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Hazardous or harmful alcohol use in emergency care –

early detection, motivation to change and brief intervention

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Sammanfattning

Alkohol leder ofta till olyckor, misshandel, dålig hälsa inom familjen och alkohol har samband med psykiatrisk och somatisk sjukdom. Särskilt berusningsdrickande har visat sig ha samband med alkoholproblem. Inom olycksfallsvården rapporteras en av fem patienter ha riskabla eller skadliga alkoholvanor. Att screena för alkohol, åtföljt av rådgivning, skulle göra kirurgisk akutvård mer effektiv och ha en preventiv inverkan på problem, som alkoholen ger upphov till. Syftet med denna avhandling har varit att öka kunskapen att upptäcka, motivera till förändring och ge kort rådgivning vid riskabla eller skadliga alkoholvanor bland somatiska akutpatienter. Två olika patientgrupper låg till grund för arbetet.

På akutvårdsmottagningen på S:t Görans sjukhus blev 1909 patienter slumpmässigt fördelade till gängse vård eller med ett tillägg av alkoholscreening. Vid användning av screeningtest gavs indikation på minst dubbelt så många riskkonsumenter, som indikerades i journalanteckningar för den förstnämnda gruppen. Bland unga kvinnor var proportionerna flera gånger större. Således är screening särskilt viktigt för unga kvinnor.

På den akuta intagningsavdelningen på Danderyds sjukhus kontaktades 697 patienter. I ett stickprov på 234 patienter undersöktes validiteten på de psykologiska alkoholmarkörerna Malmö modifierade MAST (Mm-MAST), CAGE, Trauma-skalan och de biologiska alkoholmarkörerna kolhydratfattigt transferin (CDT) och gamma glytamyl transferase (GGT) var för sig och i kombination med avseende på berusningsdrickande. Mm-MAST ensamt och CAGE och CDT kombinerat var känsligt för berusningsdrickande bland män mellan 30 och 73 år. Mm-MAST, CAGE, Trauma-skalan, CDT och GGT identifierade inte berusningsdrickande bland unga kvinnor. Således bör dessa alkoholmarkörer kombineras med frågor om berusning då testen används bland kvinnor. Berusningsdrickande visade sig ha hög förekomst bland akutpatienterna och var vanligast hos unga kvinnor.

Av 697 akutvårdspatienter, visade sig 165 ha riskabla eller skadliga alkoholvanor och de besvarade det svenska "Readiness to Change Questionnaire". I syfte att få ett index på patientens motivation, undersöktes de psykometriska egenskaperna av testet. Formuläret var tillförlitligt och faktorstrukturen överensstämde med Prochaska & DiClementes förändringsmodell. Både Quick Method och Readiness to Change-metoden för att klassificera individerna i förändringsberedskap hade medelgod begreppsvaliditet. Således verkar det svenska formuläret ge ett index på patientens motivationsstatus.

De 165 patienterna med riskabla eller skadliga alkoholvanor fördelades slumpmässigt till en Kontroll av Dryckes Vanor (Drinkers Check Up) och en kort undersökning med besked om resultatet. Det var samma utfall vid de båda interventionerna vid 6 och 12 månaders uppföljning. Resultaten visade att patienternas alkoholkonsumtion minskade och att motivationen ökade. Kirurgpersonalens insatser vid den korta undersökningen med återkoppling var fullt jämförbar med specialisternas från alkoholvården. Således skulle alkoholscreening och rådgivning kunna göras på en akutmottagning och ha en preventiv effekt.

Att ta upp alkoholfrågan skulle kunna förorsaka negativa känslor hos akutpatienter. Mindre än 4% av patienterna, som genomgick alkoholscreening hade emellertid denna reaktion. Detta är lovande med tanke på att 56% av patienterna med riskabla eller skadliga alkoholvanor inte hade tänkt på sina alkoholvanor som ett problem och att ytterligare 24% var tveksamma till om det var ett problem. Patienternas låga motivation gör emellertid att alkoholscreeningstester och rådgivning borde anpassas till detta förhållande.

Patienter med riskabla eller skadliga alkoholvanor och en traumadiagnos var mer motiverade än riskpatienter med exempelvis blindtarmsinflammation, vilken inte är alkoholrelaterad. Således skulle en alkoholrelaterad diagnos kunna vara ett motivationellt fönster för att förändra alkoholvanor.

Contents

Abbreviations

ALT	Alanine aminotransferase
ASI	Alcohol Severity Index
AST	Aspartate aminotransferase
AUDIT	Alcohol Use Disorders Identification Test
AUI	Alcohol Use Inventory
CAGE	Cutting down, Annoyance by criticism, Guilty feeling, Eye-opener
CDT	Carbohydrate deficient transferring
CI	Confidence Interval
Cl	Center liter
DCU	Drinkers Check Up
e.g.	Exempli gratia = for example
Fl	Femtoliter
FRAMES	Feedback, Responsibility, Advice, Menu, Empathy, Self-efficacy
GGT	Gamma glutamyl transferase
Kg	kilogram
MCV	Mean corpuscular volume
Mm-MAST	Malmö modified Michigan Alcoholism Screening Test
N	Number
PAT	Paddington Alcohol Test
P-value	Probability value
RTCQ	Readiness to Change Questionnaire
TLFB	Time Line Follow Back
TWEAK	Tolerance, Worry, Eye-opener, Amnesia, Cutting down
U/L	Unit per liter

List of original papers

The thesis is based on the following papers, which will be referred to in the text by their Roman numerals:

Study I.
Forsberg,L. Ahlberg,J. Möller,M. Hjalmarsson,K. Andreásson,S. **Alcohol screening in an emergency surgical ward: a randomised controlled study.** (Manuscript)

Study II.
Forsberg,L. Halldin,J. Ekman,S. Rönnberg,S. (2002) **Screening of binge-drinking among patients on an emergency surgical ward**. Alcohol 27, 77-82.

Study III.
Forsberg,L. Halldin,J. Wennberg,P. **Psychometric properties and factor structure of the Swedish version of the Readiness to Change Questionnaire.** (Accepted: Alcohol and Alcoholism; 2003)

Study IV.
Forsberg,L. Halldin,J. Ekman,S. Rönnberg,S. **The Readiness to Change Questionnaire: reliability and validity of a Swedish version and a comparison of methods of scoring** (Submitted: British Journal of Health Psychology; Mars 2003)

Study V.
Forsberg,L. Ekman,S. Halldin,J. Rönnberg,S. (2000) **Brief interventions for risk consumption of alcohol at an emergency surgical ward.** Addictive Behaviors, 25, 3, 471-475.

Abstract

Alcohol often leads to accidents, assaults, poor health in the family and is associated with psychiatric and somatic diseases. Binge drinking, in particular, has been shown to be a central factor in alcohol related problems. Adding alcohol detection and intervention to routine emergency care, where one out of five patients is reported to have hazardous or harmful alcohol habits, should make surgical care more effective and have a beneficial impact on the public health problem that alcohol constitutes. The aim of this thesis has been to increase knowledge about detection, motivation to change, and brief intervention of hazardous and harmful alcohol habits among emergency patients. Two study samples were used.

At the emergency ward at St Göran Hospital, 1909 patients were randomised for routine care or alcohol screening tests. With the use of tests at least twice as many risk consumers were indicated compared to notes in the medical records of the routine care group and among young women, in particular, the proportion was manifold. Thus, screening is important for young women, in particular.

At the Danderyd emergency intake ward, 697 patients were approached. In a sub-sample of 234 patients, the validity of the psychological tests Malmö modified MAST (Mm-MAST), CAGE, Trauma-scale, and the biological tests carbohydrate deficient transferrin (CDT) and gamma glutamyl transferase (GGT) were examined separately and in combination in relation to binge drinking. Mm-MAST alone and CAGE and CDT combined were sensitive to binge drinking among 30-73 year old men. Mm-MAST, CAGE, Trauma Scale, CDT, and GGT did not identify binge drinking among young women. Thus, these alcohol markers should be combined with questions about binge drinking, when used among young women. Binge drinking proved to be a prevalent risk behavior and most prevalent among young women.

Out of 697 emergency patients, 165 were assessed to have hazardous or harmful alcohol habits, and they responded to the Swedish Readiness to Change Questionnaire (RTCQ). In order to get an index of the patients' motivational status, the psychometric properties of the test were examined. The RTCQ factor structure was consistent with Prochaska and DiClemente's stages of change model, and that the test is reliable. Both the Quick Method to allocate a stage of change and a readiness to change score has modest construct validity. Thus, the Swedish RTCQ seems to get an index of the patients' motivational status.

The 165 patients with hazardous or harmful alcohol habits were randomized to a modified Drinkers Check Up (DCU) or brief assessment with a short feedback. There was the same outcome with the two interventions at the six and twelve month follow-up. There were reductions in alcohol outcome measures and patients moved to a stage more ready to change. Furthermore, the surgical staff was comparable to specialists in the alcohol field when conducting the brief assessment with feedback. Thus, screening and intervention could be done at an emergency ward and may have a preventive effect on the patients' alcohol use.

Opportunistic alcohol intervention might cause negative feelings as a result of the alcohol issue being raised. However, less than 4% of the patients who had alcohol screening had a negative response to the intervention. This is promising considering that 56% of the patients with hazardous or harmful alcohol use had not thought of their alcohol habits as a problem and 24% more were ambivalent whether it was a problem. However, alcohol screening tests and interventions should be adapted to the patients' low level of motivation.

Patients with hazardous or harmful alcohol habits and a trauma diagnosis were more ready to change than risk patients with e.g. appendicitis, which is not alcohol-related. Thus, an alcohol-related diagnosis might be a motivational window for changed alcohol habits.

Key-words: alcohol screening, motivation, brief intervention, emergency care

Introduction

Emergency hospitalisation
Anders in room 4, who just turned 23, has a terrible headache. In fact, his entire face feels as though it has been battered in. He doesn't recall too much about the brawl, since he was very drunk. The doctor has said that he has a severe concussion and that his jaw needs surgery. A moment ago he agreed to participate in the research project on alcohol. A nurse would ask him some questions. Thinking about alcohol brings on feelings of disgust. Sometimes he feels as if he drinks too much, although he doesn't drink more than his buddies. Hangovers are indeed unpleasant, and steering his cement-lorry after a weekend of drinking makes him feel a bit unsteady, but work is stressful and heavy and he needs to drink a bit on weekends in order to feel relaxed and cheerful. Problems disappear and he feels carefree. Yesterday, it all started with Pelle and himself sharing a crate of strong beer. Then they went to the tavern, some more beers and four to five shots.

Anders is quite a diminutive guy, only 62 kg, and has been involved in several quarrels and brawls in the past years. He has had to visit the emergency ward no less than three times for injuries, which he had suffered in brawls (a total of 16 days of hospitalization). Anders is estimated to have drunk 275 grams of alcohol on Saturday. Thus, Anders will probably have alcohol in his blood a day later, since it is estimated that 6–8 grams of alcohol is metabolized under normal conditions (Alkoholpolitiska utredningen, 1974) p. 25. However, many factors influence the metabolism of alcohol, which makes it difficult to estimate the blood alcohol level without a blood analysis.

Early detection of hazardous or harmful alcohol use
Drinking alcohol is for many something enjoyable and one of the good things in life. However, it also entails risks. It may be difficult for an individual to judge the extent of the risk and whether it is outweighed by the benefits. Early discovery of hazardous or harmful use allows individuals the opportunity to consider whether the benefits of alcohol outweigh the disadvantages and to make this evaluation before the behavior gradually becomes a deeply rooted habit difficult to break (Stephens and Marlatt, 1987; Baldwin and Baldwin, 1998).

The alcohol consumption has increased
Alcohol consumption in Sweden has increased during the 1990 (Leifman, 2001). Especially serious is the fact that consumption has increased among youths (Leifman, 2001). In a recently conducted population study (Bergman and Källmén, 2002), the number of total abstainers has decreased among women between 1997-2001, and the prevalence of hazardous or harmful alcohol use has increased from 11 to 15%. In the age group 17 to 27 years, hazardous or harmful alcohol use is found in 36% of women and 42% of men. Generally speaking, alcohol intake has become more frequent than it was earlier. Today, alcohol use is a mounting public health problem. This increase in consumption is tied to the gradual abandonment of earlier successful Swedish methods of countering excessive alcohol use due to Sweden's membership in the EU. Entry into the EU has involved a reduction in price and increased availability, which stimulates increased alcohol use (Leifman, 2001). In a review of existing knowledge conducted by the Swedish National Public Health Institute (Andreásson, 2002), approximately 700 000 individuals in Sweden are estimated to have risky consumption of alcohol and approximately 300 000 are estimated as being alcohol dependent.

Alcohol-related problems
The individual who drinks to much alcohol as well as others in society who might be affected by the drinking have interests in avoiding alcohol-related problems and costs. Early detection of hazardous and harmful alcohol habits might contribute to lower the present large negative effects of the alcohol use in society. Alcohol at times plays a part in traffic and drowning accidents (Duncan, 1997; Nelson et al., 1998).There is a relation between problem drinking and occupational accidents (Webb et al., 1994), increased sick-days (Hermansson, 2002) and elevated costs for employers (Hermansson, 2002). There is a connection between alcohol and physical abuse, psychosocial poor health in the family (Wakefield et al., 1996), impulsive decisions and actions, violence, and unwanted pregnancies among youths (Wechsler et al., 1994; Murgraff et al., 1999). Alcohol is a possible etiological factor in surgical diagnoses such as trauma, pancreatitis, ulcers, gastrointestinal disorders, and fatty degeneration of the liver (Rydberg et al., 1973; Kristensson-Aas et al., 1981; Nordén, 1988, p.295; Bombardier et al., 1997; Bombardier and Rimmele, 1998). Alcohol may be implicated in hypertension, cardiovascular disease, diabetes, breast cancer, as well as psychiatric diagnoses, such as depression, anxiety (Söderpalm, 2002) and posttraumatic stress syndrome (Chilcoat and Breslau, 1998; Stewart et al., 1998). However, more often than not data is equivocal and unable to pinpoint the effects of alcohol (Nordén, 1988; Chilcoat and Breslau, 1998). What is required is an analysis of alcohol habits and often behavior experimentation in order to obtain an explanation. Behavior experimentation may entail the patient abstaining from alcohol for a certain period of time in order to check for a possible effect on hypertension, impaired mental functioning, elevated liver values or depression (Miller and Rollnick, 1991; Bandura, 1997, p. 373). The association between alcohol habits and illness is also reflected in an association between increased alcohol use and increased sickness absence respectively disability pensions (Upmark, 1999).

Individuals rarely seek help for alcohol problems
Individuals with alcohol problems seldom seek alcohol-abuse treatment, particularly not individuals with hazardous drinking habits (Sobell et al., 1993). It has been reported that in the USA during the 1980s a mere 11-33% sought treatment for hazardous alcohol consumption, alcohol abuse, or alcohol dependence (Committee of the Institute of Medicine, 1990b; Skinner, 1990). Many of those seeking alcohol-abuse treatment are at such an advanced stage in their alcohol problem that changing proves difficult (Project Match Research Group, 1998), leading to complications and suffering. Seeking alcohol-abuse treatment presents several obstacles (Blomqvist, 1998), and the delay may be lengthy before help is ultimately sought (Hester and Miller, 1995, pp.45-46; Öjesjö, 2000). Since individuals seldom seek help on their own, it is necessary that initiative for action comes from a second party. The extent of and increase in consumption along with the disposal of traditional alcohol policy places demands on new methods for limiting the harmful effects of alcohol. Early detection of hazardous and harmful alcohol consumption followed by brief treatment may be one way. This intervention should also be cost-effective (Holder et al., 2000).

The emergency ward - a meeting place
Health care facilities constitute one of the arenas for meeting people with hazardous and harmful alcohol consumption. Primary health care (Committee of the Institute of Medicine, 1990a; Andreásson and Öjehagen, 2001), occupational health services (Hermansson, 2002), and school and university health services (Marlatt et al., 1998) are contexts, which may be opportune for early detection of hazardous and harmful alcohol consumption. Chafetz expressed early on that a crisis, which brings the patient under medical attention constitutes an

opportunity to treat an ailment, such as an alcohol problem, which may otherwise become chronic (Chafetz, 1968).

It is common to find individuals with hazardous and harmful alcohol consumption among patients at an emergency ward, which constitutes an important motivation for implementing efforts against alcohol right in the ward (Andréasson et al., 1990; Skinner, 1990; Andréasson, 1991). Within emergency somatic health care, it is estimated that 20-28% of patients have hazardous or harmful alcohol use (Borg et al., 1979; Jariwalla et al., 1979; Holt et al., 1980; Beresford et al., 1982; Brismar et al., 1983; Lloyd et al., 1986; Skinner, 1990; O´Connor and Schottenfeld, 1998). In a Swedish study, approximately 25% of the men and 19% of the women at an emergency surgical ward have hazardous alcohol use (Persson, 1991). Out of these patients, 80% are estimated to have sought medical care for alcohol-related problems (Persson, 1991).

Motives for screening and brief intervention in emergency care
Many surgical illnesses are alcohol-related (Cherpitel, 1993; Poon et al., 1994; Borges et al., 1998; Bradley et al., 2001). One motive for screening and intervention is that it can reduce alcohol intake and thus improve the prognosis of an alcohol-related illness. Continued harmful consumption likely leads to a relapse following treatment and recovery, since the treatment has not considered the aetiological cause behind the illness or injury (Bombardier et al., 1997; Bombardier and Rimmele, 1999).

A further motive for routine screening and intervention of hazardous and harmful alcohol habits at an emergency surgical ward is that alcohol testing is recommended as part of preoperative risk assessment. High alcohol consumption increases the risk of infection (Sander et al., 1995), somatic stress reaction, and other complications during and after surgery (Tönnesen et al., 1992a-b, 1999b; Tönnesen, 1999). The patients tend to have prolonged intensive care and more days of hospitalisation (Spies et al., 1996a). There is also a risk of withdrawal symptoms (Spies et al., 1996b). Having knowledge of the patient's alcohol intake can improve the health care given. For instance, prophylaxis for alcohol abstinence can be administered (Spies et al., 1995; Spies and Rommelspacher, 1999). If possible, a period of abstinence prior to surgery might be considered in order to prevent the negative effects of alcohol in connection to surgery (Eklund, 1996; Tönnesen and Kehlet, 1999). Complications can be reduced along with the accompanying risk of prolonged intensive care. This can result in great economical savings (Tönnesen, 1999).

The emergency care is a health-learning situation
There is evidence from the literature that emergency care is especially favorable from a pedagogical viewpoint (Gentilello et al., 1988; Chick et al., 1991). Chick states that :
"Patients may be especially receptive to counseling when recovering from medical illness"
(Chick et al., 1985). In an article by Longabaugh (Longabaugh et al., 1995) "the teachable moment hypothesis" is discussed. This means that those patients experiencing distress, which they attribute to alcohol involvement, may be ready to change their drinking. This is also the reasoning of Bombardier (Bombardier and Rimmele, 1998, 1999). A visit to the emergency ward can be a motivational window remaining ajar for a short period, but closing when the individual's everyday life takes over following the visit to the ward or being discharged. To increase the probability of successful early detection and brief intervention it may be wise to make use of this favorable learning situation.

Screening and brief intervention have good effects
There is firm support from research that screening of patients with hazardous and harmful alcohol habits followed by brief intervention results in a reduction of the amount of alcohol consumed (Committee of the Institute of Medicine, 1990b; Andreásson and Öjehagen, 2001; Miller et al., 2002b). In one review, the authors have substantiated that brief intervention can be upheld for up to two years (Andreásson and Öjehagen, 2001). Moyer (Moyer et al., 2002) found that the greatest effect for populations with less serious alcohol problems was accomplished within three to six months, followed by a gradual diminishment. Nevertheless, Kristenson demonstrates (Kristenson et al., 1983) that brief intervention has long-term effects with fewer sick-days following four years, lower health-care consumption following five years, and lower mortality following six years, compared with control groups and lower alcohol-related mortality following 13 years (Kristenson et al., 2002). However, in this study an interpretation dilemma involves brief intervention, which is more extensive than in other studies with regular return visits for up to four years, while brief intervention commonly constitutes three to five sessions (Babor and Higgins-Biddle, 2000). However, Fleming and colleagues have found (Fleming et al., 2002) that the effect is maintained for up to four years, and in Fleming's study, brief intervention comprises two sessions of 10-15 minutes each. It has also been demonstrated that the effect of four sessions of motivational enhancement therapy was maintained following three years (Project Match Research Group, 1998).

The cost of screening and brief intervention appears to be moderate, and the effort seems to be profitable from a health economical perspective (Holder and Blose, 1992; Holder et al., 2000). Fleming (Fleming et al., 2002) has reported that brief intervention leads to fewer days of hospitalization and fewer visits to the emergency ward. Yet lower alcohol-related mortality has been reported during a period of 10-16 years after brief intervention (Kristenson et al., 2002).

Screening and brief intervention at an emergency ward
Several studies from somatic emergency wards have reported favorable effects of screening and brief intervention (Antti-Poika et al., 1988; Persson and Magnusson, 1989; Dinh-Zarr et al., 1999; Gentiello et al., 1999; Bombardier and Rimmele, 1999; DÓnofrio and Degutis, 2002; Williams et al., 2002). However, it has not been reported that the studies have led to implementation of routine screening and alcohol prevention. In order to increase the possibility of initiating long-term alcohol prevention, surgical personnel can be involved in conducting the study. When personnel are familiar with the method, then it becomes easier to uphold the innovation, which in turn makes it easier to promote the innovation vis-à-vis their colleagues. In addition, the results of such a study may be easier to generalize, and a more accurate picture may be achieved. However, such a strategy might not be compatible with the regular work done in the ward, or perhaps handling the issue of alcohol is too great a challenge for surgical personnel. A delicate subject, such as the patient's alcohol habits, should perhaps not be dealt with in connection with a visit to an emergency ward, which is a noisy environment with a limited privacy.

What should be identified and which are the marginal values?

Preoperative risk assessment
In order to avoid increasing the risks of surgery, consumption of alcohol is recommended not to exceed 60 grams of pure alcohol per day. This is approximately equivalent to three strong beers or a bottle of wine per day (Tönnesen et al., 1992a, 1999b; Sander et al., 1995).

A hazardous regular amount of alcohol

The limit is not obvious, and often considerably more restricting, in terms of when the amount of alcohol consumed is hazardous and harmful in regard to social, occupational, and medical circumstances, etc. The circumstances in which the drinking takes place as well as individual differences exert an influence (Committee of the Institute of Medicine, 1990a; Fleming, 2002). Both regularly elevated alcohol consumption and becoming intoxicated may be hazardous or harmful. Earlier on, researchers in Sweden drew up limits for alcohol intake, which have been available for reference in places like the Systembolaget (state-controlled company for the sale of wines and spirits). During recent years the limits for risk consumption has generated conferences where researchers have agreed on set limits (Hollstedt and Rydberg, 1981; Damström Thakker, 1998; Rydberg and Allebeck, 1998). At the International Symposium on Moderate Drinking and Health (Ashley et al., 1994), healthy men are recommended to drink no more that two standard-sized glasses (27 grams of pure alcohol) per day, six days of seven. Women are recommended to drink no more than one and a half glasses (20.5 gram) per day. The symposium also recommends that individuals should avoid binge drinking in order not to jeopardize their health and bring about undesired social consequences (Ashley et al., 1994).

Binge drinking

Binge drinking has long been regarded as an important risk behavior (Chafetz, 1967; Cooney et al., 1995; Österling, 1997; Bondy et al., 1999) and in the last decade there has been cogent documentation of the correlation between binge drinking and injuries. Binge drinking is associated with an increased risk for trauma (Rivara et al., 1993) and with stroke and sudden death in connection with head injury (Altura and Altura, 1999). The frequency of binge drinking was correlated with drunk-driving (Duncan, 1997; Nelson et al., 1998), which is a serious risk behavior for the person who drinks and drives as well as for the road-using public. Binge drinking among youths is correlated with accidents, risk of violence and rape, unprotected sex and suicide (Wechsler et al., 1994, 1995; Murgraff et al., 1999). When defining hazardous and harmful alcohol use, the frequency of binge drinking is an aspect with at least as great importance as regular alcohol use (Rehm et al., 1996; Martinic, 1999; Reynaud et al., 2001). Binge drinking is probably the most common way to drink alcohol among youths who drink (Nyström, 1993). It is found that the risk of harm increases if the average amount consumed increases, and particularly if the individual binge drinks (5+ standard drinks / occasion) (Room et al., 1995). It may be more efficient to predict future alcohol-related problems by focusing on heavy drinking occasions rather than on the individual's general level of consumption (Single and Leino, 1998). The frequency of binge drinking as well as the average amount consumed were each independently correlated with the development of dependence (Dawson and Archer, 1993; Robin et al., 1998). Binge drinking can be an early sign of future alcohol dependence (Chafetz, 1967). Consequently, this is of particular interest with reference to early detection from a preventive viewpoint.

However, binge drinking has been defined in various ways. In the Alcohol Use Disorders Identification Test (AUDIT) (Babor et al., 1989), which is a modern test for hazardous or harmful consumption, binge drinking is defined as six standard drinks of 12 grams per occasion regardless of sex. However, the effect of alcohol differs for men and women, and men generally weigh more than women, which means that different limits can be considered for each sex. More recently, the limit of standard drinks of binge drinking has been suggested to be four standard drinks for women (Wechsler et al., 1995; Bradley et al., 1998a).

Discovery of hazardous or harmful alcohol use

The clinical eye

There are reports of substantial underestimation of physicians' assessments of alcohol dependence and hazardous and harmful alcohol habits (Rodriguez and Cami, 1988; Persson, 1992; Rydon et al., 1992; Isaacson et al., 1994). In a Swedish study, serious under-diagnoses of alcohol as a contributing factor to death were observed (Romelsjö et al., 1993). However, more knowledge is needed whether a swift screening test could identify a greater percentage of patients with hazardous alcohol use as compared to standard procedures.

Combining psychological with biological alcohol markers

Hazardous and harmful alcohol habits can be detected both by the questionnaires and by blood analyses. An effective test should have high sensitivity and specificity. A test with high sensitivity detects most of the patients who have hazardous or harmful alcohol habits and a test with high specificity identifies those without hazardous or harmful alcohol habits (Miller et al., 2002a). It has been demonstrated that the probability of detection varies with factors such as sex and age (Connors, 1995; Österling et al., 1997). The prevalence of alcohol problems in the population naturally has an impact on the sensitivity and specificity of a test.

It is conceivable that detection also varies for different types of alcohol behavior. The majority of the tests were originally developed for screening of alcoholism or alcohol dependence, however they have subsequently also proved to be sensitive to hazardous and harmful average alcohol use. Yet, the tests' sensitivity to binge drinking is seldom reported. Given the known adverse effects of binge drinking, the validity of screening tests for binge drinking should be reported as well as the influence of age and gender on the identification of hazardous or harmful alcohol use.

Combining psychological alcohol testing with biological marker, which are based on blood tests and blood analyses, tends to increase the sensitivity of psychological testing, which is usually more sensitive than biological testing (Allen et al., 1998; Seppä et al., 1999). A further reason for employing more varied tests in screening is that they most probably capture various segments of the population with hazardous and harmful alcohol use (Hermansson et al., 2000). In addition, the reliability of the answers may increase if the patients are sober when interviewed.

However, it has been reported that if the patient associates the interview with negative consequences, then the percentage of positive cases identified by the questionnaire decreases (Midanik, 1989; Committee of the Institute of Medicine, 1990a; Sobell and Sobell, 1990, p.264). In this context, a negative consequence can be as subtle as an intonation or glance (Milmoe et al., 1967; Leake and King, 1977). Such a penalty does not only reduce the rate of detection, but most probably alters a situation, which has the potential for aiding the patients in reassessing their view of their alcohol habits, to one that is disagreeable and that tends to stimulate the patient's self defense and resistance (Brehm and Brehm, 1981; Miller and Rollnick, 1991; Baldwin and Baldwin, 1998. pp. 320-3).

Questionnaires

A number of well-known and short questionnaires used in screening of hazardous or harmful alcohol consumption are Mm-Mast (Malmö modified MAST) (Kristenson and Trell, 1982), CAGE (an acronym for Cut down, Annoyed, Guilty, Eye-opener) (Mayfield et al., 1974; Ewing, 1984) and the Trauma scale (Skinner et al., 1984). Skinner, who bore in mind that

people with alcohol problems are more often exposed to trauma, developed the Trauma Scale. The Trauma Scale includes five questions about injuries and is therefore seen as especially appropriate for an emergency surgical ward with a large percentage of trauma patients (Israel et al., 1996).

The sensitivity of Mm-Mast (nine questions) at a cut-off value of two yes-responses is 0,66 for big consumers and 0,73 for alcoholics (Kristenson and Trell, 1982) in a medical examination of middle-aged males. Mm-MAST, which was incorporated into a medical questionnaire designed for first-year students at a university in Finland, exhibited a sensitivity of 0,86 and a specificity of 0,87 for big consumers among males, while the corresponding data for females was 0,64 and 0,87 (Nyström et al., 1993).

CAGE is probably the most well-known and used questionnaire and is very short (Hays et al., 1993). CAGE is a screening test that has been proven to have high sensitivity and specificity with respect to alcohol dependence (Nilssen et al., 1994; Liskow et al., 1995), but CAGE is also used with respect to hazardous and harmful alcohol consumption (Allen et al., 1995; Cherpitel and Clark, 1995; Österling, 1997; Hapke et al., 1998).

TWEAK (five questions: Tolerance, Worry, Eye-opener, Amnesia, Cut down) is another short test (Connors, 1995). TWEAK is one of few alcohol screening tests that has been developed and validated in women drinking 14 or more standard drinks per week.

AUDIT (ten questions), which was referred to earlier has been recommended by the World Health Organization. The test has been developed for hazardous alcohol use and has adequate sensitivity and specificity (Allen et al., 1998; Babor and Higgins-Biddle, 2000).

Blood analyses
From blood analyses it has been discovered that gamma glutamyl transferase (GGT), which reveals whether the liver has been overburdened or damaged, is a marker for high alcohol consumption, which often is used in medical care. In one study, one third of high consumers and alcoholics were discovered among psychiatric patients (Bernadt et al., 1982). In another study comprising a medical examination of middle-aged males in a large city, the authors recommend the use of GGT together with a questionnaire in order to achieve high sensitivity (Kristenson and Trell, 1982). Using GGT is also an essential component in providing the patient with motivation-stimulating feedback (Kristenson et al., 1983; Antti-Poika et al., 1988). Screening makes it possible for the patient to receive clear feedback through a normal liver count when drinking is decreased or discontinued, which can be set up as a teaching behavioral experiment. Thus, if the negative effects of alcohol are substantiated, then the alternatives to drinking alcohol are reinforced (Baldwin and Baldwin, 1998 p. 323-4). Other tests of damaged liver function are Mean corpuscular volume (MCV), aspartate aminotransferase (AST) and alanine aminotransferase (ALT). MCV, AST and ALT are commonly used markers, although not very sensitive and specific.

A more recent biological marker for alcohol is carbohydrate deficient transferrin (CDT), which has satisfactory sensitivity and high specificity at relatively high consumption levels, at least 50-80 grams of pure alcohol per day on average during a period of a minimum of one week prior to sampling (Helander, 2001). According to Stibler, who has summarized studies on CDT comprising 2500 individuals, CDT demonstrates an average sensitivity of 0,82 and a specificity of 0,97 (Stibler, 1991). Researchers have found CDT to be of value because of its

high sensitivity and specificity (Allen et al., 1999; Tönnesen et al., 1999a) although, CDT is the most expensive marker (Maisto et al., 1995).

A valid assessment of alcohol habits
A test with adequate validity proves to have the capacity to measure the phenomenon, for which it is intended. A necessary prerequisite for this is its reliability. A form of reliability is internal consistency, which indicates the extension to which the test results appear to measure the same thing. Another form of reliability is measured by the extent to which a test duplicates the results when used at a later point in time.

There are several methods for obtaining a more careful description of patients, who test positive in an alcohol screening. A Swedish version of Addiction Severity Index (ASI) (Andreásson et al., 2000) offers wide mapping of alcohol and drug problems, economic problems, judicial, psychiatric areas etc. Alcohol Use Inventory (AUI) (Wanberg and Horn, 1983; Bergman et al., 2001) as well as Lifetime Drinking History (Skinner, 1979) and Time Line Follow Back (TLFB) (Sobell and Sobell, 1992) are other reliable methods with adequate relevance for mapping alcohol use. I TLFB a structured interview is conducted peering back in time using a calendar showing each day's consumption. The average consumption can be estimated in TLFB, which even offers information about binge drinking, if the interview window is wide enough. With a narrow interview window, binge drinking can be mapped using questions on maximal alcohol consumption and frequency of binge drinking. TLFB has the advantage of often elucidating part of the context in which the patient drinks. To exemplify, the positive and negative consequences of alcohol may be found as well as what triggered the drinking. Such a structured interview can turn up relevant information to be used together with the patient and stimulate self-examination, which by itself can lead to a change in alcohol habits (Miller and Brown, 1991). TLFB provides a basis for feedback of results in connection with follow-up contact, for such things as repeated liver tests, which makes it easier for the patient to see the positive consequences of abstaining from alcohol (compare differential reinforcement of other behavior (Baldwin and Baldwin, 1998, pp.323-4).

Two alternative models for motivation to change
The individual's own wish to change is deciding what will be done about the hazardous or harmful alcohol habits. Thus, one model of motivation serves a purpose in connection to patients with alcohol problems but also with many other diseases where the patient's own lesser and greater efforts have an effect on the prognosis. In the last decades, Prochaska and DiClemente's transtheoretical model of change (Prochaska and DiClemente, 1986) has gained popularity among researchers and clinicians (Davidson, 1998; DiClemente and Prochaska, 1998).

The stages of change model
In the transtheoretical model, motivation is perceived as movement through different stages in a circular process. According to the model, the individual is susceptible to different types of influences depending on which stage he or she is in. In the precontemplation stage, one does not perceive oneself to have a problem with the behavior in question. In this stage, the likelihood of change increases by stimulating the individual to actively reflect upon the behavior. In the following stage, contemplation, the goal is to help the individual reflect over a complicated change. The next thing to follow in the cycle of change is preparation, where the role of the counselor is to stimulate the client to make a decision about changing. In the action stage, the individual's new behavior, thinking, and efforts need to be reinforced in

order to develop further. Supportive relationships are important in this stage, as is knowledge of pitfalls. Maintenance is the fifth stage where continual long-term reinforcement of new behavior and new lifestyle is important, as are supportive relationships and awareness of pitfalls.

The readiness to change model

The stages of change model has been criticized that the stages are not derived from theory, but that they are taxonomy having no link to determinants in each stage. It has yet to be proven that any specific process or factor is significant in facilitating movement from one stage to the next (Bandura, 1997; Davidson, 1998). Moreover, the stages precontemplation, contemplation and preparation, may appear to be an arbitrary division of the addict's gradually growing intention to change, while the action and maintaining stages can be seen as an arbitrary division expressed in behavioral terms (Davidson, 1998).

Rollnick (Rollnick, 1998) proposes a continual readiness to change variable, which summarizes how importantly the individual perceives the change as well as the extent of the individual's confidence in achieving change. A continual readiness variable, comprising these two components, can be an easy model, clinically speaking, in the practical work with patients.

Testing motivation to change alcohol habits

There are questionnaires devised to measure the will to change – motivation (McConnaughy et al., 1983; Rollnick et al., 1992; Miller and Tonigan, 1996). The Readiness To Change Questionnaire (RTCQ) (Rollnick et al., 1992) is designed for clients with alcohol problems who might not be aware of having an alcohol problem and contains 12 statements for the individual to respond to. It assesses three of the model's stages of change. The maintenance stage was not included because items, reflecting this stage, were difficult to differentiate from items reflecting precontemplation, and the maintenance stage was not relevant to the population targeted by the RTCQ. The three-factor structure (Rollnick et al., 1992) is replicated with the German version of the RTCQ (Hapke et al., 1998) and with the Spanish version (Rodriguez-Martos et al., 2000). In a Dutch study (Defuentes-Merillas et al., 2002), a two-factor structure was found, comprising an action scale and a bipolar scale with precontemplation and contemplation items forming the negative and the positive pole of the scale, respectively. The RTCQ (Rollnick et al., 1992) has satisfactory reliability in male subjects with excessive alcohol consumption and low alcohol dependence who have sought health care but not alcohol treatment. The test has concurrent (Rollnick et al., 1992) as well as predictive validity (Heather et al., 1993) using both the Quick and the Refined Method of allocating a stage of change. However, the Refined Method can be used to match risk drinkers to brief motivational intervention or skill-based counseling (Heather et al., 1996), and this method also allows for allocating patients to the preparation stage.

In a comprehensive review (Carey et al., 1999) of the psychometric properties of tests assessing stages of change, including the RTCQ, Carey is in favor of a continuous readiness to change construct. A reanalysis of the original data in the Rollnick study (1992) favors a continuous 'readiness to change' variable (Budd and Rollnick, 1997). Budd & Rollnick propose that the two alternative models should be examined further with regard to reliability and validity, contrasting their relative merits. To our knowledge, the two alternative models have not been further tested.

Merits of a motivation to change test

Scores from a test assessing stages of change should predict change-related behaviors such as quit attempts, thoughts about quitting, and decisions to reduce or cut drinking (concurrent validity). Alcohol problem severity and alcohol consumption seem to be related to motivation. Thus, patients report more reasons to change drinking habits with more advanced stages of change, and stage of change was also positively associated with alcohol problem severity (Blume and Schmaling, 1997; Kahler, 2001). Internal motivation for alcohol treatment has been found to be greater for patients with more severe alcohol problems (DiClemente et al., 1999). A merit of a readiness to change test would be to predict level of severity of alcohol problems.

In the Project Match study (Project Match Research Group, 1998) motivation to change is the most potent predictor of drinking outcome throughout the three-year post-treatment period. Thus, the predictive validity seems to be of relevance considering the merits of a test assessing motivation.

Stimulating motivation

The motivation model, either in the form of stages of change or as a continuous readiness variable, assumes that people's motivation varies and can be influenced. Insufficient motivation is to some extent assigned to the failure of the health-care provider to match the client's stage of change or readiness to change (Miller and Rollnick, 1991). When the individual's innate endeavor for self-control is threatened by the authoritative attitude of the health-care provider, then the usual reaction of the individual is to defend himself/herself through resistance (Brehm and Brehm, 1981). DiClemente and Prochaska (1998) have found in their studies of the stages of change model, that only a minority of individuals with behavior considered to be unhealthy, are prepared to change (DiClemente and Prochaska, 1998). Examples of such unhealthy behavior are smoking tobacco, not exercising enough, and drinking a lot of alcohol. Very often approximately 40% of individuals with unhealthy behavior are in the precontemplation stage and an equal percentage in the contemplation stage (DiClemente and Prochaska, 1998). In order to stimulate the clients' motivation to change, the treating personnel must adapt themselves to the fact that a large majority of patients are not prepared to change (Miller and Rollnick, 1991, 2002; Rollnick et al., 1999). The knowledge that the relationship between the treating personnel and the patient can influence the patient's motivation to change his/her alcohol habits (Miller and Rollnick, 1991) is one of the components to be considered from a visit to the emergency ward.

By having personnel adapting to the patient's motivational stage of change, ethical values are safeguarded, and the risk that the patient interprets an opportunistic alcohol intervention as invasive treatment is minimized.

Motivational interviewing

The effect of the relationship between the patient and the treating personnel on motivation has been brought forward in recent decades (Chafetz, 1966, 1968; Darsten et al., 1979; Miller, 1983; Jenner, 1987; Miller and Rollnick, 1991). The expression 'Motivational interviewing' was coined some 20 years ago (Miller, 1983) and is tied to Prochaska and DiClementes stages of change model (Miller and Rollnick, 2002). In motivational interviewing (Miller and Rollnick, 1991), the counselor seeks to adjust his attitude to the patient's stage of change. Despite the main focus being on flexibility in motivational interviewing, there are also directive elements. One such element is to stimulate and reinforce the client's confidence in

his/her own capacity to change. Another is to map and elucidate the consequences associated with problem behavior as well as the consequences associated with an alternative behavior. The interviews are aimed at making it easier for people to think through complicated, hypothetical changes entailing consequences, which are difficult to grasp, accompanied by great ambivalence. Motivational interviewing places great demands on a focused and intensively active practitioner.

Extensive research on motivational interviewing has given promising results (Miller, 1985a-b; Miller et al., 1988; Miller and Sovereign, 1989; Project Match Research Group, 1998). In a review of randomized controlled studies, it is reported that 60% of 29 studies on motivational interviewing had a positive outcome (Dunn et al., 2001). In another review (Forsberg, 2002) of 33 randomized controlled studies, 24 gave evidence that the method had treatment effect. The literature shows a great variation in how extensive the interviews are as well as the situations in which they are carried out. A gray zone stands out between motivational interviewing and brief intervention, which is also reflected in how intervention is captioned in different studies, e.g. brief motivational interviewing, motivational intervention, brief negotiation.

Brief intervention

Miller & Sanchez (Miller and Sanchez, 1994) summarize hypothetically active components in brief intervention in the acronym FRAMES: Feedback from alcohol assessment results; Responsibility to make one's own evaluations and conclusions; Advice for clear advice giving; Menu for patients to choose different goals for reducing or remaining sober as well as to choose different strategies for attaining goals; Empathy clearly mediated by counselor; Self-efficacy where the counselor stimulates increased confidence in the patients own competence to carry through the task. Compared to brief intervention, motivational interviewing is more complicated, however. It is unknown whether the difference is crucial for the patients. There are few studies on what mechanisms in motivational interviewing facilitate changes in alcohol habits.

In one review, it was found that brief intervention is often just as efficient as more extensive treatment (Bien et al., 1993b), while others have found that extensive intervention improves the results (Richmond and Anderson, 1994; Andreásson and Öjehagen, 2001, p.55). However, there are differences in how brief intervention is defined (Jönson et al., 1995), which renders the interpretation of studies on brief intervention uncertain. In Bien's (Bien et al., 1993b) review, brief intervention varies between one session lasting from five minutes up to 12 sessions (Jönson et al., 1995), and in one study taking between 18 and 48 months (Kristenson et al., 2002). A distinction of both practical and economical interest can be made between a 30 minute-long intervention conducted by surgical personnel with brief training and an intervention lasting 2-4 sessions comprising motivational interviewing carried out by psychologists specialized in alcohol treatment.

General aims

The main purpose of this work was to examine the outcome of alcohol screening and brief interventions in emergency wards. Thus, one aim was to examine whether alcohol screening iindicates a larger percentage of patients with hazardous alcohol habits than standard procedures. Another aim was to investigate the validity of the psychological tests Mm-MAST, CAGE, Trauma scale and the biological markers GGT and CDT separately and in combination in relation to binge drinking. A third aim was to investigate the psychometric properties and factor structure of the Swedish Readiness to Change Questionnaire in order to get an index of the patients' motivational status. Lastly, an aim was to investigate whether extended alcohol counseling is more effective than just assessment with short feedback among surgical patients with hazardous or harmful alcohol use.

Specific aims

Study I.

1. Does a swift alcohol-screening test indicate a larger percentage of patients as having hazardous and harmful alcohol habits compared to what is indicated by standard procedures at an emergency surgical ward?

2. Does patient age and gender have an influence on the results of detection procedures of hazardous and harmful alcohol habits?

Study II.

3. What is the validity of Mm-MAST, CAGE, the Trauma Scale, GGT and CDT separately and in combination in relation to binge drinking?

4. What is the influence of patient age and gender on the validity of the screening tests with regard to binge drinking?

Study III.

5. What are the psychometric properties of the Swedish version of the Rollnick et al (1992) Readiness to Change Questionnaire and to compare the original three-stage concept to a one-factor and two-factor model of the same scale.

Study IV.

6. How are the relative merits of three methods of treating the scores for the Swedish version of the Readiness to Change Questionnaire (RTCQ) by investigating the construct and predictive validity of the three methods.

Study V.

7. Is extended alcohol counseling more effective than just assessment with a short feedback of hazardous alcohol consumption among surgical patients with risk consumption?

8. Could surgical nurses with minimal training in alcohol counseling be as effective as alcohol counselors in conducting a brief assessment with a message on hazardous alcohol habits?

Methods and material

The thesis is based on two randomized-controlled trials at two emergency surgical wards at two Stockholm hospitals. One of the studies was conducted at St. Göran's Hospital and was approved by the Research Ethical Committee at Karolinska Hospital, (No. 95/162) and was carried out in periods between January 1996 and December 1999. The other study was carried out at Danderyd Hospital in Stockholm, approved by the Research Ethical Committee at Karolinska Hospital (No. 92/327). It was conducted between 1993 and 1996 and was preceded by a pilot study in 1991 (Ekman et al., 1991), approved by the Research Ethical Committee at Karolinska Hospital (No. 91/102). The pilot study revealed that patients acutely hospitalized at surgical and orthopedic wards could be screened for hazardous or harmful alcohol consumption with the aid of psychological and biological alcohol markers.

Study I. Alcohol screening in an emergency surgical ward

Consecutive patients between 20 and 65 years of age at the emergency surgical ward at St. Göran's Hospital were asked to participate in a study on alcohol and health and be followed-up in a computerized register (n=1909). Patients who agreed to participate were randomized into a control (n=952) and study group (n=957) (figure 1). Obviously drunk or severely alcohol dependent patients and patients under the influence of narcotics were excluded. The study group responded to a health questionnaire where CAGE was used for screening of hazardous or harmful alcohol habits. CAGE was chosen because it is swift, well-known and has been used to detect alcohol abuse or harmful consumption (Österling et al., 1997; Hapke et al., 1998; Cherpitel, 2000). One or more yes responses to the CAGE identified positive cases (Hapke et al., 1998; Cherpitel, 2000). To increase the reliability in the questionnaire it was combined with biological markers (Committee of the Institute of Medicine, 1990a), which also detect different segments of patients with hazardous alcohol consumption (Hermansson et al., 2000). Thus, patients who had blood taken for surgical reasons also had the biological alcohol markers CDT and MCV analyzed. The cut-off limit for men in CDT was >20 U/L and >27 U/L for women (Helander et al., 1998). For MCV, a positive response for both sexes was >96 fL (Helander et al., 1998).

In the study group, all three screening tests could be used for 211 (22 %) patients, and positive responses in CAGE, CDT and MCV were determined. A further 36 patients responded to CAGE and had blood tests taken, but only CDT was analyzed, and results were obtained for both markers. In addition 375 (39 %) patients who had responded to the questionnaire, but had no blood tests taken had a positive response in CAGE (figure 1).

The large drop out in the study group (335; 35.0 %) after having agreed to participate in the study was due to:
➤ Illness (39; 12%)
➤ Workload on the ward (did not receive questionnaire, questionnaire lacked personal code etc.) (211; 63%)
➤ Incomplete questionnaire, went home (25; 7%)
➤ Patients changed their minds and did not wish to participate upon receiving the questionnaire (60; 18%)

A random sample of patients who had dropped out (n=36) was used in order to estimate the percentage of patients who had tested positive for alcohol among the dropouts. The random sample and dropouts corresponded in age and sex when analyzed using a log-linear model. Even the proportions between different reasons for dropping out corresponded, indicating that the random sample was representative of the entire dropout group.

Figure 1. Flow-chart of emergency patients randomized to study and control group
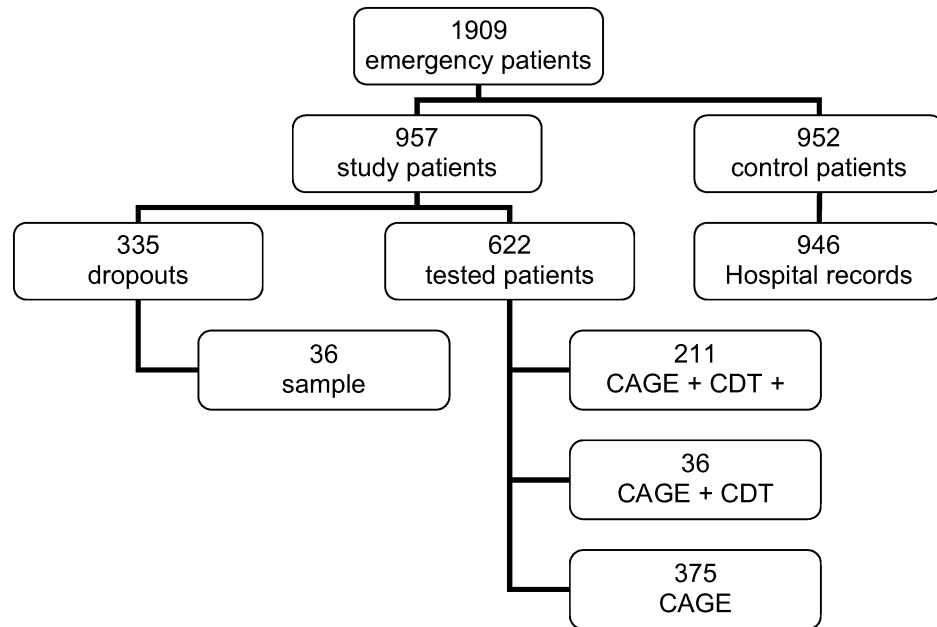
Those patients in the study group who only responded to CAGE, those who responded to CAGE and CDT, those who were screened by CAGE, CDT and MCV as well as those who constituted the drop-outs, were all comparable in gender and age distributions when analyzed with a log-linear model.

The study and control groups were compared with reference to the percentage of patients who were indicated with hazardous alcohol habits. Hazardous alcohol use in the control group was determined by analyzing notes concerning alcohol in the medical record from the visit to the emergency ward. Six patients dropped out from the control group (0.6%).

Confidence intervals for the proportions of hazardous alcohol habits in the study group and the control group were estimated using standard methods for proportions under assumption of binomial distribution and with a probability level of 95%. The odds ratio of discovering hazardous alcohol use in relation to the influence of sex and age were analyzed with logistic regression in the control group and in the study group.

Study II. Screening of binge drinking among patients at an emergency surgical ward
Consecutive patients at the surgical emergency intake ward at Danderyd Hospital were asked to participate in a study about "alcohol and health". They were told that they were going to be randomized between two interventions and were assured that no information from the study

Figure 2. Patients screened with Mm-MAST, CAGE, Trauma-scale, CDT and GGT
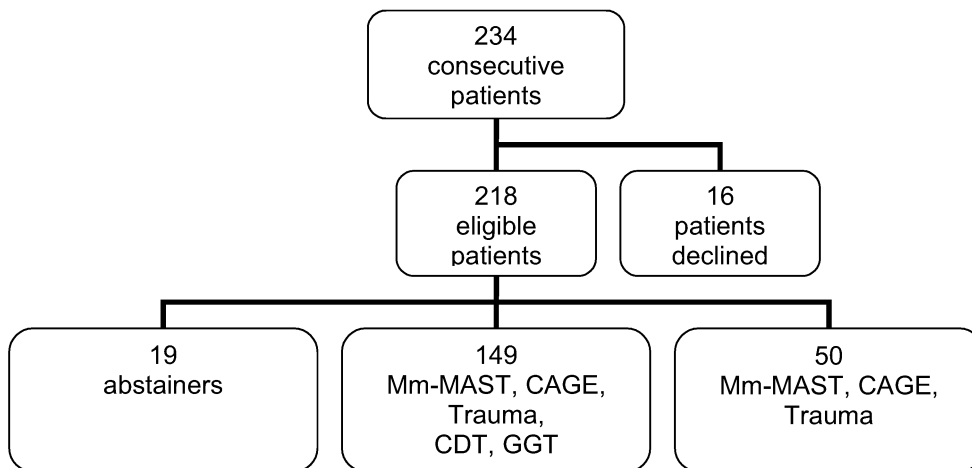
would be registered in their medical records. They would receive all results pertaining to them, and were told that they were free to discontinue their participation in the study, should they so wish. The participants were born between 1920 and 1976 and resided in Stockholm County. Exclusion criteria were terminal illness, unfamiliarity with the Swedish language, and use of narcotics for non-medical purposes.

During one month, all patients were interviewed about their alcohol consumption. Out of 234 emergency patients, who were asked to take part in the present study, 16 declined (7%) and 218 (106 men and 112 women) were interviewed. The definition of abstainers was "no use of alcoholic beverages during the last 12-month period". Nineteen patients were abstainers (14 women and 5 men), leaving 199 patients to be assessed with Mm-MAST, CAGE, and the Trauma Scale (figure 2). The cut-off level for binge drinking was set at ≥ 2 yes-replies in each of the questionnaires. Blood tests with analyses of GGT and CDT were performed on only 149 (75%) of the patients. Consequently, the validity of the screening instruments was estimated for 149 patients. As for the biological markers, CDT positive cases were set at ≥ 1.0 percent (Jeppsson et al., 1993). For GGT the cut-off value was set at ≥ 1.30 ukat/l for men and ≥ 0.80 ukat/l for women (Helander et al., 1998). The criteria for hazardous or harmful drinking with reference to binge drinking were compared with the responses in the questionnaire and from alcohol markers.

Binge drinking was assessed by questions about binge drinking and defined for men, as in AUDIT, as six standard drinks (Saunders et al., 1993) while three standard drinks was chosen as a limit for women (Bondy et al., 1999). First, a person must have been binge drinking on two or more occasions per month during the previous 12-month period. Second, a person must also have consumed at least 1.65/1.10 grams (men/women) of alcohol/kg body weight on some occasion during that same period.
Chi 2 was used to calculate differences between the proportions of patients who had blood tests taken and those who did not. Sensitivity, specificity, positive and negative predictive

values for hazardous and harmful alcohol use were calculated for each questionnaire and biological marker separately as well as for all combinations of the above. The calculations were made for men and women separately and for two age intervals, 16-29 and 30-73 years.

We were also interested to know how many patients with alcohol problems could be identified through ordinary medical routines. Lack of systematic documentation of elevated levels of alcohol consumption and binge drinking restricted us to examine the medical records with regard to diagnoses of alcohol dependence or abuse. Because of unreliable registration of outpatient medical care, only inpatient medical care was inspected. Diagnoses of alcohol dependence or abuse between 1988 and 1994 were scrutinized in the Stockholm County Council medical-care register, where all inpatient care within Stockholm is recorded.

The patients in studies III–V
The main study at Danderyd Hospital comprised 697 patients consecutively admitted at the emergency intake ward, of which 118 (16.9%) declined to participate in the study. Using the Kruskal-Wallis one-Way Anova, it was found that the patients who declined to participate were comparable in sex and age with those who took part. The inclusion and exclusion criteria are already described in study 2, being a part of the randomized controlled study at Danderyd Hospital. Eligible patients were interviewed using the screening questionnaires Mm-MAST (Kristenson and Trell, 1982), CAGE (Ewing, 1984), and the Trauma Scale (Skinner et al., 1984). The Swedish version of AUDIT (Saunders et al., 1993) was not yet available when the study was started (Bergman, 1996). Sixteen interview protocols were incomplete, which reduced the number of patients in the study material to 563 (figure 3).

Figure 3. Flow-chart of emergency patients in study III - V
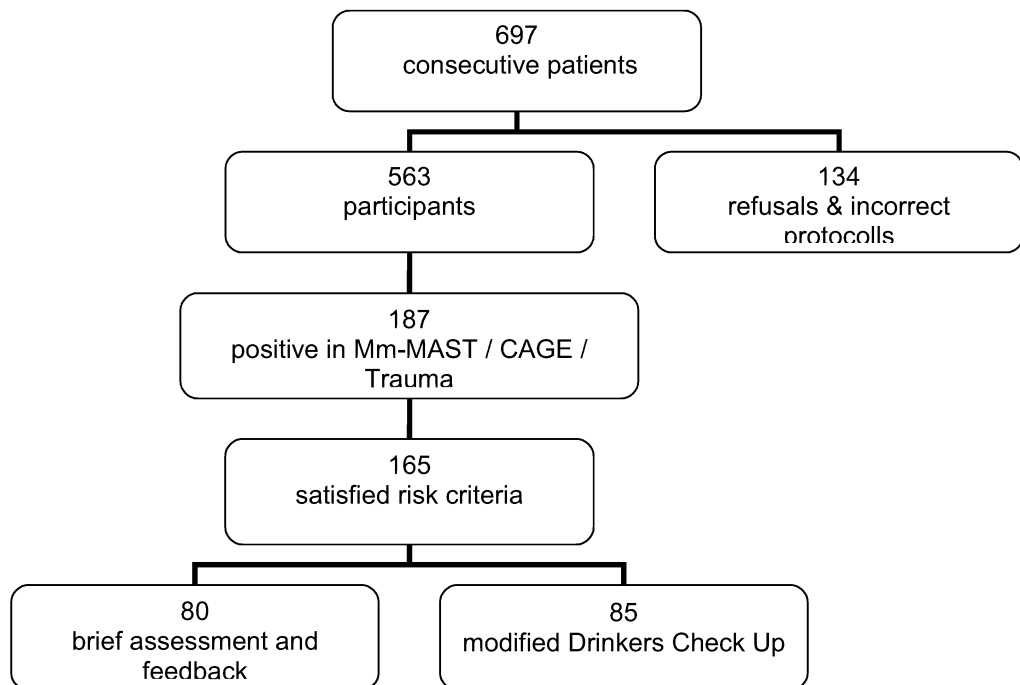
Cut-off limit for alcohol problems was two affirmative answers in any of the questionnaires (Cooney et al., 1995). As for the biological markers, CDT positive cases were set at ≥1.0 percent (Jeppsson et al., 1993). For GGT the cut-off value was set at ≥1.30 ukat/l for men and ≥0.80 ukat/l for women (Helander et al., 1998). Patients, who tested positive for alcohol in the screening tests were randomized by each receiving an envelope containing any one of the treatment alternatives. Positive cases were further assessed with regard to alcohol consumption, and those having risk consumption according to either of two criteria were subject to further analysis. The first criterion of risk consumption was regularly drinking ≥ 162 grams of absolute alcohol per week on the average for men and ≥ 82 grams for women (Ashley et al., 1994). The second criterion was peak consumption during the last 12-month period, for males ≥1.05 grams of absolute alcohol per kg body weight and for females ≥0.90 grams (Babor and Grant, 1991). Out of 563 patients, 29% (165) were classified as risk consumers, of these 80 patients were randomized to brief assessment and feedback, and 85 to a modified Drinkers Check Up (Miller, 1985a)(figure 3). Due to the workload of the staff,

Table 1. Demographics of the risk patients at Dander Hospital

		Brief assessment and feedback N=80	Extended alcohol counseling N=85	P-value statistical method	Total N=165
Gender	Percent men	65% (52)	78% (66)	0,07 1)	72% (118)
Age	Mean age	33	36	0,12 2)	
Civil status	Married/couple	56 (70%)	52 (62%)		108 (65%)
	Single	24 (30%)	33 (39%)		57 (35%)
Working status	Working	52 (65%)	54 (64%)		106 (64%)
	Studying	12 (15%)	11 (13%)		23 (14%)
	Sick-leave	2 (3%)	3 (4%)		5 (3%)
	Retired	10 (13%)	4 (5%)		14 (8%)
	Unemployed	3 (4%)	12 (14%)		15 (9%)
	Missing data	1 (1%)	1 (1%)		2 (1%)

1) Normal approximation 2) t-test two-tailed

Table 2. Preliminary intake diagnosis of the risk consumers, ranked from most to least frequent diagnoses

Preliminary intake diagnosis	Brief assessment and feedback N=80		Extended alcohol counseling N=85		Total N=165
Appendicitis	27	(34%)	18	(21%)	45 (27%)
Abdominal observation	15	(19%)	22	(26%)	37 (22%)
Trauma	13	(16%)	21	(25%)	34 (21%)
GI-bleeding	3	(4%)	9	(11%)	12 (7%)
Anal	2	(3%)	6	(7%)	8 (5%)
Ulcus/vomiting	6	(8%)	2	(2%)	8 (5%)
Diverticulitis	5	(6%)	0	(0%)	5 (3%)
Pancreatitis, bile/iterus, ileus/subileus, rest category	9	(11%)	7	(8%)	16 (10%)

Table 3. The groups at baseline in alcohol problems, affirmative responses in screening questionnaire and measures of alcohol consumption

	Brief assessment and feedback N=80	Extended alcohol counseling N=85	P-value statistical method	Total sample N=165
Scores in Mm-MAST, mean	2,74	3,58	0,001 3)	
Scores in Trauma scale, mean	0,98	1,48	0,007 3)	
Scores in CAGE, mean	1,04	1,48	0,039 3)	
Self-reported alcohol problems	19% (15)	21% (18)	0,70 1)	20% (33)
Alcohol diagnosis last 5 years	5% (4)	12% (10)	0,119 4)	8 % (14)
Sober days, mean	21,8	20,6	0,31 2)	
Typical day (grams alc/kg bw), mean	1,02	1,27	0,04 2)	
Peak amount (grams alc/kg bw), mean	2,21	2,42	0,29 2)	
Binge drinking			0,44 4)	
≤ once / month	9% (7)	5% (4)		7% (11)
2-4 times / month	55% (44)	49% (42)		52% (86)
2-3 times / week	29% (23)	31% (26)		30% (49)
≥ 4 times / week	6% (5)	14% (12)		10% (17)
Week consumption (grams alc) male female			0,07 4)	
0-90 0-60	50% (40)	44% (37)		47% (77)
91-180 61-120	30% (24)	30% (24)		29% (48)
181-210 121-150	4% (3)	11% (9)		7% (12)
211-420 151-300	16% (13)	11% (9)		13% (22)
421- 301-	0 (0%)	7% (6)		4% (6)
Percent raised CDT of tested patients	22% (14) N=63	13% (8) N=61	0,14 4)	18% (22) N=124
Percent raised GGT of tested patients	26% (17) N=66	18% (12) N=68	0,408 4)	22% (29) N=134

1) Normal approximation 2) t-test two-tailed 3) Mann-Whitney U, two-tailed 4) Chi square test of independence

Table 4. The groups at baseline in stage of change

	Brief assessment and feedback N=80	Extended alcohol counseling N=85	P-value statistical method	Total sample N=165
Stage of change			P=0,19 4)	
Precontemplation	50 (63%)	42 (49%)		92 (56%)
Contemplation	15 (19%)	25 (29%)		40 (24%)
Action	15 (19%)	18 (21%)		33 (20%)

4) Chi square test of independence

blood tests with analyses of GGT and CDT were performed on only 124 (75%) of the patients. Socio-demographic data are shown in table 1, and preliminary intake diagnoses in table 2. The diagnoses were categorized, but pancreatitis, bile/iterus, ileus/subileus and a rest category had few patients, and are classified as one category in the table.

The alcohol assessment incorporated: the TLFB (Sobell and Sobell, 1992) for a 14 day period, with questions regarding frequency and amounts of alcohol consumption during the past 12-month period (table 3) and the patient's "stage of change" as assessed by the RTCQ (Rollnick et al., 1992) (table 4). Initially six consumption measurements were taken. However, since "frequency any alcohol" and "sober days" seemed to be very closely related "frequency any alcohol" was omitted in most analyses:
1."Typical day", On a typical day when you drink alcohol, what and how much do you drink?
2. "Sober days", In an average month, for how many days do you abstain from alcohol?
3. "Frequency of binge drinking", How often have you, on one and the same occasion, drunk the equivalent of:
    Males (6 cans of strong beer or / 2 bottles of wine or / 6x6 cl spirits or more)
    Females (3 cans of strong beer or / 1 bottle of wine or / 3x6 cl spirits or more)
(Never / At most once a month / Two to four times per month / Two to four times per week or more)
4. "Peak amount", On the occasion you drank the most, what did you drink?
5. "Weekly consumption", calculated by TLFB over the last weeks.
Chi-square tests were employed to test differences in proportions for the variables at nominal level while t-tests were used for age and Mann-Whitney U for ranked values, all two tailed.

Study III. Psychometric properties and factor structure of the Swedish version of the Readiness to Change Questionnaire
The study was carried out as part of the randomized controlled study at Danderyd hospital (figure 3) with 165 risk patients described in tables 1-4.

In translating the RTCQ into Swedish, the readability and the comprehension of each item was tested on staff and patients of the alcohol and surgical units, and revised versions of the test were thus repeatedly tested until the understanding of the items seemed clear.

Each of the three sub-scales of the questionnaire assessing precontemplation, contemplation, and action contained four statements each to which the patients responded with one of the following five alternatives: Totally agree/+2, agree partly /+1, unsure /0, partly disagree/-1, totally disagree/-2 (Rollnick et al., 1992). Thus, the patients' score on each scale ranged from –8 to +8.

Cronbach´s alpha coefficients were calculated to estimate the internal consistency reliability of the scales. To investigate the test-retest reliability of the RTCQ, 18 patients responded to the questionnaire twice. These patients were chosen simply because they were inpatients and were available for the second interview one or two days after the first. A different interviewer most often performed the second interview.

A confirmatory factor analysis (LISREL 8.12a; (Jöreskog and Sörbom, 1993)) was conducted in order to test which of the three models was most appropriate for the data: one model with factors indicating three stages, one with two factors, and a model with one factor, indicating a continuous readiness variable.

Study IV. The Readiness to Change Questionnaire: reliability and validity of a Swedish version and a comparison of scoring methods
The study was carried out as part of the randomized controlled study at Danderyd Hospital (figure 3) with the 165 risk patients described in tables 1-4. Using the patients' responses in the RTCQ motivation was estimated both with the Quick Method and the Refined Method of stage allocation, respectively as well as a continuous readiness-to-change score.

Allocation of subjects to one of the stages with the *Quick Method* was based on the highest score obtained either on the precontemplation, contemplation, or action scales. In the event of a tie between two scale scores, the most advanced stage was chosen (Rollnick et al., 1992; Heather et al., 1993).

The *Refined Method* of stage allocation only used stage score profiles that are logically consistent with the stages of change model. Hence, this method discards subjects with a stage profile with e.g. positive scores on precontemplation and action and a negative score on contemplation. Subjects who scored zero or negatively on precontemplation and positively on contemplation and action were defined as being in the preparation stage of change, if the contemplation score was higher than the action score. If the action score was as high or higher than the contemplation score, subjects were allocated to the action stage (Heather et al., 1993).

Readiness score: All 12 items were combined to form a continuous Likert scale and were summed. The signs of the precontemplation items were changed to represent readiness to change ranging from –24 to +24.
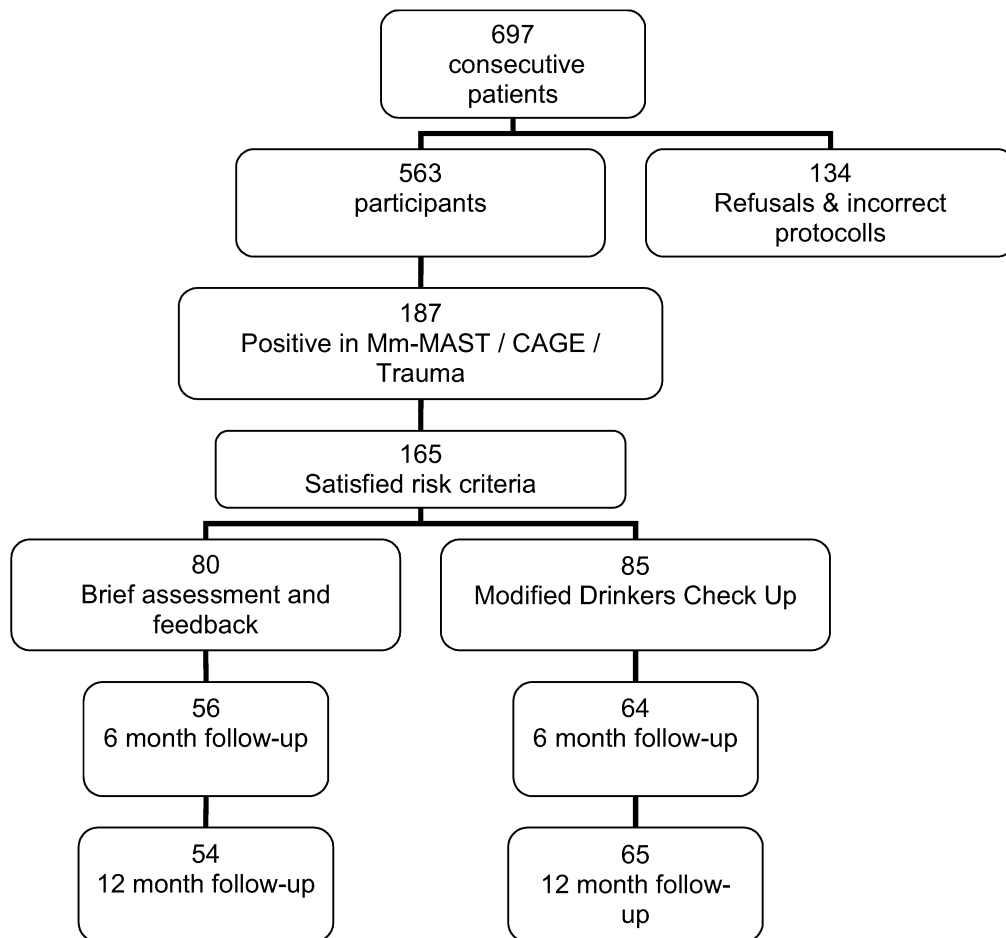
Test-retest and internal consistency reliability were calculated for each of the three investigated methods to score RTCQ. However, it was not possible to calculate the internal consistency for the Refined Method, since this method used stage profiles instead of scale scores to allocate patients to a stage of change.

The validity of the competing alternatives for determining the individual's motivation was examined by estimating the correlation between test motivation and different criteria of motivation. Thus, to estimate construct validity (Nunnally, 1967), the RTCQ results were correlated with the patient's self-reports of reducing or cutting drinking ('goal to change') and a strategy to do so ('strategy to change'). 'Goal to change' and 'strategy to change' were examined by studying session protocols regarding consideration to reduce drinking by patients in of the sub-group with extended alcohol counseling (N=85). Construct validity was also estimated by correlating RTCQ results to amount of alcohol consumed, severity of alcohol problems and alcohol diagnoses (DiClemente et al., 1999; Kahler, 2001). The four measures of alcohol consumption were 1) weekly consumption 2) typical day 3) peak amount and 4) frequency of binge drinking. Indices of alcohol problems were the number of affirmative answers in CAGE and in Mm-MAST at intervention and a DSM-diagnosis of alcohol dependence or alcohol abuse in the last five-year period.

The predictive validity of the three methods to treat RTCQ scores was also examined. Stage of change and readiness score was each correlated with the differences in alcohol intake between baseline and a six-month follow-up of the four measures of alcohol consumption. An alcohol outcome index was calculated as a ratio of the difference in alcohol intake and the mean of consumption at baseline and at follow-up, thus compensating for regression towards the mean. Follow-up data was available for 122 out of 165 patients (74%).

Study V. Brief interventions for risk consumption of alcohol at an emergency surgical ward
At Danderyd Hospital, 165 patients with hazardous or harmful alcohol use, described in tables 1-4, were randomized to either extended alcohol counseling or brief assessment and feedback and followed up after six and twelve months (figure 4).

Figure 5. Design study V

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                          ┌─────────────────────┐
                          │        697          │
                          │     consecutive     │
                          │      patients       │
                          └─────────────────────┘
              ┌──────────────────────┬──────────────────────┐
    ┌─────────────────────┐        ┌─────────────────────┐
    │        563          │        │        134          │
    │     participants    │        │  Refusals & incorrect│
    │                     │        │     protocolls      │
    └─────────────────────┘        └─────────────────────┘
    ┌─────────────────────┐
    │        187          │
    │ Positive in Mm-MAST / CAGE / │
    │       Trauma        │
    └─────────────────────┘
    ┌─────────────────────┐
    │        165          │
    │ Satisfied risk criteria │
    └─────────────────────┘
    ┌──────────────┬──────────────┐
┌──────────────┐  ┌──────────────┐
│      80      │  │      85      │
│ Brief assessment and │ │ Modified Drinkers Check Up │
│   feedback   │  │              │
└──────────────┘  └──────────────┘
┌──────────────┐  ┌──────────────┐
│      56      │  │      64      │
│ 6 month follow-up │ │ 6 month follow-up │
└──────────────┘  └──────────────┘
┌──────────────┐  ┌──────────────┐
│      54      │  │      65      │
│ 12 month follow-up │ │ 12 month follow-up │
└──────────────┘  └──────────────┘
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Brief assessment and feedback
The brief assessment and feedback (Group A) incorporated the Time Line Follow Back (TLFB) (Sobell and Sobell, 1992) for a 14-day period; questions regarding frequency and amount of alcohol consumption during the past 12-month period; the patient's "stage of change" measured by the RTCQ (Rollnick et al., 1992). The interview was concluded with the patient receiving a short feedback that he/she probably had hazardous alcohol consumption. The screening and the interview took an average of 26 minutes and were conducted either by a nurse from the ward or a surgeon or a psychologist from the alcohol treatment ward.

Nurses interested in the project volunteered to conduct the brief interview and before that to participate in a two-hour seminar on motivational interviewing as well as a few hour-long seminars, which they attended together with the entire personnel on the ward. The interested nurses were trained by participating in observations together with a psychologist (author). When they wished to try for themselves, the psychologist was present and could give feedback to them after the interviews with the patients until the nurse was able to conduct the interview with a motivating attitude. The surgeon attended a Motivational Interviewing workshop conducted by Drs Miller and Rollnick.

Out of 563 patients, 24% (136) were screened by surgical personnel, of which 40% (36) were patients who had been randomized for brief assessment and feedback. The difference in effectiveness between surgical personnel and psychologists specialized in alcohol treatment was tested in group A, comparing patients under both these conditions.

The clinical situation did not always allow seclusion, which is why patients who had been given privacy (127) were compared with patients whose conversation could be overheard (31), in consideration that a poorer result might be obtained in the follow-up. Seven interview questionnaires lacked information on seclusion.

Modified Drinkers' Check Up

The extended alcohol counseling (modified Drinkers' Check Up) (Group B) (Miller and Sovereign, 1989) was conducted by the psychologists. One psychologist (the author) had attended Motivational Interviewing workshops between 1984 and 1994 conducted by William R. Miller and/or Stephen Rollnick. The other psychologist was trained by participating in observations and was supervised in connection with interviews with patients.

In the first session the same interview as in group A was conducted. In the following feedback session the counselor explored for concerns raised by the patient of the information given:
- average consumption in relation to medical risk limits and consumption in the general population.
- estimated peak blood alcohol level put in relation to alcohol tolerance and accidental risks.
- offer to proceed with a neuropsychological screening (Trail-making A and B, Block Test, Digit Symbols) of functional impairments as a result of exposure to alcohol.
 - offer to proceed with a functional analysis of the alcohol behavior (Rönnberg, 1993; Meyers and Smith, 1995) and setting goals.
The counseling varied between 1–3 sessions in a time period of 1-2 1/2 hours depending on what patients accepted from the alcohol health check-up.

The offer of a neuropsychological screening was justified by the fact that hazardous drinking can affect the brain (Miller and Sauceda, 1992). Cognitive impairment and cerebral changes frequently occur long before the appearance of significant liver damage or other overt medical signs. The type of cerebral impairment that occurs in problem drinkers is not immediately apparent in interview settings because verbal intelligence and motor skills are largely spared. However, indications of impairment in the brain's function can be identified in neuropsychological tests (Löberg and Miller, 1986; Miller and Sauceda, 1992). By reducing or discontinuing alcohol consumption, the brain often recovers similarly to when the liver parameters normalize following a period of abstinence (Miller and Sauceda, 1992).

The offer of a preliminary functional analysis was presented as a way of gaining a general view of how different factors influence one's drinking (Meyers and Smith, 1995). Such

knowledge makes it easier to obtain ideas of appropriate strategies if one wishes to cut down on or abstain from alcohol.

Before each intervention was completed, questions were asked concerning the patients' attitude to having participated in a study of alcohol at a time when they had come for medical attention and been hospitalized for other problems.

Video was occasionally used in supervision both with brief assessment and a short feedback and with modified Drinkers Check Up, which might have improved the integrity of the protocol.

Follow-up

The same interview about alcohol consumption as was conducted at base-line was also conducted at the six and twelve month follow-up, with the exception that the study period covered the previous six months instead of twelve as it is in the base-line interview. At the six month follow-up, 74% (n=165) of the patients were interviewed (21% by telephone) and at the twelve month follow-up 119 patients (72%). If the patient was interviewed by telephone, the blood-test referral was sent to the patient so that he/she could have a blood test analyzed at the health-care center. Eighteen percent (29) of the patients could not be reached on any of the follow-up occasions.

Concerning the dropout of blood tests, 25% (41) of the patients at the baseline had no blood test taken, and a further 27% (45) at the six-month follow-up, rendering statistical analysis of the biological alcohol markers difficult to interpret. Thus, the biological markers were excluded from further analyses.

Diagnoses and information about inpatient care were taken from the medical-care register, where all inpatient care within Stockholm County is recorded. Through the medical-care register, data on health-care consumption was obtained, and information on sick-days was obtained from the regional social insurance office. Outside the frame of this work, analyses of how the effect of the intervention may have affected health-care consumption and sick-days are planned.

Statistical analysis

In testing whether the groups differed in change of alcohol consumption between baseline and follow-ups, a regression model on ranked values controlling for gender and consumption at baseline was used for the variables *peak amount, typical day, sober days* and *weekly consumption*. The variables *frequency of binge drinking* and *stages of change* were each classified as a few categories. Those categorical variables were assessed as increased, decreased or had remained unchanged, since baseline and differences between group A and B were tested with chi-square test of independence. Change for the whole study population for the variables *peak amount, typical day* and *weekly consumption* was calculated with a Wilcoxon matched-pairs signed ranks test, two-tailed. The categorical variables were tested with chi-square sign test.

Results and discussion

Study I. Alcohol screening in an emergency surgical ward

Out of 211 patients with data from three screening tests indicating hazardous alcohol habits, 45 (21.3%) tested positive in one or more of the tests CAGE, CDT or MCV. In the group of 36 patients with screening data in CAGE and CDT, 20 patients (56%) had positive results. Among 375 patients who only responded to the CAGE test, 70 patients (18.7%) were positive. Assuming a worst scenario all of the dropouts (n=335), except the seven patients in the sample who had alcohol-positive answers, were presumed not to have responded positively. Thus, with a conservative analysis, 142 patients (14.8%) had indications of hazardous alcohol habits (121–163; 95%). In the control group, notes classified as hazardous alcohol habits were found in 59 patients (6.2%). With a conservative analysis, all of the dropouts (n=6) had had notes about hazardous alcohol use. Thus, 65 patients (6.8%) had indications of hazardous consumption (42-72; 95%).

The effectiveness of the screening procedure might have been exaggerated by not controlling for lack of sensitivity and specificity in the tests (Rumpf et al., 2001). There are also patients with alcohol problems, whose physicians are aware of it, but do not make a note of it in the patients' medical records (Rumpf et al., 2001). However, the low proportion of patients in routine care that have been noted to have hazardous alcohol habits, and the high proportion of patients with hazardous use indicated by screening tests is comparable to results found in other studies (Graham, 1991; Shepherd et al., 1999; Aertgeerts et al., 2001; Manley et al., 2002).

It was noted that there were no systematic routines in the surgical ward for identifying hazardous alcohol consumption among patients. The percentage of identified individuals using standard routine was comparable to the results in study II and V. In study II only 4 out of 218 (1.8%) patients from an emergency ward had been recorded as having alcohol abuse or dependence during a seven-year period. In study V only 14 (8.5%) out of 165 patients with hazardous or harmful alcohol use had had an alcohol diagnosis in the last five-year period.

In the study group (excluding the dropouts), the odds ratio of discovering hazardous alcohol use was dependent on sex but not age. The odds ratio of being identified was 2.6 (C.I. 1.8 – 3.8) (p< 0.001) times greater for men than for women.

In the control group the odds ratio of discovering hazardous alcohol use was dependent on sex and age. Men were more frequently identified than women, with the odds ratio of 3.2 (C.I. 1.8 – 5.8) (p< 0.001). Furthermore, older patients were more frequently identified than younger. For patients above 60 years, the odds ratio of discovering hazardous consumption was 5.1 (C.I. 1.9 – 13.3) (p< 0.01), and for patients between 30 and 59 years, compared with patients below 30 years, the odds ratio was 2.4 (C.I. 1.1 – 5.4) (p< 0.01).

Even though it can be assumed that the effectiveness of the tests was somewhat exaggerated (Rumpf et al., 2001), it seems reasonable to contend that young women in particular would benefit if screening tests were introduced as part of routine. The results showed that screening indicated a significantly larger percentage of young female risk consumers (16.2 percent; N=105) compared with existing procedures (0.9 percent; N=127). The odds ratio of discovering hazardous alcohol use in a man over 60 years using prevalent procedures at the emergency ward was 16.5 times higher than for a woman under the age of 30. The disparity between different groups of patients was significantly lower when the screening procedure

was used. Without knowing the real prevalence of hazardous consumption among patients, it still seems clear that the regular procedures in the emergency department underestimated the rates of hazardous alcohol use, particularly among young women.

Among the older men, on the other hand, regular procedures in the emergency ward appeared to identify as many hazardous drinkers as the screening procedure. A conceivable explanation could be that hazardous alcohol use among older men may be viewed as socially less stigmatizing than for young women. In these cases, it may be easier for both the physician and the patient to discuss the alcohol habits and its possible contribution to illness.

However, even the screening tests might have underestimated the rate of hazardous alcohol use in young women. CAGE (Österling et al., 1993; Aertgeerts et al., 2001) and CDT (Allen et al., 1994) have earlier shown low sensitivity among women. Upon equal alcohol intake, young female students have scored lower in CAGE than male students (Nyström et al., 1993; Österling et al., 1993). CDT is sensitive to daily average alcohol intake equivalent to about three strong beers in the last few weeks (Helander, 2001). As a result, people with the drinking patterns of many young people with a lot of alcohol on weekends and abstinence during the week are lost. The actual proportion of young patients at risk is believed to have been higher, a suspicion which is backed by population studies (Hvitfeldt et al., 1999; Bergman and Källmén, 2002; Bergman and Källmén, 2003). In light of the alarming increase of hazardous and harmful alcohol habits among young women the results suggest that valid screening tests should be introduced into emergency surgical wards.

By using the sample of 36 patients considered as being representative of the dropouts, it was estimated that 65 additional patients were alcohol-positive. Thus, added to the 135 cases, a total of 200 (20.9%) patients were risk consumers (135-269; 95%). The percentage of patients with risk consumption may have been three times higher (20.9%) than was identified through regular routine at the emergency surgical ward.

There is no data about the patients who at the time of their visit to the emergency ward during the study period declined to participate in the study. Thus, there is some uncertainty in generalizing the results to emergency wards in Swedish urban cities.

Conclusions in study I

1. By using swift screening at an emergency surgical ward, the number of patients with indications of hazardous alcohol habits can be at least twice as many as with standard routine.
2. Especially among young women, CAGE is effective compared to standard routines.

Study II. Screening of binge drinking among patients on an emergency surgical ward
Out of the 149 investigated patients, 50 (33.6%) reported binge drinking according to the criterion. Binge drinking was reported by 42% of 16–29 year-old male patients, by 66% of 16–29 year-old female patients, by 27% of 30–73 year-old male patients and by 16% of 30–73 year-old female patients. The high prevalence of binge drinking among the young patients should raise particular concern for young people in this regard, especially for young women. Young women are more susceptible to injury caused by alcohol exposure (Damström Thakker, 1998) and are in the age of having children, which also puts the children at risk to get alcohol induced damages (Allebeck and Olsen, 1998). The high prevalence of hazardous drinking among young female is found elsewhere (Thom et al., 1999) and, do underscore the

importance of screening tests sensitive to binge drinking followed by preventive interventions at emergency wards. However, this is a small study and the prevalence of binge drinking has to be established in future research.

The sensitivity of the examined tests to binge drinking was unacceptably low among women. Among 16–29 year-old women, the most sensitive test, or combination of tests, was Mm-MAST with a sensitivity of 0.47. However, the sensitivity was best among 30-73 year-old men in screening tests with a sensitivity of 0.92 with Mm-MAST, followed by 0.83 with CAGE and CDT combined. Among 16–29 year-old men, CAGE alone had a sensitivity of 0.27 and the Trauma-Scale 0.36, but combined with Mm-MAST the three questionnaires did improve to the acceptable sensitivity of 0.82. Both CDT and GGT had a sensitivity of 0.09 among 16–29 year-old men and overlapped with Mm-MAST. For women there were no instruments or combination of instruments with sensitivity to binge drinking of 0.70 or above. Thus, the examined alcohol screening tests are unlikely to detect young binge drinking females, and binge drinking seemed to be most prevalent in this patient group.

CAGE in combination with CDT or GGT has been recommended as a screening method (Nilssen et al., 1994). CAGE is the most utilized test within health care, perhaps because it takes approximately one minute to complete (Hays et al., 1993). However, Bradley suggests a lower cut-off for CAGE among women (Bradley et al., 1998b). With a cut-off level of $1\leq$ yes-replies in the present study, the sensitivity increased from 0.06 to 0.31, but did not reach acceptable validity. Thus, screening with CAGE for hazardous or harmful alcohol use in female populations calls for caution. However, as shown in study I, CAGE indicates a significantly larger percentage of young female risk consumers than existing routine. Österling (Österling et al., 1997) has developed a test with CAGE and four items of AUI in combination, especially adapted to women. The CAGE + AUI4 has promising accuracy for binge drinking among women.

The AUDIT (Saunders et al., 1993) is specifically designed for hazardous or harmful alcohol habits with regard first and foremost to the previous 12 months. AUDIT is now available in a Swedish version (Bergman, 1996) and has shown that it can predict future diseases and injury among emergency ward patients (Conigrave et al., 1995a) and takes 2-3 minutes to complete (Conigrave et al., 1995b). AUDIT is reported to have adequate sensitivity and specificity for binge drinking among both women and men (Shakeshaft et al., 1998). The Paddington Alcohol Test (PAT) (Smith et al., 1996) containing three questions of which one is on binge drinking is less well known, but has shown itself to be promising in the emergency ward. As mentioned earlier, TWEAK has been validated for risk consumption among women. However, there are, to our knowledge, no Swedish versions of PAT or TWEAK (Sandahl et al., 1998).

Only four (1,8%) patients had an alcohol diagnosis during a seven-year observation period (1988-94) in the medical records of hospitalized patients.

Conclusions in study II

1. Mm-MAST, CAGE, the Trauma Scale, CDT and GGT are not sensitive to binge drinking among women
2. Mm-MAST alone and CAGE and CDT combined seem to be sensitive to binge drinking among 30–73 year-old men
3. There seems to be a high proportion of binge drinking among acute surgical inpatients, especially among young women.

Study III. Psychometric properties and factor structure of the Swedish version of the Readiness to Change Questionnaire

In order to compare how well a one and three-factor solution of the test fits the data, confirmatory factor analyses were conducted. The model best fit for data was the three-factor model in which the three factors were correlated. The root mean square error of approximation (RMSEA) is 0.06 compared to the other solutions, with RMSEA ranging between 0.08-0.16. The other fit-indices (Goodness of fit index and Comparative fit index) went in the same direction. This gives some support to the original idea of a three-factor model of the test.

Furthermore, the correlations between factors reflecting two stages near to each other had higher correlations than the two factors reflecting stages far from each other in the stages of change model; r (P x C) = 0.90; r (P x A) = 0.55; r (C x A) = 0.74. The strong and positive correlations between the three factors indicates that a high score in one scale is often accompanied by high scores in the other scales, which then might indicate that the test also measures another construct besides reflecting the three stages of change.

The internal consistency reliability was 0.78 for the precontemplation, 0.80 for the contemplation and 0.80 for the action scale. Test-retest reliability (Pearson correlation) was 0.85 (precontemplation scale), 0.97 (contemplation scale) and 0,86 for the action scale. Out of 18 patients, 16 were allocated to the same stage of change after having responded to the RTCQ a second time. The internal consistency of a continuous readiness scale was 0.88. Items deleted from the scale did not raise the internal consistency. The test-retest reliability was 0.94.

The results from studies of the RTCQ in five different languages, favors that the RTCQ factor structure is consistent with the stages of change model with a three-factor structure (Rollnick et al., 1992; Budd and Rollnick, 1996; Hapke et al., 1998; Rodriguez-Martos et al., 2000; Defuentes-Merillas et al., 2002). The strong and positive correlations between the three factors indicate that the test also measures another construct besides reflecting the three stages of change. This construct might be severity of alcohol problems.

Conclusions in study III

1. The factor structure of the Swedish version of the RTCQ was consistent with a three-factor structure in the stages of change model as tested by confirmatory factor analysis.
2. The test-retest and the internal consistency reliability were satisfactory for each of the three scales in the stages of change model.

Study IV. The Readiness to Change Questionnaire: reliability and validity of a Swedish version and a comparison of methods of scoring

Quick Method

The reliability of the test using the Quick Method as well as using the continuous readiness score is already reported above in study III. The internal consistency reliability was higher in the continuous scale due to more items in the scale.

There were significant relationships between stage of change and indices of alcohol problems (yes-responses in CAGE and Mm-MAST or an alcohol diagnosis), four measures of alcohol consumption, 'goal to change' and 'strategy to change'. However, several correlations were

low. Thus, the method had modest construct validity. The correlations using the Quick Method were slightly lower compared to the continuous scale. Stage of change did not predict alcohol consumption after a six-month period of time. However, there was a tendency that, patients in the contemplation stage reduced weekly consumption ($p < 0.07$) more often than patients in the action and precontemplation stages. Thus, the interventions might have matched the patients in the contemplation stage better than they did patients in the action and the precontemplation stages. Future research has yet to confirm this finding, which is not consistent with the prediction derived from the stages of change model (Prochaska and DiClemente, 1986, 1992; Prochaska et al., 1994; DiClemente et al., 1999). Thus, according to the model the patients in the action stage should have reduced their consumption of alcohol the most.

Continuous readiness score

Treating the continuous variable as a three-level discrete variable to be comparable to the analyses of stage of change, 15 patients were classified in the same section of the variable after having responded to the RTCQ a second time. The trichotomised continuous variable was significantly correlated (tau) with indices of alcohol problems, and 'strategy to change'. However, the significant correlations to alcohol consumption, and 'goal to change' were low. The correlations were about the same size when using the continuous variable without trichotomising it. Thus, modest construct validity was found. No tau correlation between the trichotomised variable and reduction in alcohol consumption at six-month follow-up reached statistical significance. However, without trichotomising, the readiness scores were low but significantly correlated (Spearman's rank correlation) to reduction in weekly alcohol consumption ($r = 0.15$; $p < 0.05$) at the six-month follow-up. Thus, no clinically significant predictive validity could be established.

An objection to the continuous readiness variable is that more research is needed to develop norms for cut-off values, which give meaning to the scale scores. In contrast, a stage allocation immediately informs the clinician about the meaning of that stage.

Refined Method

Using the Refined Method of stage allocation, 70 out of 165 patients (42 %) were classified to precontemplation, 16 (10 %) to contemplation, 13 (8 %) to preparation, and 13 (8 %) to the action stage. No less than, 53 (32%) patients were not classifiable according to this method. Concerning test-retest reliability, the same four patients were unclassifiable both times. Out of the remaining 14 patients, 13 were allocated to the same stage of change both times. The Refined Method resulted in higher relationships between stages of change and indices of alcohol problems and measures of alcohol consumption, and definitely higher correlations with 'goal to change' and 'strategy to change'. However, the correlation indicating construct validity might be an artifact as a result of the selection of only 68% of the patients with consistency in the response pattern when using this method. The Refined Method did not show predictive validity as previous found (Heather et al., 1993). Furthermore, not being able to classify one third of the patients is by itself a significant limitation.

The lack of predictive validity of the Swedish RTCQ might be due to small changes in the alcohol consumption between baseline and the six-month follow-up. Reported weekly alcohol consumption was reduced by 28% (37 grams of alcohol or about 2½ glasses of wine), typical amount by 13% (0.15 grams of alcohol / kg body weight) and peak amount of alcohol by 16%

(0.37 grams of alcohol per kg body weight). The small differences decreased the possibility to find predictive relations with results in the RTCQ.

However, it is justifiable to use the Swedish version of RTCQ that showed modest construct validity, either calculated as a stage of change using the Quick Method or as a continuous readiness variable. The questionnaire was a clinically useful basis for discussing risk consumption and readiness to change alcohol behavior in a non-confronting way. However, there are findings that indicate that the assessed readiness to change does not represent all, of the construct of patient motivation (McMahon and Jones, 1992, 1996). The readiness to change model and the stages of change model are complex constructs and each need further study as well as tests assessing the constructs.

Conclusions in study IV

1. The Swedish RTCQ scores treated as a continuous readiness scale is an alternative to the Quick Method of assigning a stage of change to a patient.
2. The Swedish RTCQ is reliable and has modest construct validity, but its predictive validity needs to be established.

Study V. Brief interventions for risk consumption of alcohol on an emergency surgical ward

The randomised groups at baseline
Patients in the two treatment alternatives were comparable in demographics (Table 1) and in preliminary intake diagnosis (Table 2) as well as in four measures of alcohol consumption (Table 3). The groups also were comparable in percent raised CDT, and GGT; in percent of alcohol dependence and alcohol abuse according to the DSM-IV in the last five-year period; in reported alcohol problems, in reported previous treatment for alcohol problems; and in the proportions of stages of change (Table 4). However, B-group (modified Drinkers Check Up) had higher consumption in "typical day" (Table 3), and there was a tendency in this group to have higher week consumption and higher scores in the Trauma questionnaire, and there were significantly higher scores in Mm-MAST and CAGE. Thus, there might have been patients with more severe alcohol problems in the group with a modified Drinkers Check Up than patients with a brief assessment and feedback.

The two groups at follow-ups
There were no significant differences found between the group that was followed up and the drop-outs at six and twelve months, using Kruskal Wallis one-way Anova, estimated on the value of rank order in a regression model with indices of alcohol consumption and controlling for gender.

At the six-month follow-up, group A with assessment and feedback showed a reduction in peak amounts compared to the patients in Group B with a modified Drinkers Check Up (P=0,03), but at the twelve month follow-up there was no difference between groups (P=0,23). There were no other differences in outcome between groups. Thus, the modified Drinkers Check Up with an offer of neuropsychological screening and a functional analysis of the alcohol behavior carried out by psychologists specialized in alcohol treatment did not improve outcome.

Patients are not asking for much help
Few patients in the modified Drinkers Check Up group made use of the offer of a neuropsychological screening (27 patients accepted; 11 with positive screening results) or a

functional analysis of alcohol behavior (10 patients). As many as 57 (67%) patients only had feedback on their alcohol use related to norms of risk to one's health and normal consumption levels. An offer of further help was not taken advantage of by the patients and did not lead to any improvement.

The fact, that an offer of further help was not taken advantage of by the patients is a result also found in other studies (Heather et al., 1990). In one study, researchers found that feedback of alcohol assessment results had effect on treatments (Agostinelli et al., 1995), as did normative information of alcohol behavior, but both efforts combined were *less* effective (Nye et al., 1999). In Project Match prolonged treatment appeared to have been detrimental to certain groups of patients. Hence, patients with a satisfactory prognosis (low alcohol dependence, minimal pressure to drink, minimal psychiatric problems), who have received minimal treatment (four sessions) during the follow-up period required health care to a lesser degree, and therefore had better results in this regard than if they had received long-term treatment (twelve sessions).

Starting-up is enough
One explanation may be that a significant proportion of patients is only helped by a starting-up intervention. Alcohol screening, interviews, and test-taking conducted in a respectful manner can be optimal stimulus. It can be painful and shameful to discover that one has a bad habit, and continued exposure in the form of help and support can provoke discomfort. By minimizing support, feelings of shame and inadequacy are avoided. Berg & Skutle (Berg and Skutle, 1986) interpreted their results in a way that the alcohol assessment at the beginning of the treatment study accounted for the positive results. Elvy (Elvy et al., 1988) found that only the follow-up examinations at 18 months affected so that alcohol consumption decreased. The offer of further examination, feedback and help in the Drinkers Check Up group might have been too confronting for patients at the emergency intake ward. A recent study about motivational interviewing found that certain patient groups responded in a way that predicted negative outcome when confronted with negative drug feedback and the planning ahead for a sober lifestyle (Amrhein et al., 2003).

Consumption decreased and motivation to change increased
There were reductions in frequency of binge drinking, typical day, and weekly consumption for the risk patients and they moved to a stage more ready to change. The decrease was on average a standard glass on a normal drinking occasion and between 1 1/2 - 3 standard-glasses at peak intake. Consumption decreased in both groups between 13 and 16 % in a typical day, peak amounts and weekly consumption, suggesting that patients drank about as often as before, but reduced their risk of becoming intoxicated. At the six and twelve month follow-ups 16 (13%) patients and 20 (16.5%), respectively, of risk patients no longer met risk criteria. The reduction in consumption was of the same magnitude as has been reported in a WHO multi center study in 10 countries (Babor and Grant, 1991) and in reviews of brief interventions (Edwards and Rollnick, 1997; Babor and Higgins-Biddle, 2000).

Furthermore, 21% of the patients moved to a stage more ready to change their alcohol habits at the six month follow-up. At the 12 month 27% of the patients had moved to a higher stage. The changes were significant, suggesting that the interventions may have increased the patients' motivation to change.

The patients who came to the follow-up interview were comparable to those who dropped out, which indicates that the dropout did not bias the results. A methodological limitation of our results is that the reduction in consumption among patients may have been due to factors other than the interventions, e.g. regression towards the mean or spontaneous improvement. The effect of the interventions may also have been obscured by a floor effect, which can be the result of a relatively low level of criteria for risk consumption.

Alcohol treatment training

The comparison between the regular surgical staff and the psychologists could be analyzed for the brief assessment and feedback in group A. Good comparability between the two interview categories was found in outcome measures. Nurses who volunteered were enrolled in 2 - 3 hour seminars followed by observations with two to four of the psychologist's patients. Thereafter, the nurses interviewed just as many of their own patients, while being supervised by the psychologist. The relatively short training effort was effective with a positive selection of nurses, who had volunteered to participate. A more general training effort in brief motivational alcohol intervention may require additional efforts. A deeply-rooted attitude, in conflict with what is taught, has been proven resistant to training (Rollnick, 2001). To exemplify, a physician may have developed a behavior such as to interrupt a patient or having a repudiating attitude (Kramer et al., 1987; Langewitz et al., 2002), which may take longer to replace with motivational interviewing style (Nerdrum, 1997).

Also the comparison between being interviewed in seclusion and where the interview could be overheard could be analyzed and good comparability between the two settings was found.

Gender and severity of alcohol problems

When patients were classified into severe alcohol problems (n=62) and, average alcohol problems (n=103) and this variable was treated as an independent variable in a regression model, no significant differences were found. The dependent variable was outcome in alcohol consumption at six-month follow-up and controlling for gender and type of intervention. The majority of researchers only recommend brief intervention in cases where the individual hasn't yet developed alcohol dependence (Marlatt et al., 1993; Babor and Higgins-Biddle, 2000). However, motivational interviewing has positive effects on patients with alcohol dependence (Bien et al., 1993a; Brown and Miller, 1993; Project Match research group, 1997; Project Match Research Group, 1998). Thus, existing data may not be sufficient to exclude the idea that the brief interventions can have a positive effect on patients with serious alcohol problems.

Women and men responded in the same way in both interventions, which was also found in other studies (Andreásson and Öjehagen, 2001; Moyer et al., 2002). However, there are also researchers who have found differences between the sexes in this regard (Babor and Higgins-Biddle, 2000).

Motivation to change alcohol behavior

Out of 165 patients, 56% (92) patients were classified to the precontemplation, 24% (40) to the contemplation and 20% (33) to the action stage, using the Quick Method of stage allocation. Similar proportions were reported among hospitalized patients with hazardous and harmful consumption (Orfordet al., 1992) and among patients who sought hospital care and tested positive in screening with CAGE or MAST (Hapke et al., 1998). The percentage of motivated patients was greater among harmful drinking patients with spinal cord injury (21%

in precontemplation, 45% in contemplation and 34% in action stage) (Bombardier and Rimmele, 1998). Data from the emergency intake ward at Danderyd Hospital shows that 56% of patients with hazardous or harmful consumption and preliminary trauma diagnosis were classified to the contemplation or action stage. Among patients with hazardous or harmful alcohol habits with a non-alcohol-related preliminary diagnosis, such as appendicitis, 26% were classified to the contemplation or action stage. Thus, there seems to be an association between a patient's diagnosis and stage of change. On one hand, patients with alcohol problems run an elevated risk of being exposed to trauma (Jariwalla et al., 1979; Thom et al., 1999; Bradley et al., 2001) on the other hand these patients´ motivation to change the problem drinking is higher.

The present results made it apparent that screening and intervention posed a considerable challenge, since 80% of the patients were in precontemplation and contemplation and did not consider their drinking a problem or were doubtful that it was a problem. However, it has been reported that (Rumpf et al., 1999) a greater number of alcohol dependent individuals among hospitalized patients felt motivated compared to the number of alcohol dependent individuals who felt motivated in the general population. Thus, an emergency surgical ward may be a relative motivational window, despite the low percentage of motivated patients.

Frustration among health-care providers

Unmotivated patients can lead to frustration among health-care providers. In a survey study, it was found that less than 10% of physicians were satisfied with their efforts in helping patients to alter their life-style and also that the counseling that was provided was only successful for 5-10% of the patients (Mahler, 1998). It has been reported that only 50% of patients followed their physician's medication prescription, and less than 10% followed the prescription of changes in life style (Butler et al., 1996). These data are in agreement with the fact that a majority of the patients were in precontemplation or contemplation, a result also found by others (DiClemente and Prochaska, 1998) in relation to unhealthy life style behavior. In regard to hazardous alcohol consumption, it has been reported that physicians often view alcohol prevention efforts as only insignificantly rewarding (Bendtsen and Åkerlind, 1999), which, despite a positive attitude (Bendtsen and Åkerlind, 1999) and good ambitions for the most part, risks extinguishing their preventive efforts (Baldwin and Baldwin, 1998). It is apparent that stimulating the patient to change is a challenging task facing treating personnel.

General practitioners, psychotherapists, and midwives, etc., who have been trained in motivational interviewing describe the clinical work, anecdotally, as no longer being cumbersome. They do not feel so frustrated about patients with injurious life-style problems, e.g. pregnant smokers, chronic pain patients, and patients with alcohol problems. These accounts can be significant signals indicating that heavy responsibility can be mitigated for personnel under intense pressure. Thus, frustration, which may contribute to the increasing problem of burn out within the health care sector, can possibly be mitigated. This perspective of motivational interviewing, which has not been subject to research as far as is known to the present author, is yet to be studied.

Negative effects of opportunistic alcohol prevention

The brief assessment with a short feedback and the modified Drinkers Check Up could both be done at a busy emergency intake ward with somewhat lower refusal (17 %) as compared to others (Hungerford et al., 2000). Many of those who declined were worn out by their illness or injury, and several were intimidated by needles and found blood tests unpleasant. All of the

patients who participated in the study responded to questions concerning their experience of this. Responses to the question: "How does it feel to be asked questions about alcohol when having sought medical attention for other problems?" were classified into four categories and processed (Table 5):

➢ *Positive:* "Just fun", "Interesting", "eye-opener", "It's had an impact", "Important issues";
➢ *Neutral:* "It doesn't matter", "Okay", "Not a bad thing", "Good for research", "Can help others";
➢ *Ambivalent:* "A bit remarkable", "Feels odd", "I should cut down, don't know", "Ashamed", "Embarrassed";
➢ *Negative:* "Borderline case", "A bit wrong", "As if one will be impacted", "Difficult because of the illness".

Table 5. "How does it feel to be asked questions about alcohol when having sought medical attention for other problems?"

	Data missing	Positive	Neutral	Ambivalent	Negative
Risk, N=165	2% (4)	20% (33)	62% (102)	10% (16)	6% (10)
No risk, N=339	6% (21)	21% (72)	62% (209)	8% (26)	3% (11)
Total abstainer, N=59	7% (4)	12% (7)	76% (45)	5% (3)	0

The question, "Do you feel that these questions could be posed to everyone who is hospitalized?" was responded to with a yes-answer by 7% (12) of patients with hazardous or harmful alcohol habits, by 13% (44) of patients without hazardous use and by 3% (2) of abstainers.

Out of all patients taking part in the study, not more than 3.7% of the patients said that they felt negatively about the opportunistic alcohol intervention. That proportion was increased to 6% in the selected sample of patients having hazardous or harmful alcohol use with no differences in attitudes between patients in the two interventions. Considering that 80% of the patients with hazardous or harmful alcohol use were not ready to change and that 56% were classified as not being aware of an alcohol problem, the results were promising indeed. No difference was found between brief assessment and feedback and modified Drinkers Check Up concerning the way in which the above mentioned questions on attitude were responded to, as tested with chi 2 (two-sided, P=0.527; P=0.292). There was good comparability between the way in which the questions were responded to by patients who had contact with psychologists and by surgical personnel.

A methodological limitation of our results is that the reduction in consumption among patients may have been due to factors other than our interventions, e.g. regression towards the mean or spontaneous improvement. The effects might also have been biased by a floor effect due to low levels of criteria for hazardous or harmful alcohol consumption. Another bias might be the large heterogeneity in the sample due to inclusion of seriously alcohol dependent cases with high alcohol consumption. However, the heterogeneous sample is at the same time an advantage since it is more representative to emergency surgical patients with hazardous or harmful alcohol use.

Conclusions in study V

1. The brief assessment with a short feedback and the extended alcohol counseling could both be done at a busy emergency intake ward with acceptable refusal rates.
2. Few patients taking part in the study felt negatively about the opportunistic alcohol interventions.
3. There were no differences between the brief assessment with a short feedback and the extended alcohol counseling in outcome measures.
4. There were no differences in outcome when conducting the brief assessment with a short feedback by a surgeon or surgical nurses versus by specialists in the alcohol field.
5. There were no differences in outcome when conducting the brief assessment with a short feedback in seclusion versus where the intervention could be overheard by other patients.
6. A large majority of acute emergency patients with hazardous or harmful alcohol use was not ready to reduce alcohol consumption.
7. An alcohol related trauma diagnosis is associated with a larger proportion of patients ready to modify alcohol use than in a diagnosis like appendicitis.

Summary, conclusions and future research

One aim of this thesis was to examine whether alcohol screening indicates a larger percentage of patients with hazardous alcohol habits than standard procedures at a surgical emergency ward. The results showed that by using screening tests the number of possible risk consumers could be significantly increased. Furthermore, the screening tests increased particularly the proportion of indicated hazardous alcohol habits among young women, while older men had the same proportion as through existing procedures. Thus, screening tests are especially important to the young female emergency patient.

A possible side effect of an opportunistic screening and brief intervention among emergency patients might be that the patients feel negatively about the alcohol issue being raised. However, less than 4% of the patients, who had alcohol screening, had a negative response to the intervention, and no more than 17% refused participation in a study about alcohol and health. The results are promising considering that a large majority of the participating patients with hazardous or harmful alcohol habits were not ready to change their alcohol habits.

The patients' low level of motivation suggests that alcohol screening tests and brief interventions should be adapted to this condition. Motivational interviewing is helpful among patients with different levels of motivation. However, alcohol-screening tests should be designed to provoke minimal resistance among patients not ready to change and, thus improve the effectiveness of the alcohol intervention.

Another aim in the thesis was to investigate the validity of the psychological alcohol markers Mm-MAST, CAGE, Trauma scale and the biological markers GGT and CDT separately and in combination in relation to binge drinking. Mm-MAST alone CAGE and CDT combined seem to be sensitive to binge drinking among 30-73 year old men. However, the CAGE, CDT, Trauma Scale and Mm-MAST, did not seem to identify binge drinking among young women. Thus, these tests should be combined with questions about binge drinking or replaced by a valid screening test, like the AUDIT.

Binge drinking was a prevalent risk behavior among emergency patients and was more prevalent among young women than among young men. Young women are in the age of having children. Thus, the prevalence of binge drinking among young females should have consequences for the rate of illness and injury for mother and child in relation to pregnancy. However, this is a small study and the prevalence of binge drinking has to be established in future epidemiological research.

The high proportion of binge drinking at the emergency intake ward suggests that this site has considerable potential for the prevention of alcohol problems. Furthermore, the emergency context might stimulate motivation to change unhealthy behaviors like excessive alcohol use. Patients with hazardous or harmful alcohol habits and a trauma diagnosis were more ready to change than risk patients with e.g. appendicitis, which not is alcohol related. A hypothesis of interest for future testing is wither risk patients with alcohol related diagnosis may be more ready to change and are more likely to reduce their alcohol use than risk patients without an alcohol related diagnosis.

A third aim in the thesis was to investigate reliability, factor structure, construct and predictive validity of the Swedish Readiness to Change Questionnaire in order to get an index of the patients' motivational status. The results showed that the Swedish RTCQ factor structure is consistent with the stages of change model and the test is reliable. Both the Quick

Method to allocate a stage of change and a continuous readiness to change score has modest construct validity. The predictive validity has to be further investigated. However, the stages of change model as well as the continuous readiness model are complex constructs, both of which requiring further theoretical and empirical work to be conducted. Although the RTCQ has limitations it might have useful functions in enhancing motivation to change among emergency patients with hazardous or harmful alcohol habits.

Lastly, an aim in the thesis was to investigate if extended alcohol counseling is more effective than just assessment with a short feedback among surgical patients with hazardous or harmful alcohol use. There was the same beneficial outcome with the brief assessment and short feedback as with the more specialized modified Drinkers Check Up. Furthermore, the brief assessment with feedback conducted by surgical staff versus specialists in the alcohol field had comparable outcome. Thus, screening and brief intervention could be done at a busy emergency ward and may have preventive effects on the patients' alcohol use. Furthermore, alcohol as a factor in surgical illness and injury might be examined by the brief assessment session.

Knowledge of long-term effects is important in order to determine whether screening and brief intervention is cost-effective. In one study, it is required that least 1% of patients should change to a healthy behavior permanently (Lindholm, 1998). Future analyses of the data from Danderyd Hospital may supply data to possible effects of health care consumption.

Alcohol intervention methods are under way of being tested at emergency surgical wards. One study will give a report on the preventive role of family doctors, who, after receiving information about their patients' risky alcohol use from the emergency ward, are in charge of preventive efforts. In a small pilot study, a pocket-pad computer was used for brief assessment and feedback among hospitalized emergency surgical patients. The pocket-pad was programmed with the screening tests and the RTCQ, and the patient could choose to be informed about his/her results.

Another type of future research should be to examine whether the personnel who have been trained in motivational interviewing, experience less frustration when confronting patients who have unhealthy life-styles. If frustration felt by health care personnel due to patients' lack of interest in advice given is a source of burn out, then it may be possible to reduce the influence of the source.

A challenging future research should be to investigate which components in brief intervention or motivational interviewing can be helpful for patients in stopping harmful or hazardous alcohol habits.

Although, we evidently are lacking knowledge my intention with this work has been to implement a perspective that early detection and prevention can be accomplished at the emergency ward, if we put our minds to it. What is stopping us? Is it the physicians' situation in health care? Is it a lack of economic recompense for preventive efforts? Is psychological treatment too foreign and unfamiliar to be included in the medical role of the physician? Is the health care system and personnel organised and trained in a top down approach to patients that, is too much in conflict with the self-control equality approach to patients, which is required by health prevention? Or is it several conjoint reasons that hinder early detection and motivation to change the alcohol habits? The lack of successful implementation of alcohol

prevention, preoperative alcohol assessment, and alcohol assessment as a part of the surgical treatment is a challenging, unanswered research question.

The Danderyd study was set up in order to promote implementation of screening and intervention at the emergency surgical intake ward However, the economizing efforts had a negative affect, since surgical nurses were left with a tighter time-margin, new roles, and were transferred. Prior to the alcohol project being conducted, the surgical intake ward was closed down. Implementing alcohol screening, brief assessment and feedback is yet to be conducted at the emergency surgical wards.

Returning to Anders in his hospital bed with his battered jaw and concussion, he did indeed cut down on his drinking. From having drunk one to two times a week, he was drinking a few times a month at both the six and twelve month follow-up. Although, when he drank, he did drink much too much, as he had done earlier, but the reduction must be considered a significant step forward. However, the research project was short-term, and today when other patients visit the emergency ward, there is no systematic intervention among the surgical personnel to detect hazardous or harmful alcohol habits and to stimulate the patient into contemplating about his/her alcohol habits.

Another example of evidence based treatment methods, which not are amenable for patients seeking treatment, is the Drinkers Check Up. More than fifteen years have passed since the first randomized studies reporting its effectiveness were published (Miller, 1985a; Miller and Sovereign, 1989; Miller et al., 1994). Patients seeking alcohol treatment should in his/her first contact with alcohol treatment get an effective intervention, carried out by the best-trained personnel. Some patients do not need any further help and patients who are not helped by the Check Up have an adequate basis for other appropriate efforts. A Drinkers Check Up should involve motivational interviewing as the first step in a comprehensive assessment of the alcohol habits, relating to social, psychological, and biological consequences of alcohol. The assessment should comprise questionnaires about negative consequences, a neuropsychological screening of impaired brain functioning, and biological markers of the alcohol related physical health, e.g. the state of the liver. The assessment would be followed by result feedback in the form of motivational interviewing. Depending on the motivation of the patient, a functional analysis of factors maintaining the alcohol habits could be conducted.

Psychologists have the best training to carry out the Check Up as they have been trained in using questionnaires, structured interviewing as well as empathic/accurate listening, which is a fundamental skill in this intervention (Miller and Brown, 1997). Psychologist could carry out a neuropsychological screening about impaired brain functioning due to alcohol exposure, which is a neglected examination in Swedish alcohol treatment facilities although the large prevalence of this disorder (Miller and Sauceda, 1992). The neuropsychological test results can be a powerful wake-up call for many patients with alcohol problems and the medical expertise could contribute results from the physical examinations. A positive side effect of using psychologists for this intervention is that some of the heavy workload, which today burden psychiatrists and nurses in Sweden could be taken away. However, using psychologists instead of psychiatrists to carry out the patient intake session is another change, which has to be implemented.

The health care knowledge is growing fast while the need to implement the new knowledge is increasingly more important. How come that we lack "implement engineers" who build those bridges between research and the patient reality?

Acknowledgements

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