients (378 men and 435 women) were recruited for healthchecks.

Table 1 provides details of the study group as a percentage of registered patients.

**Table 1. Study group by age/sex as percentage of registered patients**

<table>
<thead>
<tr>
<th>Patient age group</th>
<th>30 - 69 years</th>
<th>18 - 29 years</th>
<th>Total</th>
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<tbody>
<tr>
<td></td>
<td>males</td>
<td>females</td>
<td>males</td>
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<tr>
<td>Register</td>
<td>376</td>
<td>425</td>
<td>192</td>
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<tr>
<td>Excluded</td>
<td>31 (8%)</td>
<td>16 (4%)</td>
<td>0</td>
</tr>
<tr>
<td>Study group</td>
<td>345 (92%)</td>
<td>409 (96%)</td>
<td>192</td>
</tr>
</tbody>
</table>

(100%) (100%) (96%)
Table 2 reports the number of Maori patients in the study. Apart from a very small number of Polynesian and Chinese patients, the remaining patients were of European ethnicity. Maori patients comprise 13% of the practice register of patients age 18 - 69 years, which is consistent with local demographic data. Maori comprise 20% of the younger 18 - 29 year old group and 10% of the 30 - 69 year old group.

**Table 2: Maori patients in study** (with per cent of total patients in each group)

<table>
<thead>
<tr>
<th>Patient age group</th>
<th>30 - 69 years</th>
<th>18 - 29 years</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>males</td>
<td>females</td>
<td>males</td>
</tr>
<tr>
<td>Register</td>
<td>41 (11%)</td>
<td>39 (9%)</td>
<td>37 (19%)</td>
</tr>
<tr>
<td>Study group</td>
<td>36 (10%)</td>
<td>37 (9%)</td>
<td>37 (19%)</td>
</tr>
</tbody>
</table>
Chapter 15

Practice study: results of screening and clinical detection of alcohol risk and disorder in a general practice
Practice study: results of screening and clinical detection

Throughout the study period, information on alcohol use was obtained both by screening and in a clinical context. Screening refers to the collection of alcohol information during a health check. Screened patients had no known symptoms or problems relating to alcohol use at the time of screening. Clinical collection of alcohol information indicates that this information was obtained as part of an assessment of symptoms or health problems presented by the patient.

The results of this section of the study are presented in 3 parts.

Part 1 reports the information known prior to screening. This includes the prevalence of alcohol risk and disorder detected clinically, and the factors associated with the clinical detection of alcohol disorder.

Part 2 reports the information collected through the health check screening programme. This includes the recruitment rates for screening, the classification of screened patients, the effect of screening on the detection of alcohol risk and disorder, risk assessment in screened patients, the relationship between risk assessment and diagnosis of alcohol disorder, and the performance of the screening tests.

Part 3 summarises the screening and clinical information available at completion of the study. This part of the report includes the prevalence of alcohol risk and disorder for the study group, the classification of patients in the study group including the number of patients meeting DSM111R criteria for alcohol dependence/abuse and ICD10 alcohol dependence/harmful use, and collateral support for alcohol diagnoses.
Part 1: Information on alcohol use available prior to screening

1. Collection of information

The study group comprised 1093 patients (537 men, 556 women), of whom 851 (78%) had alcohol information obtained. An alcohol disorder had been diagnosed prior to the study period in 25 patients and was recorded in their clinical problem list. Any other alcohol information obtained for the study group prior to screening was recorded in the clinical progress record and was not retrievable for the purposes of the study. A further 826 patients had alcohol information collected over the study period (40 during assessment of clinical problems and 786 by screening), and the remaining 242 were neither screened nor had alcohol use assessed in a clinical context.

Figure 1a: Information collection for 1093 patients in study group
2. Clinical detection of alcohol risk or disorder

The study group prevalence of current alcohol disorder detected clinically was 4% (44 patients), the known prevalence of lifetime alcohol use disorder 5% (57 patients), and of any alcohol diagnosis (risk or disorder) 6% (66 patients).

Figure 1b. Prevalence of alcohol diagnoses detected clinically in study group (1093 patients)

3. Factors associated with clinical detection of alcohol disorder

The factors associated with the detection of alcohol disorder in the 44 patients identified clinically were reviewed (Table 1a). The most frequent markers of alcohol disorder were laboratory tests (abnormal liver function tests) with the most common presenting problems
gastro-intestinal symptoms, including nausea and vomiting, haematemesis, abdominal pain, pancreatitis, fatty liver and cirrhosis. Other clinically important factors included association with hypertension, gout and obesity, as well as accidents and injuries, sexual problems, one patient with rosacea related to alcohol intake and one patient with alcoholic cardiomyopathy. Two patients died over the study period of an alcohol-related cause, one woman with cardiomyopathy and one man with malnutrition/self-neglect. Non-physical factors were strongly represented as indicators of alcohol disorder including depression and other mental health symptoms, relationship and family problems and personal problems of anger/violence and poor self-care.

Table 1a: Factors associated with clinical detection of 44 patients with alcohol disorder

<table>
<thead>
<tr>
<th>Factor</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal LFTs</td>
<td>17</td>
</tr>
<tr>
<td>Relationship problems</td>
<td>13</td>
</tr>
<tr>
<td>Mental health symptoms</td>
<td>12</td>
</tr>
<tr>
<td>Gastro-intestinal symptoms</td>
<td>11</td>
</tr>
<tr>
<td>Hypertension</td>
<td>10</td>
</tr>
<tr>
<td>Gout</td>
<td>8</td>
</tr>
<tr>
<td>Self-neglect</td>
<td>8</td>
</tr>
<tr>
<td>Injury</td>
<td>6</td>
</tr>
<tr>
<td>Obesity</td>
<td>5</td>
</tr>
<tr>
<td>Anger/violence</td>
<td>3</td>
</tr>
<tr>
<td>Sexual problems</td>
<td>3</td>
</tr>
<tr>
<td>Intoxicated at surgery</td>
<td>2</td>
</tr>
<tr>
<td>Family stresses</td>
<td>2</td>
</tr>
<tr>
<td>Cardiomyopathy</td>
<td>1</td>
</tr>
<tr>
<td>Rosacea</td>
<td>1</td>
</tr>
</tbody>
</table>
Part 2: Results of the screening programme

1. Recruitment for screening

Recruitment for healthchecks was highest among women with 435 screened (78% of 556 women in the study group). The women's healthcheck rate was similar for the 30-69 year old group (76%) and the 18-29 year old group (80%). For men, the recruitment rate in the 30-69 year old group was markedly higher (85%) than in the 18-29 year old group (44%) with 378 men recruited for healthchecks in total (70% of 537 men in the study group).

Recruitment of Maori patients for healthchecks

As shown in Table 2b1, 66% of Maori patients were screened compared with 74% of the total group. The proportion of female Maori patients screened (76%) was similar to the total female screening rate (78%) but the screening rate for Maori men was only 58% compared with the total screening rate for men of 70%.

Recruitment for each age/sex group

As shown in Table 2c, all 30-69 year old patients attended a planned healthcheck, as did most of the women in the 18-29 year old group. Only 11 of the 84 healthchecks (13%) in men age 18-29 years were completed at a separate health screening appointment, the others (46) being completed as an opportunistic check (55%) or being screened (27) at a follow up from a clinical consultation (32%). Table 2d shows this group in more detail. Information was available for 16% of this group from clinical presentations. Of the remaining 162 patients in this group, 84 (52%) completed healthchecks as a result of the different screening strategies, but 64 (40%) were not offered the opportunity to complete a healthcheck. The remaining 14 men (8%) declined the invitation for a healthcheck.
Figure 2a: Number of study group patients recruited for healthchecks by age group/sex

Table 2c: All patients recruited for healthchecks by age/sex

<table>
<thead>
<tr>
<th>Patient age group</th>
<th>Study group</th>
<th>Recruited for healthchecks</th>
<th>Per cent screened</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 - 69 years</td>
<td>18 - 29 years</td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>females</td>
<td>males</td>
<td>females</td>
</tr>
<tr>
<td>Study group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>345</td>
<td>409</td>
<td>192</td>
<td>147</td>
</tr>
<tr>
<td>Recruited for</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>healthchecks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>294</td>
<td>317</td>
<td>84</td>
<td>118</td>
</tr>
<tr>
<td>Per cent screened</td>
<td>(85%)</td>
<td>(76%)</td>
<td>(44%)</td>
</tr>
</tbody>
</table>

Table 2d: Maori patients recruited for healthchecks by age/sex

<table>
<thead>
<tr>
<th>Patient age group</th>
<th>Study group</th>
<th>Recruited for healthchecks</th>
<th>Percent screened</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30 - 69 years</td>
<td>18 - 29 years</td>
<td></td>
</tr>
<tr>
<td>males</td>
<td>females</td>
<td>males</td>
<td>females</td>
</tr>
<tr>
<td>Study group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>37</td>
<td>37</td>
<td>30</td>
</tr>
<tr>
<td>Recruited for</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>healthchecks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>14</td>
<td>24</td>
</tr>
<tr>
<td>Percent screened</td>
<td>(78%)</td>
<td>(73%)</td>
<td>(38%)</td>
</tr>
</tbody>
</table>
Table 2c: Recruitment method for healthchecks by age group/sex

<table>
<thead>
<tr>
<th></th>
<th>18-29 years</th>
<th></th>
<th>30-69 years</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>males</td>
<td>females</td>
<td>males</td>
<td>females</td>
</tr>
<tr>
<td>Planned healthcheck</td>
<td>11</td>
<td>108</td>
<td>294</td>
<td>317</td>
</tr>
<tr>
<td>opportunistic healthcheck</td>
<td>46</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>linked to follow-up</td>
<td>27</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2d: More detailed analysis of recruitment of men age 18-29 years

<table>
<thead>
<tr>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group men age 18-29 years</td>
</tr>
<tr>
<td>Alcohol information obtained clinically</td>
</tr>
<tr>
<td>Invited for healthcheck</td>
</tr>
<tr>
<td>Attended healthcheck</td>
</tr>
<tr>
<td>Declined healthcheck</td>
</tr>
<tr>
<td>Not invited to healthcheck</td>
</tr>
</tbody>
</table>

Analysis of inappropriate responses to healthcheck alcohol questions

An analysis of inappropriate responses for the 611 patients screened age 30-69 years showed 11 patients initially screening positive required exclusion. Three respondents had misunderstood the questions, 7 patients had concerns about alcohol use unrelated to their personal situation, and one abnormal GGT proved related to anti-convulsant therapy. There were no positive screened patients in the 18-29 year old group who required exclusion.
2. Classification of screened patients

The screened group: 786 patients

Healthchecks were completed in 813 of the 1093 study group patients (74%). Of these 813 patients, 27 already had an alcohol diagnosis made clinically. In these patients, the healthcheck screening was not necessary to diagnose alcohol status. The remaining group of 786 patients recruited for healthchecks were of unknown alcohol status at the time of screening (Table 2e). Data relating to this screened group of 786 patients is analysed in Figure 2b.

Table 2e: The screened group

<table>
<thead>
<tr>
<th>Study group</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>1093</td>
</tr>
<tr>
<td>Recruited for healthchecks</td>
<td>813</td>
</tr>
<tr>
<td>Alcohol status already known</td>
<td>27</td>
</tr>
<tr>
<td>Screened group</td>
<td>786</td>
</tr>
</tbody>
</table>

Diagnoses in the screened group of 786 patients

A positive screen was found in 165 patients (21%). Current alcohol disorder was identified in 40 patients. Alcohol disorder in remission was identified in 7 patients and the remaining 118 positive screens did not meet criteria for disorder and were classified at-risk.
3. The effect of screening on detection of alcohol diagnoses

An alcohol diagnosis was made as a result of screening for 165 patients. Current disorder was detected by screening for 40 patients, alcohol disorder in remission for 7 patients, and a further 118 patients were classified at-risk. Figure 2c shows the addition of patients detected by screening to those detected clinically for each classification group. Figure 2d reports this information for men and women with current risk or disorder.
Figure 2c: Effect of screening on detection of alcohol problems

- 126 patients
- 84 patients (current disorder)
- 20 patients (alcohol disorder in remission)
- 44 detected clinically
- 40 detected by screening
- 7 detected clinically
- 13 detected by screening

Figure 2d: Number of men and women with current risk or disorder

- 537 study group
  - 556 study group
  - 18 current disorder
  - 23 at-risk
  - 103 current disorder
  - 66 at-risk

- Men
  - 200
  - 100
  - 0
- Women
  - 100
  - 50
  - 0
4. Risk assessment in 813 patients completing healthchecks

All patients completing healthchecks had alcohol information available in a standardised format. These 813 patients were graded into high, intermediate and low risk on the basis of consumption (refer table 2f). The high risk group comprised 42 patients (5%), the intermediate risk group 95 patients (12%), and the low risk group 676 patients (83%).

Table 2f: Risk status by consumption (standard drinks/week)

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>&lt; 21</td>
<td>&lt; 16</td>
</tr>
<tr>
<td>Intermediate risk</td>
<td>21 – 50</td>
<td>16 – 35</td>
</tr>
<tr>
<td>High risk</td>
<td>&gt; 50</td>
<td>&gt; 35</td>
</tr>
</tbody>
</table>

Figure 2e: Risk assessment by consumption of 813 patients recruited for healthchecks
5. Relationship between risk group and alcohol disorder

Of the 84 patients with alcohol disorder identified throughout the study, a sub-group of 50 had completed a healthcheck. The data recorded at the healthcheck was reviewed to determine the number of patients in this subgroup at each risk level, identifying 26 (52%) drinking at high risk levels, 17 (34%) and intermediate risk, and 7 (14%) at low risk levels (Table 2g).

Table 2g: Risk category for the subgroup of 50 patients with alcohol disorder who completed healthchecks

<table>
<thead>
<tr>
<th>Risk group</th>
<th>Number with alcohol disorder</th>
<th>Percent of subgroup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>Intermediate</td>
<td>17</td>
<td>34%</td>
</tr>
<tr>
<td>High</td>
<td>26</td>
<td>52%</td>
</tr>
</tbody>
</table>

Of the 813 completed healthchecks:

The 676 low risk drinkers included 14% of those diagnosed with alcohol disorder.
The 95 intermediate risk drinkers included 34% of those diagnosed with alcohol disorder.
The 42 high risk drinkers included 52% of those diagnosed with alcohol disorder.

The probability of alcohol disorder was calculated for each risk level as shown in Table 2h. Those drinking at low risk levels has a very low probability of alcohol disorder (0.01), those drinking at intermediate risk levels had a moderate probability (0.18), and those drinking at high risk levels had a high probability of alcohol disorder (0.62).
Table 2h: Probability of alcohol disorder for each risk level

<table>
<thead>
<tr>
<th>Risk group</th>
<th>Number in group</th>
<th>Number/percent with alcohol disorder</th>
<th>Probability of alcohol disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>676</td>
<td>7 (1%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Intermediate</td>
<td>95</td>
<td>17 (18%)</td>
<td>0.18</td>
</tr>
<tr>
<td>High</td>
<td>42</td>
<td>26 (62%)</td>
<td>0.62</td>
</tr>
</tbody>
</table>

6. Screening test performance

A review of those diagnosed clinically over the study period identified two men and one woman meeting criteria for alcohol disorder who were missed by screening. Alcohol use disorder was therefore correctly diagnosed in 40 patients and incorrectly excluded in 3 patients. A further 118 patients screened positive (classified at-risk) but did not meet criteria for disorder, and 652 patients were correctly screened negative. Table 2i shows this information in standard 2x2 format. As a test for DSM111R alcohol use disorder, the screen has a sensitivity of 0.93, a specificity of 0.85, a positive predictive value of 0.25, and a negative predictive value of 0.99.

The pre-and post-test probability of disorder in a patient in the study group can be calculated from the above data. In the study group of 1093 patients, the detection of 84 patients with disorder gives a pre-test probability of disorder 0.08 (0.12 for men and 0.03 for women). Alcohol disorder could be expected before testing in 1 in 12 patients (1 in 8 men and 1 in 30 women). Of the 158 patients screened positive, 40 were diagnosed with alcohol disorder, giving a post-test probability of 0.25. A patient screening positive had a 1 in 4 chance of meeting criteria for alcohol disorder. To identify each man with alcohol disorder, it would be necessary to screen 8 men, and to identify each woman with alcohol disorder it would be necessary to screen 30 women.
Table 2

<table>
<thead>
<tr>
<th></th>
<th>With disorder</th>
<th>Without disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>screened positive</td>
<td>40</td>
<td>118</td>
</tr>
<tr>
<td>screened negative</td>
<td>3</td>
<td>652</td>
</tr>
</tbody>
</table>

7. Screening criteria identifying risk or disorder

Of the 158 patients with current risk or disorder detected by screening, 133 (84%) were identified by consumption information, 49 (31%) by concern responses, and 56 (35%) by abnormal LFTs (Table 2). Alcohol disorder was classified in 37 of the 133 screens positive for consumption, 26 of the 49 screens positive for concern, and 30 of the 56 screens with abnormal LFTs. Of the 37 patients with alcohol disorder identified by the consumption questions, 35 had weekly consumption above the screening cut-off (men > 20, women > 15 standard drinks/week). Two men (both in the 30-69 year old group) reported weekly consumption less than 20 standard drinks/week but were identified by positive responses to the heavy drinking question. The heavy drinking question was also positive in another 17 patients not screening above the cut-off level, but these patients did not meet the criteria for alcohol disorder.

Of the 26 patients with alcohol disorder identified by a screen positive for concern, 23 patients indicated concern by reporting a positive response to the question about cutting down on alcohol use, and 8 patients reported the concern of others about their drinking. Both
questions were positive for 5 patients, 18 reporting only cutting down and 3 reporting only others concern.

Table 2k summarises the probability of current disorder given a positive screening result. Consumption information identified 37 of the 40 patients with alcohol disorder detected by screening, not detecting the other 3 patients who were identified by abnormal LFTs, and not detecting the 3 patients who were incorrectly screened negative and later identified clinically with alcohol abuse.

Table 2k: Screening criteria identifying 158 patients with current risk or disorder

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Number (%) identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption information</td>
<td>133  84%</td>
</tr>
<tr>
<td>Concern responses</td>
<td>49   31%</td>
</tr>
<tr>
<td>Abnormal LFTs</td>
<td>56   35%</td>
</tr>
</tbody>
</table>

Table 2k: Probability of disorder for positive criteria

<table>
<thead>
<tr>
<th>Positive criteria</th>
<th>Probability of current disorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption</td>
<td>0.27  1 in 4</td>
</tr>
<tr>
<td>Concern</td>
<td>0.53  1 in 2</td>
</tr>
<tr>
<td>LFTs</td>
<td>0.54  1 in 2</td>
</tr>
</tbody>
</table>
Part 3: Study group information

1. Alcohol diagnoses in the study group

No alcohol problem was identified in 863 of the 1093 patients in the study group (79%). An alcohol diagnosis was made clinically for 65 patients and by screening for a further 165 patients. The diagnoses and method of detection are summarised in Table and Figure 3a.

Table 3a: Alcohol diagnoses in study group of 1093 patients

<table>
<thead>
<tr>
<th>Detection method</th>
<th>At risk</th>
<th>Current alcohol disorder</th>
<th>In remission</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical</td>
<td>8</td>
<td>44</td>
<td>13</td>
<td>65</td>
</tr>
<tr>
<td>Screening</td>
<td>118</td>
<td>40</td>
<td>7</td>
<td>165</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>84</td>
<td>20</td>
<td>230</td>
</tr>
</tbody>
</table>
In the study group of 1093 patients, the criteria for current alcohol disorder were met by 84 patients (66 men, 18 women), with a further 20 patients (18 men and 2 women) meeting criteria for alcohol disorder in remission. The study group prevalence of current alcohol disorder was 8% and the lifetime prevalence 10%. For men the prevalence of current alcohol use disorder was 12%, with a lifetime prevalence of 16%. For women the current prevalence was 3% (3.2%), the lifetime prevalence 4% (3.6%). A further 126 patients (12%) were classified at-risk, 103 men (19%) and 23 women (4%). The criteria for current risk or disorder were met by 169 men (31%) and 41 women (7%). Figure 3b shows the prevalence information before and after screening. Figure 3c shows the information for men and women.
Figure 3b: Prevalence of alcohol diagnoses before and after screening

Figure 3c: Classification of 169 men and 41 women meeting criteria for current alcohol risk or disorder
3. DSM111R alcohol dependence and abuse

The DSM111R criteria for current alcohol dependence were met by 32 patients (24 men and 8 women). This group comprised 3% of the study group, 19% of those with any alcohol diagnosis, and 38% of those with alcohol use disorder. The criteria for current alcohol abuse was met by 52 patients (42 men and 10 women). This group comprised 5% of the study group, 23% of those with any alcohol diagnosis, and 62% of those with an alcohol use disorder. The other 126 patients with a current alcohol diagnosis were classified at-risk. This group comprised 12% of the study group, and 55% of those with any alcohol diagnosis.

Figure 3d: Classification of 210 patients with current alcohol diagnosis

As shown in figures 3c and 3d, men were consistently more represented in all categories of alcohol diagnosis.
4. Criteria for alcohol dependence

The dependence criteria (DSM111R) were met by 32 of the 84 patients in the study group diagnosed with a current alcohol disorder. Four criteria identified the majority of these patients: criterion 1 was met by 30, criterion 6 by 27, and criteria 2 and 5 each by 22 of these patients (Figure 3e). Classification of these 32 patients using ICD10 criteria identified only 16 as alcohol dependent. The other 16 patients meeting DSM111R but not ICD10 criteria for dependence did meet criteria for harmful use (Table 3b).

Figure 3e: Number of patients with alcohol dependence for each DSM 111R criteria
5. Criteria for alcohol abuse

Table 3c reports criteria which identified the patients meeting DSM111R criteria for alcohol abuse. Patients with physical or psychological criteria also met the ICD10 harmful use criteria. However, among the 30 patients with social criteria for alcohol abuse, 14 met no other criteria for alcohol abuse, and would not be able to be classified under ICD 10 in the harmful use category. Criteria for DSM111R alcohol abuse was therefore met by 52 patients, but ICD10 criteria for harmful use was met by only 38 of these patients. A total of 54 patients met ICD 10 criteria for harmful use which includes the 16 patients not meeting ICD 10 criteria for dependence.

Table 3c  
Criterion identifying DSM111R alcohol abuse/ICD10 harmful use

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DSM111R</th>
<th>ICD10</th>
</tr>
</thead>
<tbody>
<tr>
<td>physical</td>
<td>34</td>
<td>49</td>
</tr>
<tr>
<td>social</td>
<td>30</td>
<td>N/A</td>
</tr>
<tr>
<td>psychological</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>occupational</td>
<td>0</td>
<td>N/A</td>
</tr>
<tr>
<td>No. of patients identified</td>
<td>52</td>
<td>54</td>
</tr>
</tbody>
</table>

(For a detailed description of DSM111R alcohol abuse and ICD 10 harmful use criteria see appendix 2)
6. Collateral support for alcohol diagnoses

Collateral information on alcohol use was available for 46 of the 84 patients (55%) with alcohol disorder. Family members were the most common source of additional information, and provided collateral information for 28 of the 50 patients with alcohol disorder who had other family members registered with the practice. Other sources (hospital reports, court news, other health professionals) provided additional information for 22 patients.
Summary of practice study results

Alcohol information was obtained on 851 of 1093 study patients (78%). Current alcohol disorder was diagnosed in a clinical context for 4% of the study group. Clinical factors most commonly associated with alcohol disorder were abnormal liver function tests, gastrointestinal symptoms, hypertension, gout, and mental health symptoms. Personal and relationship problems were also linked to detection in a clinical context. Screening increased the detection of current alcohol disorder from 4% (44 patients) to 8% (84 patients).

Recruitment for screening was highest among women (78%), with a high level of screening in both 18-29 year old and 30-69 year old groups. Recruitment of men (70%) was notably more successful in the 30-69 year old group (85%) than in the 18-29 year old group (44%). Alcohol consumption indicating increased risk (intermediate or high risk consumption) identified 86% of patients with alcohol disorder. The remaining 14% of patients with alcohol disorder were drinking in the low risk category. It was necessary to screen 8 men or 30 women to identify each diagnosis of alcohol disorder. Alcohol consumption indicating increased risk (men > 20 women > 15 standard drinks/week) indicated a 1 in 4 likelihood of alcohol disorder. A positive response to a concern question increased the likelihood of alcohol disorder to 1 in 2.

DSM111R criteria identified 32 patients with alcohol dependence and 52 patients in the alcohol abuse category. ICD10 criteria identified only 16 patients with alcohol dependence and 54 in the harmful use category. Collateral information provided an additional contribution to the diagnosis of alcohol disorder in 46 patients (56% of those with alcohol disorder).

As well as detecting the patients with alcohol disorder who would otherwise have been missed, the healthcheck programme provided the opportunity to assess alcohol risk on all patients screened.
Chapter 16

The practice study: case examples
Case examples: introduction

This section is intended to raise some points for discussion by reporting cases identified during the study that exemplified issues of specific reference to general practice, particularly the collection and classification of alcohol information and issues arising from the principle of patient-centred management.

Brief case summaries are presented and the issues raised discussed in more detail in the discussion section.

Case examples: method

The clinical records of all study participants were reviewed at completion of the study period. All patients meeting criteria for risk or disorder had their case characteristics summarised. From this list, exemplary cases were identified and details reported below.

Case examples: results

1. Collection of alcohol information:

1.1 Availability of information from multiple sources

The classification of patients depended on information available in the clinical records. For some patients, this information was readily available from Emergency department reports or other evidence.

Case example 1.1

KG, a man in his thirties had frequent Emergency Department reports of alcohol-related injury attendances and had presented for a consultation intoxicated on one occasion. He had attended a specialist outpatient alcohol clinic and his alcohol abuse was reported by a
1.2 Availability of information from formal assessment

Although previously undiagnosed, screening identified some patients who subsequently attended for formal assessment providing detailed information.

Case example 1.2

ET, a women in her forties screened positive by consumption (80 + standard drinks/week) and concern questions (had tried to cut down), and had attended for an alcohol assessment which identified increasing alcohol use with frequent intoxication, blackouts, morning sickness and work impairment, development of tolerance and impaired control, and elevated blood pressure. The classification of alcohol dependence was confirmed meeting criteria 1,2,5,6,7 DSM 111R.

1.3 Gradual collection of information

However, for other patients, information was more difficult to obtain and was accumulated on an opportunistic basis over a period of time. Any opportunity at which more detailed assessment could reasonably be performed proved valuable in providing a better picture of the patient's drinking and options for intervention.

Case example 1.3

EF, a man in his 40s, was screened at risk with weekly consumption over 45 standard drinks and concern expressed regarding his drinking. He was reluctant to explore alcohol use in more detail and seen intermittently over subsequent years without further information, though collateral information from his separated wife suggested he had more problems than identified. A clinical presentation after some years provided an opportunity to review his alcohol and other drug use in more detail, supporting the diagnosis of drug and alcohol dependence, and providing an opportunity for review.

1.4 Collateral information

Information from the patient was often supplemented from collateral sources. At times it was
appropriate to involve the patient's partner or other significant person as part of an
assessment although this information was often provided independently.

Case example 1.4

JS, a man in his late 30s was admitted to hospital with chest pains, diagnosed as stress-
related. Evaluation with his wife subsequently revealed stress and violence issues related to
relationship problems compounded by moderately heavy alcohol use over 30 drinks per
week. His wife's involvement not only provided an entry point for assessment but also for
supportive intervention.

1.5 Inadequate information

For some patients it was not possible to collect sufficient information to verify a probable
diagnosis.

Case example 1.5:

NH was an infrequent attender at the surgery, a man in his 60s, whose heavy drinking was
detected during a health check, but who declined follow-up attendance for this issue. His poor
self care was evident and his daughter, also a patient, reported her concern about his
housing problems and family stresses due to his alcohol use. Classification difficulties were
largely due to inadequate opportunities to assess his drinking, but on the information
available from the health check and his daughter, he met the criteria for alcohol abuse. There
were features suggesting he was alcohol dependent but could not be assigned to this
category without further information. After several unrelated consultations he transferred out
of the practice though his daughter continued to report her ongoing concern.

2. Classification of alcohol information: difficulties

2.1 Transient problems

Some patients were identified with either transient or intermittent alcohol disorder, affecting
the person in a substantial way but only for a relatively short duration (over some months) or
during periods of increased stress. At other times alcohol was of only minimal importance for that person.

**Case example 2.1**

LP, a woman in her late 40s, presented distressed during a time of relationship separation. Previous light alcohol use had quickly escalated to increasingly heavy use (80 drinks/week) over several months. She described her father and her husband as alcoholic and had tried to cut back on drinking herself with development of withdrawal symptoms. Strongly motivated because of her family experience to stop drinking, she did so with support and subsequently attended Alanon which she felt was more suited to her needs than AA. She has remained a light drinker over the subsequent years. LP met DSM criteria 1, 5, 8 for alcohol dependence for a period of several months only without evidence of any recurrence since that time.

**2.2 Effect of early intervention**

Early intervention may have modified progression to full alcohol use disorder making it difficult to formally classify a patient.

**Case example 2.2**

DB, a man in his 30s, reported weekly use of 35+ drinks/week in his health check questionnaire with concern about his current use. Exploration of his concerns revealed his dissatisfaction with loss of employment related to a shoulder injury and the impact of financial and personal stresses on his relationship with his wife. He had increasingly been using alcohol in this context without evidence of meeting criteria for alcohol abuse to date. His self reported concern provided an opportunity to discuss alcohol use and a marked reduction in alcohol use followed. He has required sustained support with chronic injury related problems and relationship stresses, but has not increased his alcohol use again.

**2.3 Borderline/intermediate classification**

Some patient's alcohol use appeared borderline or intermediate between categories.

**Case example 2.3**

DB a man in his late forties had screened negative at his health check for alcohol but
subsequently reported concern about alcohol use during a clinical consultation, reporting a considerable degree of impairment of his social interactions related to alcohol use. He wished to address these issues in a treatment programme and was referred to a relatively short intensive course programme. He was borderline for classification of alcohol abuse yet his concern indicated the probability of more major problems.

2.4 Undifferentiated classification

In some patients, alcohol use may remained undifferentiated for some years i.e. unclear if drinking at-risk, actually causing harm, or developing dependence.

Case example 2.4

TG, a man in his 40s, presented with recurrent indigestion. Investigation results included elevated GGT and eventually (after some reluctance for investigation) he had a peptic ulcer diagnosed by gastroscopy. He reported light to moderate alcohol use and denied concern about his use. He continued to use alcohol in spite of deterioration in epigastric symptoms associated with drinking and subsequent hospital admission with ulcer perforation. Several years later his wife separated from him, reporting alcohol use as contributory to this decision. Initially he could be classified only as drinking at risk on the basis of continuing but reportedly low-moderate consumption with elevated GGT and a history of indigestion. With the diagnosis of peptic ulcer he could be classified as meeting criteria for alcohol abuse having continued use despite knowledge of a physical problem exacerbated by alcohol. His subsequent unsuccessful efforts to control his drinking, continued use despite problems and social impact classified his drinking as alcohol dependence. His alcohol use could only be differentiated into DSM111R criteria with information gained over a prolonged period, though his actual drinking pattern was much the same throughout the entire time.

2.5 Complex patients

Alcohol use was sometimes so interwoven with the personality and personal life of patient that classification proved very difficult.
Case example 2.5

RM, a woman in her 20s, was diagnosed with a schizoaffective disorder during her teen years, though in the course of seeing a series of psychiatric specialists her diagnosis was often modified and no consistent classification was agreed. With a variety of medications, several in-patient programmes and intensive out-patient follow-up RM increasingly developed independent coping skills in her early twenties but her life was complicated by her self-assessment as a victim of sexual abuse, her development of an eating disorder, and her legal action against her formerly supportive family. On this background she began drinking at an intermediate risk level and was admitted via her many contacts in the mental health services to a drug and alcohol rehabilitation centre where she was given the diagnosis of alcohol use disorder. Her complex mental health history and her personality make it difficult to define the real extent of her alcohol use and related problems if any.

2.6 The irrelevance of classification

Sometimes diagnosing the patient proved more important than the disorder category.

Case example 2.6

WR developed mild psychotic symptoms in his early twenties and remained relatively well on medication, able to function in a non-demanding job. Closure of the factory increased his stress and he had borderline intermediate risk alcohol use over this period with deterioration in capacity to function independently. Intervention included fairly frequent surveillance at the surgery with support for reduction in alcohol use. Although he was borderline for the criteria for alcohol abuse, he recognised himself as a person for whom alcohol use beyond a very light consumption was inappropriate and likely to lead to problems.

3. Classification of alcohol information: the advantages

3.1 Classification enhances therapeutic options

In spite of diagnostic difficulties, there were advantages in being able to classify the
problems presented or detected. Several aspects of classification were particularly important. The first was an increased awareness of therapeutic options suited to a particular patient's situation.

**Case example 3.1**

KW, a man in his early 20s, had heavy alcohol use identified during a healthcheck, drinking in excess of 100 drinks/week, with subsequent assessment identifying difficulty with control of drinking, diagnosed with alcohol dependence meeting DSM criteria 1,2,5,6 (appendix 2). Subsequent relationship issues were identified including partner violence. The initial focus of management was on partner safety and support, then on the patient's drinking with abstinence agreed as the appropriate goal. KW reported being abstinent at the follow-up from his health check, but subsequently separated from his wife and his next healthcheck recall was returned 'gone no address'. In this situation, classification of an alcohol disorder focused the initial intervention on safety issues, a problem which may have remained undetected if not raised within the context of an alcohol assessment.

**3.2 Classification increases awareness of related issues**

The classification of alcohol disorder also increased awareness of issues that may be relevant to a patient's care that may not be otherwise apparent. Some patients with alcohol disorder had areas of poor functioning other than those presented or identified by screening.

**Case example 3.2**

BA, a woman in her forties, met criteria for alcohol abuse with previous driving offences and alcohol contributing to obesity and hypertension. As well as identifying alcohol use as an area requiring attention in relationship to these health problems, awareness of an alcohol diagnosis explained poor compliance with medication being taken for thyroid disease and hypertension.

**3.3 Recording of diagnosis**

A further benefit of classifying alcohol use identified in this study was inclusion of risk or disorder as a part of the patient's medical record in a retrievable form. Alcohol used raised
and recorded in a consultation may become inaccessible in subsequent years and a system for identifying and accessing this information has proven valuable.

Case example 3.3

AT, a man in his 50s, screened at risk during a health check with heavy intermittent drinking up to 20 drinks/session. He was unwilling to identify any problems relating to this use until he developed atrial fibrillation some years later. The previous identification of risk drinking provided a context for understanding the aetiology of his arrhythmia and an opportunity to re-evaluate alcohol use.

4. Focus on the patient

4.1 Patient-related issues

The process of collecting sufficient information to allow accurate classification required a balance between the need to establish a diagnosis of predictive and therapeutic value, and the risk that some patients could become so alienated by the pursuit of information about alcohol use that opportunities to help them were lost.

Case example

TM, a man in his forties, presented with epigastric pain, investigations revealing abnormal LFTs, and alcohol history suggesting criteria for abuse and possibly dependence. He was not keen to open up about his drinking and declined further alcohol assessment. Minimal advice about safe drinking was offered. Collateral information from his subsequently separated wife supported the diagnosis of alcohol disorder, probably dependence, but only minimal surveillance was possible at subsequent health checks, the recorded consumption reducing at each check. It is likely that any effort to pursue alcohol assessment would have been counterproductive, and that a complete diagnosis remains unlikely.

4.2 The patient’s understanding of alcohol

The intermittent revealing of alcohol-related information by some patients appeared to reflect a gradual process involving the patient’s understanding of the problem, the patient’s
feelings/expectations about the problem, and information about related problems. A patient-focused approach in some cases appeared to provide opportunities not only for alcohol diagnoses to be sorted but for other problems to be shared, particularly mental health problems.

Case example 4.2

LB, a man in his twenties, was identified by screening with heavy alcohol use, a history of driving convictions, relationship separation, anger and violence issues. Information available over several years supported a diagnosis of dependence (DSM criteria 1,2,3,5,6,7). His willingness to gradually acknowledge alcohol dependence provided a focus for surveillance over unrelated visits and also a framework in which depression and suicide intention was able to be presented subsequently.

4.3 Focus on management

Sometimes management of the patient was more important than obtaining information by formal review.

Case example 4.3

NK presented in her late teens concerned about her alcohol use and its impact on her life, including her engagement breakup, memory loss when drinking, mood changes and inability to stop drinking once started. She was keen for help in changing her use of alcohol. Although it was possible to diagnose mild dependence as information became available, her initial focus was to stop drinking, and working with her from this basis was successful. It is likely that a process of more formal assessment would have acted as a barrier to the achieving the goal she had set.
Chapter 17

Discussion: the study as an example of general practice alcohol detection
The study as an example of general practice alcohol detection

This thesis has presented a descriptive study of alcohol screening in general practice. The literature review has provided a background to the issues a general practitioner is likely to confront in the detection of alcohol risk and disorder. The practice study is presented as an audit of alcohol screening and clinical detection in the author's practice. This audit reports quantitative data relating to both clinical and screening information obtained over a three year period on patients age 30 – 69 years and a five year period for patients age 18 – 29 years. Case studies are also included as a qualitative report illustrating practical aspects of the research findings.

The thesis study seeks to describe how research from a variety of disciplines can be applied to a general practice in New Zealand. The author's approach to screening for alcohol disorder in the context of the healthcheck screening programme is derived from the literature review. This practice study is not presented as an experimental study seeking to prove this screening approach, rather it describes how the healthcheck programme resulted in a marked increase in detection of alcohol risk and disorder, and reports on a number of aspects of particular relevance for general practice.

The validity of this study as an example of general practice detection of alcohol risk and disorder is dependent on several factors. First of these is the composition of the study group. Nearly all community resident patients age 18-69 years registered with the practice were included in the study group which comprises a sample fairly typical for the Wanganui population. Although little has been published on the composition of New Zealand general practices, it is evident that there are both similarities and differences in the study practice from other practices. The practice is situated centrally in a provincial New Zealand city and likely has most marked similarities with those practices located in a similar environment. There might be differences for practices located in suburban areas in provincial cities, in rural practices and in practices in parts of larger urban centres. The ethnic mix of the practice is
typical for Wanganui and may vary considerably from that of other practices, in particular in
the proportion of Maori patients and those of other non-European ethnic origin. However,
because alcohol problems are common across adult age groups regardless of socio-
economic or ethnic status, it is likely that the results of this study would be generalisable to
other New Zealand general practices whatever their particular composition. In particular, the
prevalence of alcohol disorder is consistent with New Zealand data with an 8% prevalence of
alcohol disorder in the practice study and in the Christchurch Epidemiological Study (Wells et
al 1989), and the high prevalence of alcohol risk consistent with that drinking patterns
reported in New Zealand surveys (Wylie and Casswell 1989, Wyllie et al 1995).
The male:female ratio at 4:1, with the under-detection of alcohol diagnoses in younger men
resulting in a ratio just less than the 5:1 reported in the Christchurch Epidemiological Study.
As reported in the survey of alcohol use in Maori in New Zealand (Dacey 1997), the
prevalence of alcohol risk and disorder is likely to be higher than identified in the practice
study in general practices with a higher Maori population.
The benefit of the healthcheck screening programme is more difficult to generalise. The study
did not attempt to verify any benefit from screening, concentrating on showing that screening
by healthcheck is feasible in a New Zealand general practice, and that it can improve
detection of alcohol risk and disorder. The successful recruitment of patients for screening is
essential to the success of the healthcheck programme. Recruitment was most successful in
the older age group and least successful among younger men. The concept of screening for
alcohol in the context of a health check has been endorsed by the NHC Guidelines (NHC
1999) and reported as a referred option for the majority of general practitioners participating in
the WHO ‘Drinkless’ study (Lightfoot et al 1998). Although there is no New Zealand data on
recruitment for healthchecks, comparison shows the 81% recruitment for 30-69 year olds in
the practice study identical with the 81% recruitment for nurse health checks in the UK
OXCHECK study for patients age 35-64 years (Oxcheck Study Group1995). The OXCHECK
recruitment method included postal and telephone invitations as well as opportunistic
personal invitations during surgery visits.
Screening rates in the practice study for women (76% for 30-69 year olds, 80% for 18-29 year
olds) were similar to the rate of 82.5% for women age 20-69 years reported in an evaluation of the National Cervical Cancer Screening Programme in Otago, New Zealand (Coppell et al 2000). Although there is no other data on recruitment for comparison from general practice, the similarities in screening rates as above suggest that screening by healthcheck could be a method generalisable to other New Zealand general practices, particularly for 30 – 69 year olds, and when linked for women to cervical cancer screening.

The comparison of screening in younger men with other studies is more difficult. Recruitment in this age group was least successful. In the absence of any commonly accepted screening programme for this age group, there is no published data with which to make a comparison. It is likely that practices with predominantly young male patients might find it difficult to provide screening in the context of a healthcheck. The reasons for reduced recruitment in this age group are discussed later.

Other factors which have a bearing on the generalisability of the study findings include funding issues and the commitment of the practice staff to the screening programme. The healthchecks were funded on a fee-for-service basis which included a GMS (general medical services) subsidy and a patient fee. The high overall attendance rate for screening suggests that cost was not a barrier. Screening in younger women was linked to cervical cancer screening which has considerable public endorsement over the study period. Minimal extra costs were involved for young women attending for a healthcheck. It is unclear if costs were a factor in the reduced screening of younger men. As discussed later, this finding appears more related to inadequate opportunities to arrange for healthchecks than cost barriers. There may have been cost issues involved in follow-up appointments. In the age group 30-69 years, of those booked for follow-up of positive alcohol screening at the health check, half the men and nearly all the women attended. The remainder were picked up opportunistically at later consultations (McMenamin 1994). The reasons for a lower follow-up attendance among men remain unclear. As well as cost, other factors are likely to affect attendance for non-urgent issues (e.g. time off work). Funding for New Zealand general practice is currently undergoing further changes with the shift to District Health Board control of funds (Ministry of Health 2000). It is possible likely that the future will hold different funding
options of preventive care.

Although the concept of alcohol screening as part of a well-person check is endorsed by New Zealand general practice (Lightfoot et al 1998, NHC 1999), there is little information on how widespread this approach to screening is in practice. A survey of New Zealand general practitioners in the Central and Southern Health Regions identified that 86% of the random sample reported managing under 13 patients per year with alcohol-related problems (Adams et al 1997). This is somewhat lower than the number identified in the study sample even prior to the screening programme. From the known extent of alcohol problems in New Zealand, it is unlikely that the lower numbers managed in the survey practices are related to a lower prevalence but more likely that a number of patients with alcohol disorder remained undetected. This survey suggests that there is considerable scope for the development of organised screening for alcohol disorder in New Zealand general practice. The commitment of the author and practice staff to screening for alcohol risk and disorder arose out of the high return for this section of the healthcheck programme, with an alcohol diagnosis made as the result of screening for 165 out of the total study group of 1093 patients.

Role endorsement has been identified as one of the necessary steps for improving general practice management of alcohol (Adams et al 1997) and one aspect of this endorsement is role legitimacy. Screening for alcohol risk and disorder as part of a healthcheck which also screened other items provided a context which was perceived by both patients and staff as legitimate. The context of the healthcheck as a patient-centred focus on preventive health, its neutral style of inquiry, and its set format of alcohol questions indirectly provided skills training and improved competency in discussing alcohol issues with patients.

Although the screening programme required the commitment of extra time and resources in the practice, it reduced the need for opportunistic screening considerably which minimised the disruptions to practice routines associated with that approach.

There is nothing in screening for alcohol risk and disorder by healthcheck which is necessarily specific to the study practice. While recognizing the influence of personal interest, funding issues and competing demands on practice resources, this screening approach could be
organised in other New Zealand general practices.

The inclusion of nearly all adults registered with the practice as part of the study group has avoided selection bias, though it is noted that younger males are under-represented among those actually screened. In the older adult group, some patients were excluded from the study on the basis of being screened elsewhere (only four patients), or because they were considered inappropriate for screening because of physical or mental health disabilities (43 patients).

Although none of these patients have subsequently been identified with alcohol problems, increasing clinical awareness of the importance of identifying co-morbidity (NHC Guidelines Alcohol 1999) suggests that it would have been prudent to have included some degree of alcohol screening on all patients regardless of disability.

A further and related factor supporting the validity of the study is the completeness of the data collection. The clinical records of all 1093 study patients were reviewed and some information was available on each patient. Specific alcohol information was collected on 78% of the study group, the group most absent from data collection being men age 18-29 years. This group have the highest predicted use of alcohol and related problems and reduced information about this group would tend to underestimate overall problems of alcohol use in the study. This suggests that the study findings represent the minimum impact of screening and that an even greater number of patients would be identified with alcohol risk and disorder with strategies aimed at this higher risk group.

Alcohol information was collected in relationship to three aspects of the study - the baseline information available by review of diagnoses recorded prior to the study period, information collected about alcohol use in a clinical context during the study period, and information collected by screening. Confidence in the completeness of data is reinforced by the review of the clinical records of all study patients, and also by the finding that the prevalence of alcohol diagnoses were consistent with results of other studies discussed above.
Chapter 18

Discussion: clinical detection of alcohol risk and disorder
Clinical detection of alcohol risk and disorder

The importance of clinical detection of alcohol disorder is evident from the findings that just over half of those meeting criteria for alcohol use disorder were identified in a clinical context. At the start of the study period, only about a third of those with alcohol disorder had been diagnosed. Although the larger proportion of those subsequently diagnosed were detected by screening, clinical diagnosis identified a number of patients with alcohol disorder during the study period. It is possible that involvement in the screening process transferred an increased clinical alertness to the possibility of alcohol disorder. Abnormal liver function tests were the most common indicator of alcohol disorder clinically, but non-physical symptoms related to relationship and mental health problems were the most frequent presenting indicators. The wide range of clinical factors contributing to an alcohol diagnosis is consistent with the extensive lists of problems to which alcohol may contribute (RCGP 1986) and supports recommendations to consider the role of alcohol in a variety of clinical situations. The findings of this study are likely to under-estimate the impact of alcohol on health problems. New Zealand research suggests adverse effects from alcohol are much more common than would be identified if formal DSM criteria are to be met (Wyllie et al 1995). Some of these effects impact on areas other than health but for many people general practice provides one of the few opportunities in which alcohol use can be addressed. This may be especially true for the large number of people who are affected by someone else’s drinking.

Very few patients meeting risk criteria only (in the absence of evidence of harm or disorder) were identified in a clinical context. This finding suggests there was difficulty collecting information on alcohol use unless the clinical situation provided opportunities. As a practice policy, reliance on a clinical opportunity to detect alcohol risk is likely to be unsuccessful, failing to identify risk in most patients and missing the opportunity for early intervention. With evidence accumulating in support of the benefit of intervention, it is important for general
practice not only to diagnose current alcohol disorder and alcohol disabilities but also to prevent development of these problems by risk assessment and early diagnosis.

The study findings suggest clinical diagnosis makes an important but incomplete contribution to the detection of alcohol risk and disorder in general practice.
Chapter 19

Discussion: the screening programme
Screening detection

While collecting data on alcohol use for the majority of adult patients in the practice, the screening programme detected about half of those with disorder, and identified nearly all those with alcohol risk. Most of the patients were in the low consumption group which nevertheless included some of those meeting criteria for alcohol use disorder. Of note was the finding that only half of the patients with alcohol use disorder were drinking at a high consumption level, a finding consistent with that in other studies (Saunders 1993a, Wyllie et al 1995) suggesting that a practice strategy that focused only on heavy drinkers would have missed half of those with alcohol disorder. These findings lend support to recommendations to provide screening to the practice population rather than just high risk patients. Heavy drinkers (as defined by those in the high consumption group) nevertheless were an important group to identify, very likely to have alcohol problems with nearly two-thirds meeting criteria for alcohol use disorder.

The healthcheck

Most screening was undertaken during a healthcheck appointment which included other health and lifestyle screening items (appendix 4). The invitation to attend a healthcheck appointment was offered personally for the first time on an opportunistic basis during attendance for an unrelated reason, extended at an appropriate time with regard for other issues affecting the patient at the time. The interval for subsequent healthchecks was negotiated with the patient and recall arranged by letter. This method achieved a high recruitment rate for most patients apart from younger men who tended to be less interested in the idea of returning for a specific healthcheck appointment. For many women and especially younger women, arranging the healthcheck to coincide with cervical cancer screening requirements was particularly successful. The screening process was undertaken
by the practice nurse who checked the patient questionnaire responses and performed specific examination items as part of the check. The use of the nurse was a practical necessity to ensure a high screening rate and resulted in enhanced skills for the nurses involved. A number of patients addressed alcohol issues during the nurse-supervised part of the screen suggesting there is considerable scope for the development of nurse involvement not only in screening for alcohol risk and disorder but also for subsequent assessment and intervention. Some of the barriers reported to affect nurse involvement in management of alcohol issues in New Zealand general practice include personal attitude, role legitimacy, and inadequate workplace support (Lightfoot 1998). The healthcheck screening programme gave an opportunity to address these barriers by providing experience in a structured approach to alcohol screening.

**Screening questions**

The screening questions performed well in detecting alcohol risk and disorder with very few patients with disorder missed by screening. The use of a self-administered questionnaire not only saved time in collecting information about alcohol use, but also avoided the tendency to under-reporting found during interviews (Midanek 1982), attributed to the need for people to provide socially desirability answers (Isaacsson 1987).

The primary screen in the healthcheck was the quantity/frequency/heavy drinking questionnaire from which was assessed a patient’s alcohol risk. All patients at increased risk had some degree of further assessment of their drinking, this alone being sufficient to diagnose the majority of those with alcohol disorder.

The requirement for assessment of all those at increased risk (intermediate and high consumption levels) resulted in a high sensitivity for the screen but required the assessment of three patients without alcohol use disorder for every one with disorder. If the purpose of screening was only to identify disorder, the extra workload involved in these assessments would be excessive. However, the healthcheck also screened for alcohol risk, and those whose consumption measures indicated an increased risk had the opportunity to review this
as part of the assessment of a positive screen.

**Consumption questions**

A number of factors suggested by research (Hughes and Dodder 1988, Russell et al 1991) to contribute to a sensitive consumption screen were included in this part of the healthcheck questionnaire (appendix 4). The frequency options were weighted towards more frequent drinking and the quantity questions included beverage-specific and drink size information. Drinking location (Wyllie et al 1994) and social context items (Single and Wortley 1994) were not included in the screen, not only due to lack of space, but because it was judged that this would weight the overall screening questionnaire too heavily towards alcohol questions in a manner inconsistent with the questions on other health and lifestyle screening. As well as quantity/frequency information, an alcohol screening questionnaire needs to be able to identify variability in drinking patterns (Streissguth et al 1976) to more accurately determine consumption. The brief questionnaire used in the healthcheck included an enquiry about frequency of heavy drinking. This was in contrast to the subsequently developed AUDIT questionnaire which specifically asks how often the respondent consumes six or more drinks on one occasion. At the time the brief healthcheck questionnaire was developed, there was some uncertainty about what was considered heavy drinking in the literature though in general most surveys have used six drinks as a benchmark (Williams et al 1994, Harford 1994). The purpose of heavy drinking questions however is to identify those patients who drink heavily but not necessarily frequently. In this situation, the quantity/frequency questions tend to provide a low weekly consumption figure, under-estimating the risks related to the heavy drinking occasions. The inclusion of a question specifically asking about heavy drinking has face validity allowing these patients to self-report their status as heavy drinkers, with self-reported heavy drinking likely to indicate the presence of an alcohol problem (Kristenson and Trell 1982). In the practice study however, the heavy drinking question identified only two men who would not have been detected by the quantity/frequency questions. This was probably
because most of the patients with alcohol disorder were drinking sufficiently frequently to be above the screening cut-off for the quantity/frequency questions. A larger group not screening positive by quantity/frequency but reporting heavy drinking were identified, but these 17 patients did not meet criteria for alcohol disorder. They were an important group to identify however as episodic heavy drinking placed them at risk from consequences related to both intoxication and the consumption of large amount of alcohol (RCP 1987, RCGP 1989).

The requirement for a question on heavy drinking is somewhat dependent on the cut-off for weekly consumption. Of the 813 patients screened in the study, 17% were drinking at the intermediate or high risk level (lower cut-off point M>20 standard drinks/week, F>15 standard drinks/week). This group included 86% of those with alcohol disorder. Screening by consumption alone with this cut-off point would therefore miss 14% of those with alcohol disorder. To identify the 37 patients with alcohol disorder detected by positive consumption screen, 133 patients required assessment. This meant that 3 patients without alcohol disorder required assessment for every patient with disorder. Shifting the positive cut-off point has the potential to affect the detection of a high proportion of drinkers (Wilson 1986). For example, raising the screening cut-off in this practice study to include just those reporting heavy drinking (M>50 standard drinks/week, F>35 standard drinks/week) would require assessment of only 42 patients of whom 62% would have alcohol disorder. However, for every patient identified with alcohol disorder, one would be missed. The need to assess three patients without alcohol disorder for every one with disorder at the screening cut-off point used in the study has the disadvantage of creating extra workload. However in the context of health screening in which the questionnaire was provided this was not particularly problematic. Further, the opportunity to assess alcohol risk status also yields benefit for the patient providing information about the possibility of harm that may be associated with intermediate or high risk drinking even in the absence of current problems.

The heavy drinking question was placed after the quantity/frequency questions. This appeared to be a commonsense order for the questions to be asked and there is nothing in the questionnaires completed to indicate an attenuated response as suggested by some research indications (Harford 1994).
Concern questions

Consumption questions provide no information about problems experienced by patients, nor about their perception of alcohol use. Additional questions are required to screen for possible complications of alcohol use. As discussed above, the healthcheck limited these extra questions to two indicators of concern about alcohol use - *Have you ever felt the need to cut down on your drinking?* and *Do close relatives ever worry or complain about your drinking?* (Davis et al 1987, 1989). These concern questions identified 26 of the 40 patients with alcohol disorder detected by screening (65%), although these were all also identified by the consumption questions. Only patients drinking above the screening cut-off point expressed self or other concern about their drinking. However, if a concern question was positive, the likelihood of alcohol disorder increased twofold. A patient reporting a positive concern question and heavy consumption was very likely to have alcohol use disorder. The two concern questions were invariably completed by patients indicating their acceptability as the last two items in a 5-item alcohol screening section.

Concern about alcohol use was most frequently detected by a positive response to the cutting down question, with most of those screened with alcohol disorder only answering this concern question positive (23 out of 26 patients). However, three of the patients detected with alcohol disorder reported others' concern only and a further five patients reported both questions positive. Although the concern questions were not absolutely necessary to detect alcohol disorder, they were useful as part of the screen, not only because a positive response increased the likelihood of disorder, but also because they indicated that alcohol use was a concern which provided an opportunity for further discussion with the patient.

There does not appear to be consensus in the literature about the best screening questions to use to identify alcohol disorder. The AUDIT has the best reported performance for primary care settings (Barbor et al 1989a, Volk et al 1997, Lightfoot et al 1998) but it is unknown how acceptable the 10 alcohol items would be in a health screening questionnaire. The extra questions are unlikely to identify any more patients than the consumption and brief concern
questions used in the study, but the AUDIT has the advantage of indicating risk, problem and dependent drinking, as well as the ability to provide a score which has been shown to correlate with specific risks. How the AUDIT questions could best be included in a healthcheck questionnaire requires further testing in practice. A potential benefit of computerised screening would be the capacity to provide the AUDIT or other more detailed questionnaires only to those participants who report a positive response to initial questions. This approach has been developed in the computerised lifestyle assessment (CLA) reported above (Skinner 1994) and the recommendation to include a computerised version of the AUDIT was one outcome from the feasibility study involving Auckland general practitioners (Lightfoot et al 1998). Developments in the availability of an alcohol screen in a computerised format include the presentation of the AUDIT questions as part of the Alcohol Advisory Council of New Zealand website in 2001 (ALAC 2001). However, there are currently no patient self-administered computerised health screening questionnaires available for general practice which include the AUDIT questions.

Trauma questions have been used successfully as a screen in US primary care (Israel et al 1996) detecting about the same proportion of problem drinkers that were identified by the two concern questions used in this study. This approach would appear to be useful if the focus is on identifying established problems rather than assessing alcohol risk for all patients. As well as providing another dimension to the screening process, extra questions may be useful as an entry point for further assessment or intervention. Assessment of concern about alcohol use readily leads into motivational assessment (Miller and Rollnick 1991). The concern questions can also influence the sensitivity and specificity of the healthcheck screen. An "either/or" approach with either a positive consumption screen or a positive alcohol questionnaire would increase sensitivity. A "both/and" approach requiring positive consumption and positive alcohol questionnaire would improve the specificity of the screen. In this case, a "both/and" positive result would be highly likely to indicate the presence of alcohol disorder but some cases would be missed.

The 5-item healthcheck screen comprising quantity, frequency, heavy drinking, self and other concern questions, proved very effective in the practice study identifying nearly all those with
alcohol disorder and quantifying consumption-related risk. The validity of the healthcheck questionnaire is supported by the comparability of findings in the practice study with those using the AUDIT screening questionnaire in a random selection of general practices in Auckland (Paton-Simpson et al 2000), and with the results of national (Wyllie and Casswell 1989, Wyllie et al 1995) and community surveys (Wells et al 1989).

**Healthcheck interview**

All consumption screening questions required interview assessment to verify the accuracy of the responses and to calculate the consumption measure. Borderline consumption levels were found to be inherent in the screening process as each frequency option included a range of days which multiplied by reported typical quantity yielded a range of weekly consumption. Frequently the calculated intake was borderline for a positive screen requiring discussion of the recorded information to decide the actual level of consumption. Similarly, those who responded positively to engaging in bouts of heavy drinking required interview assessment if they responded positively to at least 1-2 days per month. Although interview is considered to result in lower consumption when used as the primary method of collecting information, in this situation the patient's responses were discussed as already indicated on the screening questionnaire. This should have avoided the problems associated with the social desirability effect (Isacsson 1987). The more detailed questioning of borderline respondents is likely to have increased the assessed consumption level and reflected true drinking status (Russell et al 1991, Williams et al 1994).

**Laboratory tests**

This study was undertaken in the context of routine general practice where most of the patients were reasonably well known to the doctor. This background information influences the pre-test probability of any screening test. Knowledge of the patient's personal and social
history inevitably affects the likelihood of a diagnosis of alcohol disorder. While it is clear from the study that alcohol disorder was missed without screening in about half of the patients, nevertheless it is possible with a high degree of certainty to exclude some patients from consideration of a diagnosis of alcohol disorder on the basis of negative screening questions for consumption and concern and supported by personal doctor-patient knowledge. For this reason, the use of laboratory tests was restricted to patients who could not be excluded in this manner. This included those patients identified as likely to be in the risk or disorder category based on their answers to the quantity/frequency or concern questions. The commonly used biochemical tests have a recognised value in screening for alcohol disorder provided their limitations are understood (Whitfield 1991). The sensitivity of liver function tests or MCV among unselected patients in a primary care setting is likely to be relatively modest, in the order of 30% - 40% for heavy drinking, and lower for formal diagnosis of alcohol disorder. With the opportunity provided in general practice, it is likely that non-alcohol related causes of abnormal tests could be excluded and therefore the tests should have a relatively high specificity. The choice of laboratory screening tests used in the study was largely determined by availability. The liver enzyme tests GGT, AST and ALT were readily available and relatively inexpensive. Many patients also had MCV available as an extra test when screened or because it is part of a commonly requested laboratory complete blood count. The MCV was used more as an adjunct in determining the diagnosis of alcohol disorder rather than as a screening test in its own right. Although considerable evidence has accumulated to support the value of CDT as a screen, this test and other more recently developed tests including B-hexosaminidase were not available during the study period. Biochemical screening in this study was therefore restricted to the selective use of liver function tests (LFT = GGT, AST, ALT). Those with a positive or borderline positive quantity/frequency or concern question had LFTs arranged as did some patients in whom an alcohol diagnosis could not be excluded on the basis of doctor-patient knowledge. This represents a selected group likely to have a relatively higher prevalence of formal diagnosis of alcohol use disorder than the general population and therefore closer to a medical patient sample than a community population. The sensitivity of this test would therefore be expected
to be high and this would be further enhanced by the use of the 'either/or' approach where any one of GGT, AST or ALT in the abnormal range was considered a positive screen. The emphasis on sensitivity was chosen at the expense of specificity because a positive screen could be evaluated by brief interview to confirm the likelihood of alcohol disorder. As discussed earlier, the formal classification using DSM11R criteria could take some time to be completed but a brief interview was sufficient to confirm the presence of an alcohol disorder otherwise not classified. In the context of the overall screening programme, the use of LFT (any abnormal GGT, AST or ALT) in this selective manner yielded a sensitivity of 76% and the specificity of 96%. It was not possible to calculate the performance of LFT as a non-selective test for the screened group as a whole because it was either not appropriate or not possible to collect a blood sample from all the patients. The value of LFT as a selective screening test is supported by its contribution to overall screening. The sensitivity of the screening process at 83% using the quantity/frequency questions increased to 93% with the addition of LFT.

The evidence supports the use of laboratory tests in patients over age 30 years but there is little evidence for currently available laboratory tests under this age. The selective use of LFT primarily in patients with borderline to positive quantity/frequency or concern questions proved of value in both age groups screened. In the 35 men age 30-69 years identified by screening with alcohol use disorder, four indicated consumption below the screening cut-off of 20 drinks/week. (McMenamin 1994) These four men also reported negative concern questions and were identified only because of abnormal LFT. Similar results were found in the 18-29 year old group where two men reported borderline consumption and had abnormal LFT (McMenamin 1997a). These men may have been under-reporting consumption, although it is possible that they represent a group who were susceptible to problems at a lower level of consumption or they were drinkers who were deliberately reducing alcohol intake because of problems. In both groups the selective use of LFT screening contributed to identifying patients with alcohol use disorder who would otherwise have been missed by the quantity/frequency or concern questions. A positive LFT screen indicated approximately a 1 in 2 chance of current alcohol use disorder.
There is also a value in identifying patients with abnormal LFT who do not meet the criteria for alcohol use disorder as a formal diagnosis. The presence of abnormal LFT in a patient who uses alcohol regularly indicates an increased risk status even in the absence of current problems or dependence (Conigrave et al 1993). This information may be of value to the patient in the process of decision-making about personal alcohol use and identify a risk category which may benefit from long term follow-up.

It is possible that a less selective use of laboratory screening might be useful. No one screening method will identify all patients and as found in this study selective LFT screening identified men otherwise undetected with alcohol use disorder. The role of other laboratory tests remains unclear in the general practice setting but evidence suggests that CDT is both more sensitive and specific than liver function tests. It may be useful in identifying heavy drinking when under-reported on quantity/frequency questions or when opportunities to screen by questionnaire are limited, in particular extending the range of screening options available for younger patients. Although to date it appears that CDT is least sensitive in patients under age 30 years, an either/or combination with LFT is likely to identify some of the heavy drinkers in this group who may not be screened by questionnaire.

The role of other biochemical tests remains uncertain. B-hexosaminidase has promise as a screening test but insufficient information is available to understand how useful it would be in general practice. Given that it is affected by some chronic conditions, it would seem to be less useful than CDT in older general practice patients. Studies with younger patients are not supportive but this may reflect the use of serum rather than urine B-hexosaminidase. It is a less expensive test than CDT and further research may prove its value particularly as a combination test where it has been shown with GGT to provide a relatively high sensitivity.

The inclusion of biochemical tests with other screening items in a discriminant test appears to improve sensitivity and specificity but would require the development of a simple system for calculation. Increasing use of computers in general practice may make this more readily available though in other aspects of general practice (e.g. coronary risk assessment) it is standard practice to combine different types of information to achieve clinical judgement.
Organisational factors affecting screening

There is ample evidence of role endorsement for GPs to be involved in preventive care and this was supported by the high response rate to a personal invitation to attend a healthcheck appointment (McMenamin 1992). Although the lack of skills training has been identified by GPs as a reason for low involvement in this area, the principles of providing a relatively straightforward screening test (e.g. healthcheck questionnaire) and discussing the results in a patient-centred style are generic to general practice. This is not to argue against the value of skills training, particularly motivational and assessment skills, but rather to identify that the barriers may well be more perceived than actual. In this study, the health check screening system provided an effective framework for screening and discussing alcohol and other issues without evidence of a negative effect on patient attitudes towards the practice and without evidence of any negative financial effect on the practice. The healthcheck programme, although initiated via opportunistic personal invitation, subsequently has operated by letter recall with continuing patient support. Alternative recruitment methods are possible. Telephone and postal invitations for example have been shown to enhance recruitment for nurse health checks (Oxcheck Study Group 1995).

The healthcheck model used in this study is one organisational approach to screening that has proven highly successful in all adult groups other than younger men where it was still partially successful. The analysis of the lower screening rate for younger men showed that all study patients were seen over the 5 year period (McMenamin 1997a). The major reason for the reduced screening rate was that of those without clinical alcohol information available, 40% were not offered a healthcheck invitation. Of the men in this age group who were invited, 84% did actually attend a healthcheck appointment. The same computerised reminder prompts existed for all patients, so it seems likely the lower invitation rate is related to factors inherent in the differences between consultations for younger and older men particularly.
differences in suitable cues for offering an invitation for a healthcheck. The linking of healthcheck screening with cervical cancer screening in women was successful as a means of ensuring a high alcohol screening rate among the younger women. No generally accepted check is available as a focus to link screening for young men. A possible option is the linking of a healthcheck for unscreened younger men to a clinical follow up appointment. The difficulties using clinically focused consultations for health screening activities have been discussed above. These concerns could be minimised by the practice nurse separately providing the healthcheck in conjunction with the clinical consultation. The use of a self-administered computerised questionnaire such as the CLA (computerized lifestyle assessment, Skinner 1994) might facilitate this option for younger men. An alternative approach to screening with possible benefit for the underscreened group of younger men is opportunistic waiting room screening. This proved a successful approach in the US primary care study using trauma questions as a waiting room screen with patients asked about alcohol only if this screen was positive (Israel et al 1996). The authors of this study comment that present methods to screen for alcohol abuse are generally obtrusive and that alcohol-neutral trauma questions are a non-obtrusive alternative. While it is true that trauma may be perceived as a less obtrusive focus for questions than alcohol, it is unclear if patients would be willing to answer unexpected waiting room questions in routine practice.

The study healthcheck questionnaire was completed by patients in the waiting room though this was generally in a relatively private area. This questionnaire however was being completed as part of an expected screening process which is likely to make it more acceptable to patients. The AUDIT was completed as a waiting room screen in the Drink-less feasibility study in Auckland general practices (Lightfoot 1998). The drawback of waiting room screening as a routine practice is the requirement that the results are reviewed during a consultation that does not have either an alcohol or a more general preventive focus. Most of the patients who would complete a questionnaire in the waiting room are attending the surgery for some other reason and the addition of an extra item in the consultation is likely to be a barrier to sustaining this screening approach.
Benefit of screening women

A benefit of the high rate of screening in the younger female group is the increased likelihood that alcohol use likely to increase risk during pregnancy would be identified. New Zealand reporting of fetal alcohol syndrome is low by international standards (Leversha and Marks 1995). An increased awareness of alcohol use among pregnant patients could encourage more intervention during this at-risk time, and also increase alertness to the possible diagnosis of FAS.
Chapter 20

Discussion: alcohol diagnoses
Alcohol diagnoses

Overall one in five patients had some kind of alcohol diagnosis (alcohol risk, current or past disorder).

Alcohol risk

The diagnosis of risk in 19% of men and 4% of women in the study group identified an important opportunity for early intervention and prevention of alcohol-related complications. Identifying alcohol risk had value for these patients in several ways. It raised clinical awareness that any new symptoms might be alcohol related. It provided background information that was be helpful in the management of other problems presented by the patient. Most importantly, it allowed for alcohol risk to be discussed with the intention of helping patients modify risk drinking and consequently reducing their risk of problems developing.

Alcohol disorder

Although the shift in emphasis in general practice is onto risk assessment and early intervention, a large number of patients had current problems. The prevalence of current alcohol disorder at 8% (men 12%, women 3%) was consistent with other New Zealand reports (Wells et al 1989), accepting the reduced contribution to these figures associated with the lower screening rate for younger men. Similarly the male:female ratio is also consistent with other reports (Wyllie and Casswell 1989, Wyllie et al 1995). Nearly a third of the patients meeting criteria for disorder had alcohol dependency.
Alcohol dependence

Dependence is the starting point for both internationally accepted classification systems (DSM and ICD) and consequently neither system is ideally suited for general practice with its focus on risk and identification of early stages of disorder. The study indicated that the most common diagnoses were alcohol risk without evidence of current harm, and problems associated with or contributed to by alcohol use without evidence of dependence (classified if possible as alcohol abuse). Since any one individual's drinking pattern may vary over time, patients may be classified into the alcohol risk category or abuse/harmful drinking category on different occasions, and those with minor or transient problems associated with alcohol use may not meet the formal criteria for disorder. The implication in the DSM dependence-based classification systems is that patients with alcohol abuse ("residual diagnosis reserved for those with mild disorder or those who are at an early point") will develop dependence over time. This does not appear to be supported by the findings of the study which classified a large number of patients with alcohol abuse who had been drinking in a sustained pattern for many years without evidence of dependence.

The RCGP (1989) has proposed an approach to alcohol use in general practice patients that seeks to classify all patients according to level of risk and disability related to alcohol use. This system appears to provide the closest fit for classifying the study findings. It was possible to classify a level of risk for all patients screened, and to specify alcohol-related disabilities when present. These disabilities included dependence for those patients meeting the appropriate criteria. Although a classification based on alcohol-related disabilities does not affect the number of patients diagnosed with dependence, it may affect the residual harmful drinking/alcohol abuse category because patients with any alcohol-related disability will be categorised rather than just those meeting the formal criteria. This system suits the general practice focus on early problem detection, with more severe problems including dependence viewed as complications of drinking rather than as a specific disorder. The disadvantage of this system may be that dependence might be less evident (since it is not
the primary diagnostic category) and consequently might be less well managed.

The four criteria which most commonly identified dependence may have reflected bias inherent either in the type of patient in the practice or in access to information in this general practice setting. It proved easier for example to identify and/or verify some criteria than others: (1) drinking more alcohol than intended was a commonly reported symptom; (2) unsuccessful efforts to reduce drinking were fairly evident at follow up; (3) continued use of alcohol inappropriate to current problems was recognisable during surveillance of those problems; and (4) the impact of alcohol on social or occupational activities was often evident from associated relationship and financial problems. The other criteria were met less often. It is difficult to specify whether this was because the kind of information required was not easily obtained without formal assessment or because these criteria were actually met less frequently. Patients with alcohol dependence may have been reluctant to quantify the amount of time spent on obtaining, drinking or recovering from alcohol, or it may be that this kind of information was not accessible without more detailed assessment and/or collateral information. It is possible that information on frequency of intoxication was not offered in the general practice context, and it is seldom that patients actually attend while intoxicated.

Reports from emergency department attendances and court news sometimes contributed this kind of information. Somewhat surprisingly, tolerance and withdrawal symptoms/relief drinking were infrequent markers of dependence. This may be related to the severity of dependence in these patients who in general may not have developed dependence to a stage including physical symptoms. Certainly the majority of these patients seemed to be without physical symptoms of dependency. It is possible that physical dependence was unrecognised by patients because their pattern of alcohol use prevented the development of symptoms (i.e. they never had the opportunity to develop withdrawal symptoms or need for relief drinking). The diagnosis of dependence relied rather on the behavioural symptoms (increasing use i.e. larger amounts or over a longer period than intended; unsuccessful efforts to cut down; reduced social/occupational activities; and continued drinking despite problems). The tendency for behavioural rather than awareness and/or reporting of physical symptoms to indicate dependence is also evident in the lower number of patients diagnosed.
as dependent under ICD10 classification. Half of those with DSM111R criteria for dependence were only classified with harmful drinking under ICD10. This underdiagnosis with ICD10 may be a result of insufficient information available to classify dependence under this system. In spite of the difficulties arranging for patients to attend for formal alcohol assessment, the kind of information that can be obtained from an assessment is far more than that available during routine consultations and indicates a need for an alcohol assessment package suitable for general practice. Research diagnostic systems include the Diagnostic Interview Schedule (DSM 1987) and the Primary Care Evaluation of Mental Disorders (Johnson et al 1995) but these are not in current use in clinical settings.

Alcohol abuse/harmful drinking

The DSM111R criteria also proved more appropriate than ICD10 for the category of drinkers not meeting criteria for dependence but experiencing problems related to alcohol use. The ICD10 classification requires physical and/or psychological symptoms to make a diagnosis of harmful drinking. As a result, nearly a third of patients classified into the alcohol abuse DSM111R category were excluded from ICD10 harmful use, though their drinking was causing ongoing relationship and other social consequences. These are important patients to identify, not only because of the adverse consequences of drinking for themselves, but also because of the effect on others. The DSM residual diagnostic category of non-dependent alcohol abuse included patients with physical, psychological and social consequences, but no patients with occupational criteria. This may reflect the general practice rather than workplace setting in which these patients were assessed.
Assessment

The classification of patients depended not only on how much but also what kind of information was available. For many patients there was no alternative to accumulating information on an opportunistic basis over a period of time (as for KG case 1.1). The case examples ET (case 1.2) and EF (case 1.3) however show that any opportunity at which more detailed assessment could reasonably be performed proved to be of value, providing not only sufficient information to classify alcohol use, but also the opportunity to review management options with the patient.

Collateral information

Information from the patient was often supplemented from collateral sources. At times it was appropriate to involve the patient's partner or other significant person as part of an assessment although this information was often provided independently. Case example JS (case 1.4) reports the usefulness of collateral information, providing an opportunity both to gain extra information and to involve a spouse in supportive management. Collateral information on alcohol use was available for over half of the patients with alcohol disorder. Family members were the most common source supplemented by information from hospital reports, court news and other health professionals.
Chapter 21

Discussion: alcohol issues in general practice
Alcohol issues in general practice

The study has provided an opportunity to explore which concepts of alcohol theory and practice are most suited to general practice. Some examples of alcohol disorder identified in the study are discussed below to highlight issues of relevance for general practice, particularly difficulties with formal diagnosis.

Difficulties in classification

The case LP (case 2.1) exemplifies the transient or intermittent nature of alcohol disorder in some patients, alcohol use affecting the person in a substantial way but only for a relatively short duration (over some months) or during periods of increased stress, and of only minimal importance at other times. The DSM (1987) approach to classification allows for the diagnosis alcohol disorder in remission (partial or full). Such a diagnosis allows for consideration of alcohol as contributory when the patient presents at times of stress or with possible alcohol-related symptoms, and alerts the practitioner to the need to enquire about alcohol at patient reviews.

One of the goals of general practice management of alcohol problems is early intervention. As in the case of DB (case 2.2), early intervention may modify or abort progression to full alcohol use disorder, achieving a desirable outcome, but making formal classification less relevant.

Classification may also be difficult for patients borderline between categories, as in the example DB (case 2.3), where the information available was borderline for abuse category, yet the patient self-referred to an alcohol treatment programme. Classification may also be difficult when only indirect information was available and could not be checked adequately as in the case of NH (case 1.5) when collateral sources suggested a high probability of dependence but sufficient information was available only to meet the criteria for alcohol
abuse.

Even ongoing and relatively frequent clinical contact with the patient may not make it easier to complete a diagnosis. For some patients, alcohol use may remain undifferentiated for many years, and it may remain unclear if the patient is drinking at-risk, suffering alcohol-related harm, or developing dependence. Circumstances in the patient's life may resolve this situation, as in the case of TG (case 2.4) where relationship separation highlighted the nature of alcohol use yielding previously undisclosed information. Alcohol use may be so interwoven with the personality and personal life of patient it makes classification difficult (as exemplified in RM case 2.5).

While it is important not to overlook alcohol diagnoses, especially when co- incidental with other mental health problems, the availability of alcohol treatment programmes may allow alcohol to become a focus for therapeutic attention when other aspects of the patient's life are actually more fundamental problems. The importance of focusing on the patient rather than the disorder category was evident in some other case examples. Alcohol was an important factor in the management of WR (case 2.6), even though consumption was borderline, because of his vulnerability to the adverse effects of alcohol use during periods of stress.

The patient's understanding of alcohol was another example of this focus as shown by LB (case 4.2) whose intermittent revealing of alcohol-related information appeared to reflect a gradual process involving his feelings, understanding and expectations about the problem. The benefits of allowing the patient to gradually reveal information about alcohol use in this case allowed other problems including suicidality to be shared. A patient-focused approach reduced the risk that some patients could become so alienated by the pursuit of information about alcohol use that opportunities to help them were lost. The case of TM (case 4.1) indicated the benefit of forgoing the need to establish a diagnosis in favour of using minimal advice and gentle support to facilitate a better outcome. The case of NK (case 4.3) was similar, the patient openly expressing a need for support to stop drinking and indicating formal evaluation would be a barrier to success.
The advantages of classification

There are however definite advantages in classifying alcohol use identified. The first was an increased awareness of therapeutic options suited to a particular patient's situation. The need to address safety issues in the case of KW (case 3.1) was only identified as a result of classifying alcohol dependence which provided a basis for exploring the impact of this diagnosis on the patient's relationship. Similarly, in the case of BA (case 3.2), poor medication compliance was only understood in the context of her alcohol abuse.

A further benefit of classifying alcohol use identified in this study was inclusion of risk or disorder as a part of the patient's medical record in a retrievable form. The review of patient clinical progress notes at completion of the study showed how easily alcohol information previously collected may become inaccessible when entered only as part of a consultation record. Formal classification and entry onto the patient's problem list proved useful in reviewing other health problems, as in the case of AT (case 3.3) subsequent cardiac problems had their etiology in his alcohol history.

The process of classifying alcohol problems in this study often occurred over a long period of time, even years. The initial or working classification was often hypothetical i.e. an hypothesis about the alcohol disorder was based on probability (pre-testing probability affected by age, gender, personal and family medical history, occupation, appearance, reason for attendance), personal knowledge (knowledge of family, previous contact with patient, knowledge of local influences), screening or clinical information available, and what information could be explored with the patient. This hypothesis was sometimes tested by laboratory investigation (LFT, MCV) and/or formal alcohol assessment which increased the likelihood of diagnostic classification. In practice, management was based on the likely diagnosis, especially as discussed above in the case of NK (case 4.3), the patient wished to focus on management rather than further diagnosis.
The patient's perspective

Patients appeared to accept enquiry into their alcohol use within the context of the screening questions offered. This approach which initially seeks information about the patient's use of alcohol and the patient's perception of related concerns readily lead onto further assessment questions. Identifying alcohol use within a screening context provided the patient with an opportunity for what is really a form of self-assessment of alcohol use. This patient-centred approach allowed considerable flexibility in choosing which model of management was most suitable for the particular patient, based on the way in which the patient presented alcohol use and its impact on life, relationships, behaviours, social environment, or health. The models which help our understanding of why drinking works for patients (functional model), of the contexts which encourage and support drinking (environmental model), and of the social and cultural factors influencing drinking (socio-cultural model), may be useful in shaping the doctor's approach to a particular patient and may provide a means for a shift in patient understanding of alcohol risk issues.

Screening identifies some patients with definite drinking consequences. A focus on alcohol use as a behaviour with related consequences fits best with the learning theory of alcohol use and problem drinking concepts. In this context, patient alcohol use can be explored without necessarily formalising an alcohol diagnosis other than alcohol use under review. Within this model, it is not necessary for the patient to accept that alcohol is a problem for them to reach agreement that a change in drinking behaviour is appropriate. This is consistent with reports of reduced alcohol use over time in the New Zealand surveys discussed above (Wyllie et al 1988, 1995), a change which occurred for the most part without formal diagnosis and intervention (Cunningham et al 1995, Sobell et al 1996). This model seems particularly suited to patients with problems of mild-moderate severity.

The problem drinking model seems less applicable for dependent patients particularly as the severity of dependence increased. In this situation, alcohol use is a primary disorder rather
than contributory to other problems, and formal classification has several advantages. It ensures that alcohol dependence is included in the patient's medical problem list and therefore subject to regular review in the same way as other chronic health problems. It identifies dependence as a problem requiring intervention which includes both acute and chronic management and specifies a range of options that might not otherwise be considered necessary such as structured assessment and intervention, consideration of detoxification, use of antabuse, referral to specialist clinics or treatment programmes and/or involvement of AA. Although it is not necessary to label the patient as an alcoholic, some patients may find the concept of alcoholism as a disease over which they have no control a helpful means towards recovery from this disorder. The constructs of problem drinking and alcoholism need not be in conflict if the focus of assessment and management is on the best fit from the patient's perspective.

Management issues

A general practice approach identifying alcohol risk and related problems implies a variety of management requirements including motivational and behavioural interventions for risk drinking, problem solving for alcohol-related problems and specific management of dependence. The skills required for these interventions are increasingly generic to general practice. Although research indicates that general practice patients with alcohol problems remain largely undetected, and that doctors have identified skills training as one perceived need to address this problem, there is no New Zealand research which has actually tested the existing skills of experienced GPs. The experience of this screening study suggests that the skills required for detecting and assessing alcohol problems can be transferred from experience with other general practice problems. One outcome of the recent marketing research into improving GP uptake of screening will be increased awareness of whether GPs can transfer existing skills to those patients identified by screening or whether specific training is required.
New Zealand general practitioners have identified a role for themselves in screening and management of alcohol problems (Caswell and McPherson 1982, Adams et al 1997, NHC 1999). The practice study suggests it is unlikely that reliance on clinical detection will prove a successful approach and that some type of screening is required. Opportunistic screening is unlikely to be successful for a variety of reasons including the time constraints of clinical practice, and the difficulty with a shift in focus from clinical to screening issues. Although there is a requirement for a practice to commit time and resources to organise a screening programme, this study indicates that such a programme is feasible in a busy New Zealand general practice. The flow-on effect of screening does need to be acknowledged. A screening programme will identify patients with alcohol disorder (as well other conditions included in the healthcheck) which will require ongoing attention. Clearly there is some increase in clinical workload as a result. However, patients with undetected alcohol risk and disorder also create a clinical workload, some of which can be addressed more satisfactorily when the contribution of alcohol is recognised.

There are competing demands on general practitioners for their time and attention. As presented earlier, alcohol use contributes to many of the problems dealt with in general practice. The healthcheck screening programme presented in this study provides an organised approach to detecting and initiating management for these problems.
Chapter 22

Conclusion
Conclusion

There is good evidence supporting the value of general practice screening for alcohol risk and disorder. This type of screening meets the accepted criteria (Wilson and Jungner 1968). The importance of alcohol as a health problem is supported by both the prevalence of alcohol-related problems in New Zealand, and the relationship between alcohol and morbidity and mortality. It is possible to recognise a latent or early symptomatic phase (risk or early abuse/dependence) and it proved possible in the study to collect this information on most patients. There is evidence of the effectiveness of intervention for heavy drinking in the literature and it seems likely that intervention in a pre-symptomatic or early symptomatic phase is of more value than waiting until more severe disorder is established. There are good screening tests available including consumption measures, patient questionnaires and laboratory tests. These are relatively inexpensive, generally easy to deliver and provide sufficient information to determine which patients require further assessment of alcohol use. The use of these screening tests in a patient healthcheck questionnaire proved successful in detecting alcohol risk and disorder in the patients in the study. Systematic screening by healthcheck proved an effective method of detection and is proposed as a useful model for screening for alcohol risk and disorder in general practice.

Further experience in practice is required to determine which questions provide the most effective screen. The AUDIT questions have the advantage of international acceptability, and have been used in several general practice-based New Zealand studies. The AUDIT gives some indication also of level of risk, problem use and dependence. However, it contains 10 items and its consumer acceptability in routine health screening has not been determined in New Zealand. It is also unclear whether the extra information gained in the AUDIT is of more value than that obtained by the 5-item questionnaire used in the practice study. Research on questionnaires would indicate that the wording and format of the consumption questions in the AUDIT is likely to underestimate alcohol use. This need not be a problem if the screening
cut-off is appropriately set but may result in an incorrect picture of a patient's true alcohol use.

Laboratory screening has an established supportive role. There is no single laboratory test that can be used on all patients to help screen for alcohol risk and disorder. Research on the use of liver function tests show that they can be helpful adjuncts to screening questionnaires. In the practice study, patients whose alcohol disorder was detected only by liver function test screening were all males over age 30 years. The use of liver function tests is likely to be of most value in males in this age group whose alcohol use is below the screening cut-off level. Liver functions tests may be appropriate for patients drinking over the cut-off level, but this use is an assessment rather than a screen. The role of other laboratory tests in screening in general practice remains unclear. Most promising is carbohydrate-deficient transferrin, which may be complementary in screening, detecting some patients that would return normal liver function tests. Further research on the use of CDT in general practice is required, particularly as the reference ranges for results in particular patient groups may improve the sensitivity of this test in practice.

Positive screening tests require further assessment. As indicated in the case examples, this assessment may need to be undertaken gradually as patients attend the surgery. However, there is an advantage if the assessment can be completed more fully, allowing an opportunity to make a more complete diagnosis. Experience with the practice study indicated a need to develop a suitable assessment package for general practice. Assessment leads readily into management. Surveys of New Zealand general practitioners indicate a need for training in assessment and management of alcohol issues. The development of a suitable assessment and management package could provide the basis for this type of training and encourage improved delivery of this service for patients. There is scope for the development of such a package to include both general practitioners and practice nurses. Such an assessment package would also influence the prevailing model of alcohol problems in general practice by allowing patient information to be formulated into a risk and problem-based framework. This focus on risks and problems is a familiar approach to health issues in general practice and
allows the use of generic skills in risk management and problem solving. Transferring proven intervention approaches from research into clinical practice would not only improve patient outcomes, but also encourage an attitudinal shift among general practitioners towards an expectation of successful treatment.

Throughout the practice study, there was an increase in clinical identification of alcohol disorder as well as that detected by screening. This is likely to be due to a transfer of skills from a screening to a clinical context representing an increased confidence and improved technique in interviewing related to patient alcohol use. A similar transfer of skills is likely to be experienced by any general practitioner or practice nurse who is involved in routine screening using easily repeatable questions that can be replicated in an appropriate clinical context.

There is good evidence supporting the effectiveness of treatment, at least in regard to reduction of consumption, and likely therefore, because of the link between them, to reduce alcohol-related problems and dependence. The literature review therefore supports a recommendation in favour of screening for alcohol risk and disorder, and the study shows that cost-effective and ongoing screening can be provided in a general practice during a healthcheck programme.

A number of conclusions may be drawn from this thesis report of literature relevant to screening and clinical detection of alcohol disorder in general practice, the results of the practice study, and the case studies.

There are some difficulties and uncertainties in the screening/assessment process in general practice as discussed above. These problems seem to be inherent in the nature of general practice. Although much existing research can be applied to general practice, and indeed some of this research has been carried out in general practice, there is a lack of specific general practice research. The difference between research in general practice and general practice research has been presented recently as a viewpoint proposing that general
practice research addresses questions general practitioners ask (Tilyard and Dovey 2000). Much of our understanding of alcohol issues as general practitioners to date has come from research organised by other disciplines. General practice research is required to develop a suitable paradigm for a better understanding and management of alcohol problems in general practice. There is adequate information available on some of the aspects of alcohol studies required for general practice, for example, the prevalence of alcohol risk and problems. There is however insufficient data to provide a comprehensive understanding of the kinds of problems requiring management in this setting. The development of a suitable paradigm would be enhanced by more widespread reporting and discussion of general practice experiences with alcohol management.

A fundamental issue to address in general practice is the requirement is for a classification system that is suitable for use in clinical practice yet allows data to be collected in such a way as to be useful for research.

As opposed to the DSM or ICD systems where the starting point for classification is alcohol dependence, a classification useful for general practice requires the starting point to be alcohol consumption. From quantity/frequency and binge drinking information, patients can be readily classified into low, intermediate or high risk, supplemented by information indicating personal vulnerability e.g. family history. Patients whose alcohol use is causing or complicating health or social problems would be classified as problem drinking, and some of this group would be identified as dependent drinkers. This simple classification system, starting with alcohol use, assessing risk, identifying problems and diagnosing dependence, supports the use of a patient-centred approach which encourages early intervention using motivational techniques. The data required for more formal diagnosis may be collected over time and be of use for those patients requiring referral and also for research purposes.

As well as the need for a suitable classification, there is a need for existing alcohol research to be available in a form that helps general practitioners understand the theoretical basis for the development of specific general practice approaches. The information presented in the literature review suggests that while general practitioners state they have a positive attitude to enquiring about alcohol use, in general their understanding of alcohol issues is limited.
This is reflected in the lack of systematic screening, insufficient emphasis on alcohol as a health risk factor, the under-diagnosis of alcohol problems, and a tendency to devalue the usefulness of intervention. Yet there is good evidence supporting the need for the opposite outcomes to be achieved. When surveyed, general practitioners have responded to these issues by requesting skills training and the provision of appropriate resources. The practice study reported in this thesis provides some evidence that the kinds of skills required for detection and management of alcohol risk and problems are generic general practice skills involving well-established principles of patient-centred interviewing and increasingly mainstream principles of motivational interventions. The resources required for the practice study did not involve specific extra funding but relied on the re-organisation of practice systems, shifting from opportunistic approaches to a planned healthcheck screening programme. The value of the healthcheck as a means of providing alcohol screening is evident from the literature review and the findings of the study. This type of screening could be organised into any general practice. This is not to imply that funding is not an issue. In this study, the screening was funded by the patients, whose high attendance and recall rate supported the acceptability of this approach. Other funding options may well be required to provide an incentive for practices to undergo the necessary system changes, and for some patients to attend. The development of population funding structures in New Zealand provides one option for this kind of support.

The need for organisational change has been identified as fundamental to the development of preventive health care (Botelho and Skinner 2000b), and within this context to screening for alcohol risk and disorder (Botelho and Richmond 1996). Research is currently focused on how primary care can move along a continuum from a reactive through proactive organisational style towards the goal of a high functioning organisation (Botelho and Skinner 2000a,b). In this context, the role of practice nurses in providing screening and subsequent assessment and management of alcohol problems also requires further research. The issues identified for nurses affecting intervention in alcohol abuse (personal attitude barriers, role legitimacy, inadequate undergraduate teaching, inadequate support in the workplace) are similar to those identified as barriers to effective involvement for doctors. Developments in
this area of general practice as recommended in the NHC Guidelines (1999) may be most successful if they are practice-based rather than specific to professional development within each discipline.

General Practitioners have been encouraged in the recently published NHC Guidelines for Recognising, Assessing and Treating Alcohol Abuse in Primary Care (NHC 1999) to provide primary care screening and brief interventions for hazardous and harmful drinking. This thesis reports the application of alcohol research to screening for alcohol risk and disorder in general practice and proposes the healthcheck model as an effective system for providing this screening.
Chapter 23

Recommendations

This chapter lists the author's recommendations related to detection of alcohol disorder for New Zealand general practice based on the literature review and the practice study findings.
Recommendations

1) Screening for alcohol use and disorder is a desirable activity for general practice.

2) The 10-item AUDIT questionnaire is a suitable screening instrument. The 5-item healthcheck questionnaire used in this practice study is an acceptable alternative and has the advantage of brevity.

3) Laboratory tests, particularly liver function tests (GGT, ALT, AST) should be used as an adjunct to screening.

4) There is a need to research the possible contribution of other laboratory tests such as CDT to the screening and assessment process.

5) Screening tests are insufficient to allow diagnosis of alcohol disorder and require further assessment. There is a need to develop a suitable assessment package for general practice.

6) The detection of alcohol disorder also requires general practitioners to remain alert to the possibility that alcohol might be contributory to problems in clinical practice.

7) The classification of alcohol in general practice should include alcohol use, the assessment of risk, identification of problems and diagnosis of alcohol dependence.

8) Screening for alcohol risk and disorder should be practice-based and be delivered to the practice population in an organised and systematic manner.

9) The use of the periodic healthcheck is recommended as a suitable means of providing alcohol screening.

10) The role of both practice nurses and general practitioners are integral to this process.

11) Training in screening, assessment and management of alcohol issues are required by both practice nurses and general practitioners.

12) There is a need for research into the organisational resources and supports required to improve the delivery of alcohol screening.

13) General practitioners should be encouraged to report their experiences related to screening, assessment and management of alcohol disorder in general practice as a means of improving understanding of these issues.
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Appendix 1 Alcoholics Anonymous: Definition and Twelve Steps

The following is the definition of A.A. appearing in the Fellowship's basic literature and cited frequently at meetings of A.A. groups: Alcoholics Anonymous is a fellowship of men and women who share their experience, strength and hope with each other that they may solve their common problem and help others to recover from alcoholism. The only requirement for membership is a desire to stop drinking. There are no dues or fees for A.A. membership; we are self-supporting through our own contributions. A.A. is not allied with any sect, denomination, politics, organization or institution; does not wish to engage in any controversy; neither endorses nor opposes any causes. Our primary purpose is to stay sober and help other alcoholics to achieve sobriety.

Alcoholics Anonymous can also be defined as an informal society of more than 2,000,000 recovered alcoholics in the United States, Canada, and other countries. These men and women meet in local groups, which range in size from a handful in some localities to many hundreds in larger communities. Currently, women make up 35 percent of the total membership.

The Twelve Steps of Alcoholics Anonymous

The relative success of the A.A. program seems to be due to the fact that an alcoholic who no longer drinks has an exceptional faculty for "reaching" and helping an uncontrolled drinker. In simplest form, the A.A. program operates when a recovered alcoholic passes along the story of his or her own problem drinking, describes the sobriety he or she has found in A.A., and invites the newcomer to join the informal Fellowship. The heart of the suggested program of personal recovery is contained in Twelve Steps describing the experience of the earliest members of the Society:

1. We admitted we were powerless over alcohol - that our lives had become unmanageable.
2. Came to believe that a Power greater than ourselves could restore us to sanity.

3. Made a decision to turn our will and our lives over to the care of God as we understood Him.

4. Made a searching and fearless moral inventory of ourselves.

5. Admitted to God, to ourselves and to another human being the exact nature of our wrongs.

6. Were entirely ready to have God remove all these defects of character.

7. Humbly asked Him to remove our shortcomings.

8. Made a list of all persons we had harmed, and became willing to make amends to them all.

9. Made direct amends to such people wherever possible, except when to do so would injure them or others.

10. Continued to take personal inventory and when we were wrong promptly admitted it.

11. Sought through prayer and meditation to improve our conscious contact with God as we understood Him, praying only for knowledge of His will for us and the power to carry that out.

12. Having had a spiritual awakening as the result of these steps, we tried to carry this message to alcoholics and to practice these principles in all our affairs.

Newcomers are not asked to accept or follow these Twelve Steps in their entirety if they feel unwilling or unable to do so.

They will usually be asked to keep an open mind, to attend meetings at which recovered alcoholics describe their personal experiences in achieving sobriety, and to read A.A. literature describing and interpreting the A.A. program.

A.A. members will usually emphasize to newcomers that only problem drinkers themselves, individually, can determine whether or not they are in fact alcoholics. At the same time, it will be pointed out that all available medical testimony indicates that alcoholism is a progressive illness, that it cannot be cured in the ordinary sense of the term, but that it can be arrested through total abstinence from alcohol in any form.
Appendix 2. Diagnostic classification of alcohol disorders

Diagnostic criteria for ICD-10 harmful use of alcohol and alcohol dependence syndrome

F10.1 Harmful use of alcohol

(a) A pattern of alcohol use that is causing damage to health. The damage may be physical (as in cases of liver cirrhosis) or mental (e.g. episodes of depressive disorder secondary to heavy consumption of alcohol). The diagnosis requires that actual damage should have been caused to the mental or physical health of the user.

(b) No concurrent diagnosis of the alcohol dependence syndrome.

F10.2. Alcohol dependence syndrome

A definite diagnosis of dependence should usually be made only if three or more of the following have been experienced or exhibited at some time during the previous year:

(a) A strong desire or sense of compulsion to drink;
(b) Difficulties in controlling drinking behaviour in terms of its onset, termination, or levels of use;
(c) A physiological withdrawal state when alcohol use has ceased or been reduced, as evidenced by: the characteristic withdrawal syndrome for alcohol; or use of the same (or closely related) alcohol with the intention of relieving or avoiding the alcohol withdrawal symptoms;
(d) Evidence of tolerance, such that increased doses of alcohol is required in order to achieve effects originally produced by lower doses (clear examples of this are found in alcohol dependent individuals who may take daily doses sufficient to incapacitate or kill nontolerant users);
(e) Progressive neglect or alternative pleasures or interests because of drinking, increased amount of time necessary to obtain alcohol, to drink, or to recover from its effects;
(f) Persisting with alcohol use despite clear evidence overtly harmful consequences, such as harm to the liver through excessive drinking, depressive mood states consequent to periods of heavy alcohol use; efforts should be made to determine that the user was actually, or could be expected to be, aware of the nature and extent of the harm.
Diagnostic criteria for DSM III-R alcohol dependence and alcohol abuse

Alcohol Dependence

A. At least three of the following:

1. Alcohol often taken in larger amounts or over a longer period than the person intended
2. Persistent desire or one or more unsuccessful efforts to cut down or control alcohol use
3. A great deal of time spent in activities necessary to get alcohol (e.g., theft), using alcohol or recovering from its effects
4. Frequent intoxication or withdrawal symptoms when expected to fulfill major role obligations at work, school, or home (e.g., does not go to work because hung over, goes to school or work "high", intoxicated while taking care of his or her children), or when alcohol use is physically hazardous (e.g. drives when intoxicated)
5. Important social, occupational, or recreational activities given up or reduced because of alcohol use
6. Continued alcohol use despite knowledge of having a persistent or recurrent social, psychological, or physical problem that is caused or exacerbated by the use of alcohol (e.g. keeps using alcohol despite family arguments about it, or having an ulcer made worse by drinking)
7. Marked tolerance: need for markedly increased amounts of the alcohol (i.e. at least a 50% increase) in order to achieve intoxication or desired effect, or markedly diminished effect with continued use of the same amount
8. Characteristic withdrawal symptoms
9. Alcohol often taken to relieve or avoid withdrawal symptoms

B. Some symptoms of the disturbance have persisted for at least one month, or have occurred repeatedly over a longer period of time.

Alcohol Abuse

A. A maladaptive pattern of alcohol use indicated by at least one of the following:

1. Continued use despite knowledge of having a persistent or recurrent social, occupational, psychological, or physical problem that is caused or exacerbated by use of alcohol.
2. Recurrent use in situations in which use is physically hazardous (e.g. driving while intoxicated)

B. Some symptoms of the disturbance have persisted for at least one month, or have occurred repeatedly over a longer period of time.

C. Never met the criteria for Alcohol Dependence.
Appendix 3. Screening questionnaires.

CAGE Questions

1. Have you ever felt you ought to CUT DOWN on your drinking?
2. Have people ANNOYED you by criticizing your drinking?
3. Have you ever felt bad or GUILTY about your drinking?
4. Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (an EYE-OPENER)?

S-MAST Questionnaire

1. Do you feel you are a normal drinker?
   - Yes (0)
   - No (2)
2. Do friends or relatives think you are a normal drinker?
   - Yes (0)
   - No (2)
3. Have you ever attended a meeting of Alcoholics Anonymous (AA)?
   - Yes (5)
   - No (0)
4. Have you ever lost friends or girlfriends/boyfriends because of drinking?
   - Yes (2)
   - No (0)
5. Have you ever got into trouble at work because of drinking?
   - Yes (2)
   - No (0)
6. Have you ever neglected your obligations, your family or your work for two or more days in a row because you were drinking?
   - Yes (2)
   - No (0)
7. After heavy drinking, have you ever had delirium tremens (DTs), severe shaking, heard voices or seen things that weren't there?
   - Yes (2)
   - No (0)
8. Have you ever gone to anyone for help about your drinking?
   - Yes (5)
   - No (0)
9. Have you ever been in a hospital because of drinking?
   - Yes (5)
   - No (0)
10. Have you ever been arrested for drunk driving or driving after drinking?
    - Yes (2)
    - No (0)
AUDIT questions

1. How often do you have a drink containing alcohol?
   - NEVER
   - MONTHLY OR LESS
   - 2-4 TIMES A MONTH
   - 2-3 TIMES A WEEK
   - 4 OR MORE TIMES A WEEK

2. How many drinks containing alcohol do you have on a typical day?
   - 1 OR 2
   - 3 OR 4
   - 5 OR 6
   - 7-9
   - 10 OR MORE

3. How often do you have 6 or more drinks on one occasion?
   - NEVER
   - LESS THAN MONTHLY
   - MONTHLY WEEKLY
   - DAILY OR ALMOST DAILY

4. How often during the last year have you found it difficult to get the thought of alcohol out of your mind?
   - NEVER
   - LESS THAN MONTHLY
   - MONTHLY WEEKLY
   - DAILY OR ALMOST DAILY

5. How often during the last year have you found that you were not able to stop drinking once you had started?
   - NEVER
   - LESS THAN MONTHLY
   - MONTHLY WEEKLY
   - DAILY OR ALMOST DAILY

6. How often during the last year have you been unable to remember what happened the night before because you had been drinking?
   - NEVER
   - LESS THAN MONTHLY
   - MONTHLY WEEKLY
   - DAILY OR ALMOST DAILY

7. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?
   - NEVER
   - LESS THAN MONTHLY
   - MONTHLY WEEKLY
   - DAILY OR ALMOST DAILY

8. How often during the last year have you had a feeling of guilt or remorse after drinking?
   - NEVER
   - LESS THAN MONTHLY
   - MONTHLY WEEKLY
   - DAILY OR ALMOST DAILY

9. Have you or someone else been injured as a result of your drinking?
   - NO
   - YES, BUT NOT IN THE LAST YEAR
   - YES, DURING THE LAST YEAR

10. Has a relative or friend or a doctor or other health worker, been concerned about your drinking or suggested you cut down?
    - NO
    - YES, BUT NOT IN THE LAST YEAR
    - YES, DURING THE LAST YEAR
Scoring for the AUDIT:

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<td>2-4 times a month</td>
<td>2</td>
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<tr>
<td>2-3 times a week</td>
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<td>4 or more times a week</td>
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<td>Daily or almost daily</td>
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<td>0</td>
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<tr>
<td>Yes, but not in the last year</td>
<td>2</td>
</tr>
<tr>
<td>Yes, during the last year</td>
<td>4</td>
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The maximum possible score is 40.
Appendix 4: Healthcheck self-administered questionnaire

HEALTH CHECK QUESTIONNAIRE

Name: 
Date of Birth: 
Ethnic origin: European
Sex: Male / Female (Circle one) 
Maori
Other (Please specify)
Occupation: (Please specify)

PERSONAL AND FAMILY MEDICAL HISTORY

Record below any medical problem relevant to you or any member of your extended family:

Disease Relationship Please note age at onset of condition

High blood pressure
Heart attacks
Strokes
Diabetes
Glaucoma (raised pressure in eyes)
Alcohol problem
Cancer - state type
Other - please specify

CURRENT HEALTH Mark the bracket below if you have noticed:

( ) Abnormal bleeding ( ) Change in bowel habit ( ) Unexpected weight loss
( ) New skin moles/lumps ( ) Change in existing mole

Females: ( ) Family history of osteoporosis or frequent bone fractures
( ) For women after menopause: bleeding within last year

Males: ( ) Lumps/swelling in testes

Please turn page
HEALTH SCREEN Please tick the bracket which indicates the most appropriate answer.

Weight
1. Are you currently overweight?
   ( ) Definitely yes ( ) A little ( ) No

2. Have you ever followed a diet to help you lose weight?
   ( ) Regularly ( ) Occasionally ( ) Never

Exercise
1. How often do you undertake exercise to improve your fitness?
   ( ) Most days ( ) 3 - 4 days/week ( ) 1 - 2 days/week ( ) only occasionally

2. Which bracket best describes your current exercise?
   ( ) Fitness training ( ) Jogging, brisk walking ( ) Walking, gardening ( ) No routine
   eg gym or swimming or other light activities activities

3. Have you ever felt a need to improve your fitness?
   ( ) Definitely yes ( ) Sometimes ( ) Not really

Smoking
1. Have you ever smoked tobacco on a regular basis?
   ( ) Yes ( ) No skip to next section

2. If Yes, are you currently smoking?
   ( ) Yes ________ Number per day ( ) No skip to next section

3. Have you ever attempted to cut down or quit smoking?
   ( ) Yes ________ Number of times ( ) No

Alcohol
1. Do you sometimes drink alcohol?
   ( ) Yes ( ) No skip to next section

2. How often do you usually have a drink containing alcohol?
   ( ) Most days ( ) 3 - 4 days/week ( ) 1 - 2 days/week ( ) 1 - 2 days/month ( ) Less often

3. Estimate below the number of drinks you have on a typical day when you are drinking:
   __________ glasses __________ glasses __________ glasses
   ________ cans/stubbies __________ bottles __________ nipps
   ________ bottles Sherry __________ bottles
   ________ jugs __________ glasses Cocktails

4. How often do you engage in bouts of heavy drinking?
   ( ) Most days ( ) 3 - 4 days/week ( ) 1 - 2 days/week ( ) 1 - 2 days/month ( ) Never

5. Have you ever felt the need to cut down on your drinking?
   ( ) Yes ( ) A little ( ) No

6. Do close relatives ever worry or complain about your drinking?
   ( ) Yes ( ) Occasionally ( ) No

Other drug use
These questions are confidential, please answer them if they are relevant to you:
1. Do you sometimes use marijuana? or other drug, please specify ____________________________
   ( ) Regularly ( ) Occasionally( ) Never no further questions

2. Have you ever felt the need to cut down on your use?
   ( ) Yes ( ) Occasionally( ) No

3. Do close relatives or friends ever worry or complain about your use?
   ( ) Yes ( ) Occasionally( ) No

AIDS, hepatitis and sexually transmitted disease risk
1. Would information or testing related to these conditions be of interest? ( ) Yes
Acknowledgements

I would like to acknowledge all the patients in this practice study. They are the primary focus of this research and of the practice screening programme which is reported. In particular, I acknowledge my debt to those patients who have openly and willingly discussed issues related to alcohol in their lives.

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Dr John McMenamin
July 2001
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