

**CONTROLLED EVALUATION OF A
GENERAL PRACTICE-BASED BRIEF INTERVENTION
FOR EXCESSIVE ALCOHOL CONSUMPTION:
THE ALCOHOLSCREEN PROJECT**

Robyn Richmond,

Nick Heather,

Alex Wodak,

Linda Kehoe

and

Ian Webster

**CONTROLLED EVALUATION OF A
GENERAL PRACTICE-BASED BRIEF INTERVENTION
FOR EXCESSIVE ALCOHOL CONSUMPTION:
THE ALCOHOLSCREEN PROJECT**

Robyn Richmond^{1,2}

Nick Heather¹

Alex Wodak^{1,3}

Linda Kehoe⁴

and

Ian Webster^{2,5}

Technical Report No. 21

ISBN 0 947229 36 1

© 1993 NDARC

1.National Drug & Alcohol Research Centre, University of New South Wales

2.School of Community Medicine, University of New South Wales

3.Alcohol & Drug Service, St. Vincent's Hospital, Sydney

4.Lifestyle Unit, Eastern Sydney Area Health Service

5.South West Sydney Area Health Service

Contents

	page
Executive Summary	1
Introduction	3
Methods	8
GP recruitment	8
Allocation to study groups	8
Power analysis	9
Screening questionnaire	9
Patient recruitment	10
Research assessment	11
Follow-up assessment	12
Interventions	13
Statistical analysis	15
Results	18
Screening and recruitment	18
Sample characteristics at initial assessment	18
Differences between study groups on initial measures	21
Follow-up rates	21
Differences between patients followed up and not followed up	23
Rates of GGT measurement at initial assessment and follow-up	24
Comparability of groups with patients lost to follow-up excluded	24
Outcome of intervention (intention to treat)	25
Outcome of intervention with those lost to follow-up excluded	28
Patient attendance in Alcoholscreen	38
Outcome among Alcoholscreen attenders	45
Predictors of changes in consumption over time	46
Discussion	47
Outcome of the Alcoholscreen program	47
Outcome of minimal advice	50
Effects of alcohol assessment	51
Outcome among those who return for the second Alcoholscreen visit	52
Sex differences	54
Methodological strengths and weaknesses of the present study	55
Implications for applications of brief interventions in practice	59
Implications for future research into GP brief interventions	61
Acknowledgments	64
References	65

Executive Summary

- 1) In a controlled evaluation of general practitioner-based brief intervention for excessive drinking, 378 excessive drinkers identified opportunistically by screening in 40 group practices in metropolitan Sydney were assigned to one of four groups: (i) a group offered a five-session intervention by the GP (the Alcoholscreen Program); (ii) a group given a single-session of five minutes advice by the GP and a self-help manual to take away (minimal intervention); (iii) a group given a thorough assessment of alcohol consumption and related problems but no intervention; (iv) a group identified by screening but given neither intervention nor assessment.
- 2) Blind follow-up was carried out at six and twelve months following initial contact. In addition to self-reports of alcohol consumption, blood samples were taken for the measurement of γ -glutamyltransferase at entry, and six and twelve months follow-up.
- 3) Among all those patients allocated to receive it, the Alcoholscreen Program did not result in a statistically significantly greater reduction in alcohol consumption at follow-up than seen in control groups.
- 4) However, patients offered Alcoholscreen showed a significantly greater reduction in alcohol-related problems in the period up to six months follow-up than those in control groups, with a similar but non-significant tendency at the twelve month follow-up point.
- 5) A possible explanation for the failure to find a significant effect of brief intervention on alcohol consumption in the present study, compared with earlier British studies that have found such an effect, is as follows. When research is carried out under naturalistic conditions of routine general practice, as in the present study, fewer patients return for a counselling session than in

the less naturalistic designs of the trials previously reported.

- 6) This possibility is strengthened by the finding of the present study that those patients who returned for the crucial Alcoholscreen second visit, and who can thus be said to have received the Alcoholscreen Program, showed greater reductions in consumption at follow-up than those patients from all groups who did not receive Alcoholscreen.
- 7) There was no evidence that the minimal intervention was effective in reducing alcohol consumption at follow-up.
- 8) There was no evidence that a 15-minute alcohol-related assessment was effective in reducing alcohol consumption at follow-up.
- 9) Across all groups, males showed a significantly greater reduction in consumption at follow-up than females. While men showed a drop in consumption over time, there was no evidence of any decrease in consumption among women.
- 10) Implications of these findings for the application of GP-based brief interventions in practice and for further research into brief interventions are discussed.

Introduction

In a randomized controlled trial using 47 group practices in the United Kingdom, Wallace, Cutler and Haines (1988) showed that general practitioner (GP) brief intervention was effective in reducing drinking among patients with excessive alcohol consumption. At one year follow-up, the proportion of men with excessive consumption at interview had fallen by 44% in the treatment group compared with 26% in controls, with corresponding proportions among women of 48% and 29%. Mean value for γ -glutamyltransferase (GGT) activity dropped significantly more in treated men than in controls but there were no significant group differences on this variable among women. Also in the United Kingdom, Anderson and Scott (1992) found that heavy drinking men randomly allocated to receive brief advice from their GPs had reduced consumption at one year follow-up in excess of 65 grammes of alcohol per week compared with controls. Among women, there were no significant differences in reduced consumption between treated and control groups (Scott & Anderson, 1991).

In the light of these findings, the reasons for conducting the present study were as follows:

- 1) Although GP-based brief intervention has been shown to be effective in two studies in the United Kingdom, it is necessary to demonstrate that it would also be effective in other sociocultural settings, especially those countries where the primary health care system operates on a fee-for-service basis, as in Australia.
- 2) In roughly half the practices studied by Wallace *et al.* (1988), screening questionnaires were mailed out to a sample of patients selected from the age-sex register. In the Anderson and Scott (1991;1992) study, questionnaires were mailed to all patients aged 17-69 with a known address in two of the eight practices participating in the trial. Moreover, in the Wallace *et al.* study, patients whose screening questionnaire responses indicated excessive drinking were invited to a "lifestyle and health survey interview". Those

eligible and consenting to take part in the trial were subsequently contacted by their GPs and invited to attend for a brief interview. A similar recruitment procedure was used in the Anderson and Scott (1991;1992) study. These procedures stand in contrast to opportunistic screening of patients in practice waiting-rooms and immediate intervention by the doctor as a routine part of general practice. It is not known what effect, if any, the special procedures for screening and recruitment adopted by the two British Studies had on their results. It can be concluded, however, that the effectiveness of brief intervention has not yet been demonstrated under naturalistic conditions of routine general practice. For this reason, the present study attempted to increase the external validity of any findings that might emerge by confining screening, recruitment of patients and intervention to routine general practice.

3) In the Wallace *et al.* (1988) study, following the initial appointment, patients in the treatment group were offered a further four appointments over a ten-month period. Results showed that the number of these sessions attended was significantly associated with the extent of reduction in alcohol consumption for patients of both sexes and this was confirmed in the case of men by a significant association between number of intervention sessions attended and reduction in mean GGT activity. This finding could be due either to the cumulatively beneficial effects of GP advice or to the fact that those patients attending a greater number of sessions were more highly motivated to cut down drinking than patients attending fewer sessions and showed greater reductions in consumption at follow-up for this reason. In more general terms, the optimal amount of therapist contact that should be offered in "brief" interventions for excessive drinkers is unknown (Heather, in press). This has important implications for the cost-effectiveness of such interventions. Consequently, this issue was examined in the present study by comparing the effects of a five-session intervention program spread over six months ("the Alcoholscreen Program": Wodak *et al.*, 1991) with those of a condition in which

patients were given a single, short session of advice by the GP supplemented by a self-help manual.

4) In both British studies described above, substantial reductions in mean alcohol consumption were observed in control groups receiving assessment but no intervention, although in the data reported by Wallace *et al.* (1988) and Anderson and Scott (1992) these reductions were significantly smaller than those shown by treated groups. In the data reported by Scott and Anderson (1991) on the effects of intervention among women, treated patients and assessment-only controls showed roughly equivalent reductions in consumption. Reductions in mean consumption in assessment-only control groups have been shown in other studies of brief intervention in general practice (Heather, Campion, Neville & Maccabe, 1987; Suokas, 1992), hospital settings (Chick, Lloyd & Crombie, 1985; Elvy, Wells & Baird, 1988; Heather, Rollnick, Bell & Richmond, submitted) and as part of health screening programs (Kristenson, Öhlin, Hulten-Nosslin, Trelle & Hood, 1983). They were also observed in the recently-completed WHO multicentre trial of brief interventions in a range of primary health care and other settings (Babor & Grant, 1992). The question arises whether these control group improvements are a reflection of the statistical phenomenon of regression towards the mean or whether they represent real effects of an intensive assessment of alcohol consumption and related problems on drinking behaviour, perhaps in the manner of a session of "motivational interviewing" (Miller & Rollnick, 1992). The only way in which this question can be properly addressed is by including in the design of a study of brief intervention a group given neither intervention nor assessment and comparing changes in consumption shown by this group with those shown in an assessment-only control group. This feature was included in the design of the present study.

Thus, in this study, excessive drinkers identified opportunistically in general practice were

assigned to one of four groups: (AS) a group given the Alcoholscreen Program; (MI) a group given a single session of advice by the general practitioner and a self-help manual to take away (minimal intervention); (NI) a group given a thorough assessment of alcohol consumption and related problems but no intervention; (NA) a group identified by screening but given neither intervention nor assessment. Blind follow-up was carried out at six and twelve months following initial assessment. In addition to self-reports of alcohol consumption, blood samples were taken for the measurement of GGT at entry, and six and twelve months follow-up.

The hypotheses of the study were as follows:

- (1) patients receiving the Alcoholscreen Program (Group AS) would show greater reductions in alcohol consumption at follow-up than patients not receiving Alcoholscreen (Groups MI, NI & NA);
- (2) patients receiving a five-minute single-session intervention (Group MI) would show greater reductions in consumption than those in non-intervention control groups (Groups NI & NA);
- (3) patients receiving an assessment only (Group NI) would show greater reductions in consumption than those not receiving an assessment (Group NA).

Methods

GP recruitment

Selected GPs in the Sydney metropolitan area were sent an introductory letter inviting them to join the study together with a copy of the self-help manual used in the project. This was followed by a telephone call one week later and, if appropriate, an appointment with at least one of the principal investigators and a research assistant was arranged. GPs agreeing to take part were provided with a copy of a *Doctor's Manual* describing the study and the GP's role in it.

One hundred and nineteen (119) GPs from 40 group practices in all regions of metropolitan Sydney participated in the study. Typically, a research assistant attended three practices within easy commuting distance of each other, with more than one GP from each practice taking part in the study. The research assistant remained at each practice between six and eight weeks. All participating GPs received training in the Alcoholscreen program and research protocols from the research assistants.

Allocation to study groups

Patients were not randomly assigned but were allocated to one of the four study groups in weekly blocks, with the order of blocks being randomly determined for each GP. This method of group allocation was considered less disruptive to the routine of general practice than individual random assignment or daily changes in allocated study group, and is a procedure we have adopted in other general practice research (e.g. Richmond *et al.*, 1993).

Power analysis

Basing the estimated effect size on the proportions of men in treated and untreated groups reducing consumption to below specified levels at 12 months follow-up reported by Wallace *et al.* (1988), it was calculated that a sample size of 100 per group would provide 95% power for

confirming Hypothesis 1 above using the 5% one-tailed significance level (Cohen, 1987). Assuming the same effect size, there would be 90% power for confirming Hypothesis 2 above and 85% power for confirming Hypothesis 3. The power analysis based on Wallace *et al.*'s results for women was very similar. A target of 100 subjects per group was therefore set, giving a total sample size of 400 (see Heather 1990).

Screening questionnaire

All patients between 18 and 70 who had not previously been approached were asked to complete a brief *Health and Fitness Questionnaire* (HFQ) by either the research assistant or the surgery receptionist in the practice waiting room. The HFQ was adapted from screening instruments previously used by Wallace *et al.* (1988) and Anderson and Scott (1992). Those whose English was inadequate to complete the questionnaire were not asked to do so. Following a few demographic details, the HFQ enquired about quantity-frequency (QF) of alcohol consumption over the last three months, disguised among questions relating to weight, smoking and exercise habits. Questions taken from Wallace and Haines (1984) asking patients' opinions about whether GPs should be interested in their patients' weight, smoking, exercise and drinking habits and whether they had ever received advice from a GP about these lifestyle behaviours were also included. The HFQ took three minutes to complete on average. A longer screening instrument was used for approximately the first half of the sample. This took about seven minutes to complete and included the items of the CAGE questionnaire (Ewing, 1984) adapted for the four health-related behaviours being enquired about and other items concerned with outcome and efficacy expectancies in relation to drinking, smoking, losing weight and exercising. This initial version of the screening questionnaire was shortened when it was realized that some patients were being missed because there was sometimes insufficient time to complete it before the patient saw the doctor.

The completed HFQ was handed back to the research assistant or receptionist before the patient

saw the doctor and a quick calculation was made of weekly alcohol consumption. For the purposes of this calculation, the highpoint value for each quantity and frequency category was used. If the consumption level met entry criteria for the study, the patient's record cards were tagged to inform the GP.

Patient recruitment

Eligibility criteria for the study were: weekly alcohol consumption greater than 35 standard drinks for men and 21 for women (standard drink = 10g approx. ethanol); and intending to remain in Sydney for the study period.

In the case of Group NA, eligible patients were asked to complete a consent form on the back of the questionnaire. This stated that the study was concerned with patients' lifestyles and that they would be contacted for a further interview in six months time. For eligible patients in Groups AS, MI and NI, the questionnaire was scored and included with the patient notes. GPs were instructed to invite all eligible patients to join the study by saying: "There is a research project about lifestyles being conducted in this practice by the University of New South Wales. Would you like to participate?"

If the patient had been allocated to Group AS or MI, the GP attended to the presenting complaint before discussing the results of the screening questionnaire and the patient's alcohol consumption. GPs were encouraged to stress to any patient who appeared defensive that no suggestion was being made that he or she was an "alcoholic". Group AS patients were asked to return for further counselling and an appointment was made for one week later. Group MI patients received five minutes brief advice and a self-help manual to take away (see below). Lastly, a 10ml venous blood sample was taken and the doctor introduced the patient to the research assistant for an assessment. If the patient was assigned to Group NI, the doctor dealt with the presenting complaint before taking blood and arranging for the assessment. For all three

groups, if a research assistant was not available at the time, the patient was contacted at home, usually within 24 hours, to arrange for an assessment interview. GGT measurement was conducted by Douglas Laboratories using the method described by Szasz (1968) and Morgenstern and Vlastelica (1976), with a normal range of below or equal to 45 U/l.

Research assessment

The assessment interview began with the formal completion of the consent procedure. The consent form used was the same as for Group NA with the addition of permission for the collection of blood samples. The assessment itself included the following: demographic information; attitudes to alcohol; drinking history; past 7-days consumption of alcohol based on the diary method developed by Chick and Duffy (1981); a combined measure of alcohol-related problems (MAST: Selzer, 1971) and physical dependence on alcohol (Ph Score) taken from the *Comprehensive Drinker Profile* (Miller & Marlatt, 1984). The assessment took approximately 15 minutes to complete.

Patients were withdrawn from the study if considered unsuitable for a brief intervention or moderation goal, i.e., because of evidence of severe alcohol dependence (Ph Score > 10), a severe level of alcohol-related problems (MAST > 20), the presence of a disease in which alcohol consumption is contra-indicated, pregnancy or planning pregnancy, major psychiatric disturbance, and previous or current treatment for alcohol problems. With the patient's permission, the GP was informed of patients found to show severe alcohol dependence or problems so that appropriate referral for specialized treatment could be offered.

Follow-up assessment

Follow-up assessment was carried out at six and twelve months after entry to the study by a research assistant who was blind to study group. At least six individual attempts were made to contact patients for follow-up by telephone and letter. Medical records and telephone directory

assistance were used in the attempt to trace those who did not reply. In addition, visits were made to the address the patient had given and help from the current occupants and neighbours was sought. Even if contact was not successful at six months, further attempts were made at twelve months.

The follow-up interview was usually conducted at the GP's surgery but the research assistant visited the patient at home or the workplace if this was more convenient. At six months, patients in all four study groups completed a similar assessment questionnaire to that which had been given on entry to the study. Blindness to study group was then broken and patients in Groups AS and MI were asked questions about their use and perceptions of the self-help manual. Those in Groups AS, MI and NI were asked for a further blood sample. Patients in Group NA were given information about the harmful effects of their alcohol consumption and offered a copy of the self-help manual.

The twelve month follow-up was confined to Groups AS, MI and NI and involved the same assessment questionnaire that had been given at six months, with questions referring to drinking and other variables during the past six months. Interviews were again conducted by research assistants blind to study condition. Further blood samples were taken.

Interventions

Group AS received a structured behavioural change program called *Alcoholscreen*. This is a brief intervention consisting of 5 short consultations (introduction, patient education and three follow-up visits). It is designed to reduce drinking to limits recommended by the National Health and Medical Research Council (NHMRC) of 28 or fewer drinks per week for men and 14 or fewer for women (Pols & Hawks, 1992). *Alcoholscreen* was adapted from the *Smokescreen* (Richmond *et al.*, 1991) and *DRAMS* (Heather *et al.*, 1987) programs for GPs.

At the first visit for the presenting complaint, the GP invited the patient to join the study, provided a self-help manual (*A Guide to Healthier Drinking*: Heather *et al.*, 1989) and recommended certain sections to be read over the following week. Patients were instructed in the use of a day diary for monitoring alcohol consumption over the following week.

At the second visit lasting about 15 to 20 minutes, a personalized approach to patient education regarding the harmful effects of excessive alcohol consumption was employed using a flip-over display unit. This consisted of twelve pictorial and text prompts to raise the patient's level of awareness of alcohol-related problems. Patient counselling included techniques of motivational interviewing (Miller & Rollnick, 1991) in which "the good things" about heavy drinking were weighed against "the bad things" in a way that allowed the patient to make a personal decision to reduce drinking. Information was given about recommended daily and weekly limits, the problems associated with excessive drinking, tips for reducing the rate of drinking, identification of high-risk situations, instructions on coping with high-risk situations without heavy drinking, discussion of alternative activities associated with a changed lifestyle, and other advice on relapse prevention. The patient's consumption level was compared with Australian drinking norms and the drinking pattern was analysed using information recorded in the day diary.

Finally, dates were agreed for follow-up visits one, three and five months later and an appointment was arranged for the first of these. These interviews were aimed at encouraging and supporting new drinking habits. Goals and drinking decisions were reviewed and reasons for any lapses analysed. Renewed motivation for cutting down was attempted if necessary. The first follow-up visit was a standard consultation (i.e., lasting between five and 25 minutes) while the remaining two were short consultations lasting five minutes or less.

Patients allocated to Group MI received brief advice lasting about five minutes to reduce drinking to recommended levels, information on the health risks of continued heavy drinking,

and the self-help manual, *A Guide to Healthier Drinking*.

Statistical analysis

Self-reported number of standard units of ethanol in the past seven days was used as the principal outcome measure in the study. In Groups AS, MI and NI, level of GGT activity, MAST and Ph scores were also used as dependent variables. In analyses involving Group NA, the 3-month QF consumption measure from the HFQ was used as the baseline measure of consumption for all groups.

Results were analysed in two ways: (i) on the basis of "intention to treat" with patients lost to follow-up included in the analysis, which represents the more conservative estimate of the effects of intervention; (ii) with patients lost to follow-up excluded from the analysis. In the intention-to-treat analysis, proportions of patients drinking above and below NHMRC recommended levels were compared across the four groups. Also in these analyses, drinking status among patients lost to follow-up was evaluated on the basis of two assumptions: (a) a "worst case" scenario where drop-outs were assumed to be drinking above recommended levels; and (b) a "best case" scenario where drop-outs were assumed to be drinking below recommended levels. This method provides a range in which the actual but unknown outcomes for drop-outs at follow-up exist.

In the case of GGT activity among patients lost to follow-up, those with a GGT reading above the normal range at initial assessment were assumed to be still above the normal range at the follow-up point. Those within the normal range at initial assessment (despite self-reported excessive drinking) were assumed to be still within the normal range at follow-up.

In all analyses, sex was an independent variable. Because of the design of the study, Group NA could only be compared to Groups AS, MI and NI on the six month follow-up assessment of

7-day alcohol consumption and on variables derived from the HFQ, in particular, the 3-month QF alcohol consumption measure, attitudes to the role of the GP in treating alcohol problems etc., and the demographic variables of age and sex. Consequently, descriptive analyses of the study participants incorporate an N of 379 for some variables and an N of 286 for those variables not available for Group NA.

The log-likelihood chi-square test was used to examine any differences between groups on all non-continuously distributed variables. For continuous data, mean comparisons between Groups AS, MI, and NI were assessed using repeated measures ANOVA with orthogonal contrasts for groups. In the absence of repeated measures for Group NA, mean comparisons between Group NA and Groups AS, MI, NI were analysed using ANCOVA in which the six month assessment of 7-day alcohol consumption was the dependent variable and the 3-month QF alcohol consumption measure from the HFQ was the covariate. An additional covariate in both ANOVA and ANCOVA analyses (Ph Score) was chosen because of a significant baseline difference between groups and a significant correlation with changes in consumption over time. Where appropriate, alcohol consumption and GGT readings were log transformed in order to render the data more amenable to statistical analysis.

Results

Screening and recruitment

Figure 1 shows numbers and percentages of patients at each stage in the screening, consent, assessment and group allocation procedures. Of 14,725 HFQs handed out, 88.4% were completed and, of these, 6.9% showed consumption levels above entry criteria. Of those who met the entry consumption criteria, 713 patients (79.8%) were asked to join the study. A total of 170 eligible patients were missed at this point for a variety of reasons (e.g. the receptionist failed to add up the patient's alcohol consumption before the patient was seen by the doctor, the receptionist failed to notify the doctor of the patient's eligibility, the patient did not identify him- or herself on the screening questionnaire).

Of those patients who were asked to join by the GP, 467 (65.5%) consented to take part. Sixty-four patients were then excluded for the following reasons: above entry criteria for dependence and/or alcohol-related problems (n=22); illness where abstinence is indicated (n=4); presence of psychiatric disturbance (n=9); current or previous treatment for alcohol problems (n=25); pregnant or planning pregnancy (n=4). With a further 25 patients having been missed for assessment, this left a total of 378 patients (80.9% of those consenting) for inclusion in the study. These were allocated to groups as shown in Figure 1.

Sample characteristics at initial assessment

Of the 378 patients included in the study, 216 (57%) were male and 162 (43%) female. Mean age was 37.7 years (SD=13.9, range=19-70). Mean 3-month QF alcohol consumption was 36.8 standard units (SD=20.9), with a mean of 45.6 standard units (SD=22.1) for males and 25.1 units (SD=11.5) for females, using a midpoint value on each question in the computation of the QF score.

For the 285 patients in Groups AS, MI and NI only, means and proportions for gender, age and

alcohol consumption were almost identical to those reported above. Additional data for variables measured only in Groups AS, MI, and NI were as follows: a majority of participants in the study were single (including separated, divorced or widowed) (54%); 74% were employed full- or part-time; and 67% had some education beyond secondary schooling. Mean 7-day alcohol consumption was 50.3 units (SD=28.3, range=4-166) for males and 26.8 units (SD=16.9, range=6-125) for females. Mean GGT activity was 61.6 U/l (SD=72.7, range=2-475) for men and 22.4 U/l (SD=27.9, range=1-218) for women. Among men, 40.6% had GGT values above the normal range, while among females 7.3% had GGT values above the normal range.

The correlation (Pearson's r) between the 3-month QF consumption measure and the initial assessment 7-day consumption measure was 0.55 (N=285; $p < 0.01$). The correlation between the 3-month QF consumption measure and GGT was 0.16 (N=277; $p < 0.01$) and between the 7-day consumption measure and GGT 0.22 (N=277; $p < 0.05$).

MAST scores showed a mean of 4.5 (SD=4.0) for the three groups (n=285). One hundred and sixty-nine (169; 59%) patients were classified as "non-alcoholic" by the MAST (0-4), 45 (16%) were "possibly alcoholic" (5-6), and 71 (25%) were "alcoholic" (7+). Mean Ph Score was 3.8 (SD=2.5). One hundred and eighty-five (185; 65%) of patients were classified as showing low dependence (0-4), and 100 (35%) were classified as showing moderate dependence (5-14).

Differences between study groups on initial measures

Table 1 provides a comparison at initial assessment between all four groups on alcohol consumption variables, as well as other alcohol-related variables and demographic characteristics. (Note that entries for Group NA are blank for variables measured only at assessment in Groups AS, MI and NI.)

Alcohol consumption levels as measured by the 3-month QF variable and the 7-day

consumption measure were not significantly different between groups. However, Group MI differed significantly from Groups AS and NI on GGT levels at the start of the study ($F=3.4$; $df=2,274$; $p<0.05$). In addition, a greater proportion of Group MI patients were classified as of "low dependence" when compared to Groups AS and NI ($\chi^2=7.2$; $df= 2$; $p<0.05$). Other statistically significant differences between groups are noted in Table 1. Group NI patients were on average younger than other patients ($F=3.2$; $df=3,374$; $p<0.05$) and were less likely to be married than those in Groups AS and MI ($\chi^2=7.6$; $df=2$; $p<0.05$). Finally, mean MAST score for Group AS was significantly higher than for Groups MI and NI ($F=4.7$; $df=2,282$; $p<0.01$).

Follow-up rates

Of the 378 patients overall, 277 (73%) were successfully contacted and interviewed at six months. Of the 101 lost to follow-up, 45 (45%) refused to continue with the study and 56 (55%) were out of contact due to relocation outside the Sydney area or unavailability at the time of assessment (e.g., holidays overseas). There were no significant differences between the follow-up rates for study groups: Group AS=72% (N=69); Group MI=73% (N=70); Group NI=71% (N=66); and Group NA=77% (N=72).

At twelve months the rate of successful follow-up was slightly lower at 197 (69%) of the 285 patients in Groups AS, MI and NI. Among the 88 lost to follow-up, reasons for failure to interview were refusal to continue (N=40; 45%) and out of contact (N=48; 55%). Again, there were no significant differences between follow-up rates for study groups which were 69% (N=66), 73% (N=70) and 66% (N=61) for Groups AS, MI and NI respectively. Seventeen of those patients successfully contacted at twelve months had been unavailable for follow-up at six months.

Differences between patients followed up and not followed up

An examination of pre-treatment characteristics between follow-up drop-outs and those who continued to participate showed that the drop-outs were likely to be heavier drinkers as measured by both 7-day consumption ($t=4.3$; $df=1,283$; $p<0.001$) and the 3-month QF measure ($t=4.8$; $df=1,376$; $p<0.001$). Drop-outs were also on average younger ($t=2.8$; $df=1,376$; $p<0.01$), less well-educated as measured by level completed past secondary school ($t=2.3$; $df=1,283$; $p<0.05$), less likely to report they exercised regularly ($\chi^2=9.8$; $df=1$; $p<0.01$) and more likely to report they smoked cigarettes ($\chi^2=11.1$; $df=1$; $p<0.001$). Drop-outs did not, however, differ significantly from those remaining in the study on initial GGT levels, MAST and Ph Score.

Rates of GGT measurement at initial assessment and follow-up

Of the 285 patients in Groups AS, MI and NI, GGT readings were obtained for 277 (97%) at initial assessment. Of the 205 patients who attended six month follow-up, GGT readings were obtained from 192 (94%). Finally, of the 197 patients who attended one year follow-up, GGT readings were obtained from 182 (92%).

Comparability of groups with patients lost to follow-up excluded

When study groups were compared on initial measures with those patients lost to follow-up excluded, the only difference between groups to retain statistical significance was that for MAST scores, with Group AS differing from the other two groups (Group AS, mean=5.2, SD=4.5; Group MI, mean=3.6, SD=3.4; Group NI, mean=4.0, SD=3.4 ($F=3.4$; $df=2,219$; $p<0.05$)). Differences between groups on GGT level and Ph Score approached significance ($p<0.1$).

Ph Score was significantly correlated with change in 7-day alcohol consumption from initial assessment to six month follow-up ($r=0.14$; $p<0.05$); that is, patients with higher levels of physical dependence were likely to show greater reductions in consumption. On closer inspection, this relationship was significant only for males ($r=0.24$; $p<0.05$) and not females

($r=-0.10$). No significant correlations were observed between GGT and changes in consumption or between MAST scores and changes in consumption.

At twelve months, Ph Score continued to be significantly related to changes in consumption ($r=0.18$; $p<0.05$). Again, Ph Score was found to be associated with reduced consumption for males ($r=0.26$; $p<0.01$) but not females ($r=0.0$). However, the correlations between GGT levels and changes in consumption and between MAST scores and changes in consumption were not significant.

On the basis of these results, Ph Score was employed as a covariate, in the form of a continuous measure of physical dependence, in the analysis of changes in consumption and alcohol-related problems to be reported below.

Outcome of intervention (intention to treat)

Proportions of patients in each group with 7-day alcohol consumption above NHMRC recommended levels (males >28 units, females >14 units) at initial assessment and each follow-up point for all patients and for men and women separately are shown in Table 2. (Note that Group NA could only be compared with the other groups at the six month point.) No differences in proportions between groups were significant. However, there was a tendency for proportions above levels to show greater decreases in Group AS, for both sexes and in the overall sample, than in the other groups.

In the case of the analysis of GGT levels, the assumption was made that those patients lost to follow-up who had initially shown GGT levels above the normal range (0-45 U/l) continued to be above the normal range at follow-up. Conversely, those patients lost to follow-up with initial GGT values below the normal range were assumed to be below the normal range at follow-up. Proportions of patients with GGT levels in the abnormal range for all patients and for men and

women separately will be found in Table 3. No statistically significant differences between these proportions were observed.

Outcome of intervention with those lost to follow-up excluded

Means, standard deviations and ranges for each group on the QF measure of alcohol consumption at screening and 7-day alcohol consumption at initial assessment and each follow-up point are given in Tables 4A and 4B. In repeated measures analyses of variance involving the three groups (AS, MI and NI) with 7-day consumption measure at initial assessment and follow-up as the dependent variable and Ph Score as a covariate, there were significant overall reductions in alcohol consumption across all patients at six months ($F=20.5$; $df=1,199$; $p<0.001$) and at twelve months ($F=16.4$; $df=1,191$; $p<0.001$) follow-up. The main effect due to sex of subject was significant at six months ($F=28.4$; $df=1,198$; $p<0.001$) and twelve months ($F=32.7$; $df=1,190$; $p<0.001$). There was also a significant sex by time interaction at six month follow-up ($F=3.9$; $df=1,199$; $p<0.05$), with men decreasing alcohol consumption more than women (see Table 4A). There were no significant interactions between time and group, indicating that there were no statistically significant differences in changes in alcohol consumption between the three study groups in the analysis. However, inspection of Tables 4A and 4B shows a tendency for alcohol consumption to decrease in Group AS, for males and in the overall sample at both follow-up points, to a greater extent than in the other two groups. There was no significant interaction at either follow-up point between group, sex and time. No alterations to these conclusions were necessary when analyses were carried out on log transformed data.

Bar charts for mean alcohol consumption levels with standard deviations are given for all participants and men and women separately in Figures 2, 3 and 4.

Repeated measures analyses of variance similar to those reported above were conducted using MAST scores for subjects in Groups AS, MI and NI as the dependent variable and Ph Score as a

covariate. Means and standard deviations of MAST scores by group for men, women and in the overall sample are shown in Table 5A and 5B. The within-subjects comparison showed a significant reduction in MAST scores in the overall sample at six months ($F=6.79$; $df=1,199$; $p<0.01$) and at 12 months ($F=8.55$; $df=1,191$; $p<0.01$). Moreover, there was a significant interaction between group and time for the six month follow-up data ($F=5.19$; $df=1,199$; $p<0.05$). Inspection of Table 5A shows that subjects in Group AS showed a reduction in MAST scores from initial assessment to six month follow-up whereas the level of alcohol-related problems in groups MI and NI remained roughly constant. There was a similar tendency at 12 months (see Table 5B) but this was not statistically significant. Women showed a tendency to score lower on the MAST than men but this also did not reach significance either at the six month point ($p=0.05$) or at the 12 month ($p=0.07$). Figure 5 shows mean MAST scores for Group AS at initial assessment and both follow-up points compared with mean MAST scores for Groups MI and NI combined. Changes in MAST scores and in 7-day consumption were significantly correlated at six months ($r=0.18$; $p<0.01$) and 12 months ($r=0.15$; $p<0.01$).

Ph Score collected at initial assessment and at six and 12 months follow-up was also used as the dependent variable in repeated measures analysis of variance, although in this case no covariate was used. Within-subjects comparisons showed a significant overall reduction in mean Ph Score at six months (from 3.6 to 3.2: $F=12.5$; $df=1,199$; $p<0.01$) and at 12 months (from 3.6 to 3.4; $F=4.2$; $df=1,191$; $p<0.05$). No other main effects or interactions reached significance.

Means, standard deviations and ranges of GGT values at initial assessment and each follow-up point for all patients and for men and women separately will be found in Tables 6A and 6B. Repeated measures analyses of variance similar to those reported above were also carried out with GGT values as the dependent variable. For the six month data, the slight overall reduction in GGT did not reach significance and on this occasion there was no significant difference in changes in GGT over time between men and women. Also, there were no significant

interactions between group and time, or between group, sex and time. The same conclusions were reached from the analysis of 12 month data and for analyses at either follow-up point using log-transformed data. Bar charts for mean log transformed GGT levels are given for all subjects and for men and women separately in Figures 6, 7 and 8.

For the above analyses, Group NA could not be included because of the absence of an initial assessment of 7-day consumption or GGT. However, analysis of covariance using the screening 3-month QF consumption measure as the covariate revealed no significant differences between groups in 7-day alcohol consumption at follow-up. In particular, there were no differences between Group NI and NA. No other main effects or interactions were significant. Again, using log-transformed dependent variables did not alter the conclusions from this analysis.

Patient attendance in Alcoholscreen

Of the 96 patients assigned to Group AS, 47 (49%) attended the return Alcoholscreen consultation with the GP in the second week, as described in the protocol (see above). Twenty-three (23) of these were men and 24 were female. Of these, 28 (29%) attended only for the return Alcoholscreen visit, 8 (8%) attended the Alcoholscreen visit plus one follow-up visit, 7 (7%) attended the Alcoholscreen visit plus two follow-up visits, and 4 (4%) attended the Alcoholscreen visit plus three follow-up visits. The remaining 49 patients in Group AS patients (51%) did not attend the return Alcoholscreen visit or any follow-up visits. These non-attenders included the 27 patients in Group AS who could not be contacted for six month research follow-up and the 30 who could not be assessed at 12 months. Thus all those who attended the return Alcoholscreen visit were successfully followed up at six months and twelve months.

Since the Alcoholscreen Attenders (AA) (n = 47) are a self-selected group, pre-treatment characteristics of this group were compared with other patients in the study (i.e. those from all groups who did not attend or were not invited to attend at least two Alcoholscreen consultations:

Group NAA). These groups showed no significant differences on alcohol consumption measures or on any of the alcohol-related measures such as physical dependence or number of alcohol-related problems. Of the demographic characteristics assessed in this study, only socio-economic status as measured by an occupation prestige score (Daniel, 1983) was significantly different (AA, mean = 2.7; NAA, mean = 3.0; $F=3.9$; $df= 1,234$; $p<0.05$), indicating that AA group patients were likely to be of higher occupational status. Other characteristics, such as age, education and employment status, did not distinguish between the two groups. Finally, no significant differences were detected when examining three self-rated questions which could be viewed as measuring motivation to reduce drinking levels (i.e., "Would you find it difficult to cut down the amount of alcohol you drink?", "Do you drink too much?", and "Will you be cutting down on the amount of alcohol you drink?").

Outcome among Alcoholscreen attenders

At both follow-up assessments, there was some evidence that a greater proportion of Group AA patients reported drinking at levels below NHMRC recommended levels than Group NAA patients. This was particularly notable at the 12-month assessment where 34% of Group AA patients were below recommended levels compared to 20% of all other patients ($\chi^2= 4.0$; $p<0.05$). (In these analyses, all patients lost to follow-up were regarded as drinking above recommended levels.) Differences detected at the 6-month assessment were supportive of this finding (38% cf. 26% for AA versus NAA), but did not reach significance ($\chi^2= 2.8$; $p=0.09$). However, there were no significant correlations between outcome and the number of Alcoholscreen visits attended.

Using GGT levels as the outcome variable at the six month follow-up, 83% of Group AA patients were below the cutpoint of 46 U/l compared with 75% of NAA patients but this difference was not statistically significant. At the 12 month follow-up, 83% of Group AA

patients were below the cutpoint compared with 71% of Group NAA patients. This difference approached significance ($\chi^2=3.0$; $p=0.08$). (As before, the assumption was made for the purposes of these analyses that for patients lost to follow-up were either above or below normal levels depending on their initial GGT levels.)

Predictors of reduced consumption over time

In a multiple regression analysis, two variables were found to predict lower levels of alcohol consumption at six months after the variance due to the initial level of consumption as assessed by the 3-month QF measure was accounted for. Specifically, patients drinking at lower levels were likely to be younger ($t=4.4$; $p<0.01$) and to have lower physical dependence ($t=2.9$; $p<0.01$). Initial alcohol consumption as assessed by the 3-month QF measure did not account for a significant proportion of the variance when these other variables were included in the multivariate analysis.

At twelve months, two variables were found to predict alcohol consumption after initial 3-month consumption was accounted for. Patients drinking at lower levels at follow-up had expected to have less difficulty cutting down drinking ($t=-2.6$; $p<0.05$) and had been more likely to say that they would be cutting down drinking ($t=-2.1$; $p<0.05$). Unlike the 6-month findings, initial consumption as assessed by the 3-month QF measure did account for a significant proportion of the variance at the twelve months follow-up ($t=3.5$; $p<0.01$).

Discussion

Outcome of the Alcoholscreen program

The results of this project showed that, if analysis is confined to groups defined by the design of the study, there is no evidence that the Alcoholscreen program is effective in leading to a reduction in alcohol consumption among excessive drinkers identified in general medical practice. This conclusion applies whether the analysis is by "intention to treat" or excludes those lost to follow-up and whichever of several variables reflecting alcohol consumption (proportions drinking below recommended levels at follow-up, changes in mean consumption, changes in mean level of GGT activity) is taken as a measure of follow-up consumption. In contrast to a previous study of GP brief intervention (Heather *et al.*, 1987), this is unlikely to be due to low statistical power because, assuming an effect size reported in the best-known previous study of GP brief intervention (Wallace *et al.*, 1988), the present study had a probability of more than 0.9 of detecting such an effect.

However, the results did suggest that Alcoholscreen led to a reduction in alcohol-related problems, as measured by a well-known instrument (MAST), compared to minimal intervention and non-intervention control conditions. Patients offered Alcoholscreen showed a reduction in alcohol-related problems from initial assessment to follow-up whereas no such reduction was shown by patients in the control groups. This difference was statistically significant at the six months follow-up point but not at twelve months. However, the presence of the same tendency in the results at twelve months makes it unlikely that the significant finding at six months is a statistical artefact due to multiple group comparisons. Moreover, despite the fact that the Alcoholscreen group showed a significantly higher level of alcohol-related problems at the start of the study, the fact that patients in the control groups showed no sign of a reduction in problems makes it unlikely that the significant difference observed was due to a "floor" effect applying to control group patients. Lastly, the low but significant correlations between changes in MAST scores and changes in alcohol consumption levels add to confidence in the validity of

the observed effect on alcohol-related problems.

It remains to be explained why Alcoholscreen appeared to be effective in reducing alcohol-related problems but not alcohol consumption, since it must be assumed that there is a strong relationship between level of drinking and harm (Babor & Grant, 1992). The most likely explanation here is that the consumption measure sampled only a week's behaviour prior to follow-up, as has been done in other studies of general practice-based brief intervention (Wallace, Cutler & Haines, 1988; Anderson & Scott, 1992), whereas the measure of problems sampled the previous six months. There was a slight tendency for consumption in the Alcoholscreen group to fall more than consumption in the control groups, particularly among men, but it may be that one week was too short a period for a real but presumably relatively weak effect on consumption to reach statistical significance. It may also be the case that, by the time of the six month follow-up, the intervention effect had largely worn off but was still detectable over the six month period used to measure level of alcohol-related problems.

Accepting the validity of the finding of an effect of brief intervention on alcohol-related problems, it still remains to be explained why the present study failed to detect a benefit of GP brief intervention on alcohol consumption when previous studies (Wallace *et al.*, 1988; Anderson & Scott, 1992) have done so. One possibility is that a stronger effect of brief intervention on consumption will be found under "artificial" conditions of screening, recruitment and intervention but is less apparent under naturalistic conditions of opportunistic recruitment and intervention as part of routine general practice. This may be because, in naturalistic conditions, a greater proportion of patients do not return for further consultations. For example, in the Wallace *et al.* (1988) study, 83% of men and 92% of women attended at least one intervention. This compares with an overall rate of 49% (42% of men; 59% of women) in the present study. This suggests that, if a patient attends a specially-arranged assessment interview, it is highly likely that he or she will follow through with the intervention component of the

program; on the other hand, when the invitation to return for a session of intervention comes as a surprise, given that the patient has attended the surgery for another reason, he or she is less likely to do so.

The possibility should also be considered that the system of general practice lists in the United Kingdom fosters a bond between patient and doctor that is conducive to more effective lifestyle intervention. By contrast, in the Australian fee-for-service system, in which patients often choose a general practitioners on the basis of convenience and availability, and in which fewer patients consider a GP to be their doctor, the rapport which may be necessary for effective brief intervention is less likely to be present.

Outcome of minimal advice

This study provided no evidence of any beneficial effect of a minimal intervention of five minutes advice from the GP together with a self-help manual. This stands in contrast to the main finding of the WHO multicentre trial of brief interventions in primary health care (Babor & Grant, 1992) of a significant effect among males of any intervention, including five minutes of simple advice given by a "health adviser" in a range of primary care and other settings. Moreover, in the WHO trial, simple advice was found to be no less effective than 20 minutes of counselling and extended counselling up to a maximum of four visits. Romelsjö *et al.* (1989), Nilssen (1991) and Suokas (1992) in Sweden, Norway and Finland respectively also showed no clear advantage for a more extended intervention over brief advice in primary health care settings. By contrast, the present results suggest that the availability of more extended counselling (the Alcoholscreen Program) produces superior results to a single GP consultation with or without alcohol-related advice.

In considering the reasons for this discrepancy in findings, such factors as the sociocultural

setting in which the intervention takes place, the nature of the primary health care system in operation and the profession of the person giving minimal advice do not appear relevant in view of the wide range of sociocultural contexts, professional groups and primary health care settings in which the effectiveness of simple advice has been demonstrated. It must be concluded that the reasons for the discrepancy referred to are unknown and that this issue should be investigated in further research.

Effects of alcohol assessment

Another negative finding of the present study concerns the lack of effect of an assessment of drinking and related variables. The assessment-only group did show a reduction in consumption from initial assessment to follow-up but, controlling for initial level of consumption recorded at screening, there was no significant difference in consumption at follow-up between assessment and non-assessment control groups. Taking this finding at face value, this suggests that those studies that have found reductions in consumption among patients receiving an assessment but no intervention (Anderson and Scott, 1992; Babor & Grant, 1992; Chick *et al.*, 1985; Elvy *et al.*, 1988; Heather *et al.*, 1987; Heather *et al.*, submitted; Kristenson *et al.*, 1983; Scott and Anderson, 1991; Suokas, 1992; Wallace *et al.*, 1988) are more likely to be detecting an effect of "regression towards the mean" than a genuine effect of assessment on drinking. The usual meaning of regression towards the mean in this context is that, given random fluctuations in drinking over time, drinkers are more likely to be detected by screening at a high point in their level of consumption and are therefore likely to show a lower level of drinking at any given time in the future.

It must be pointed out, however, that the type of comparison between assessment and non-assessment groups is necessarily difficult to make. This is because of the absence of careful measurement at initial assessment which must follow from the inclusion of a non-assessment control group and also the fact of varying inclusion and exclusion criteria which necessarily

apply to the two groups being compared. Moreover, the present study had low power to detect a small effect of assessment which is likely to be the case if any effect exists.

Outcome among those who return for the second Alcoholscreen visit

A further important finding of the study is the reduced consumption at twelve month follow-up among those patients, roughly half of those assigned to Alcoholscreen, who returned for a second Alcoholscreen visit. A significantly greater proportion of such patients were drinking below hazardous levels than among all the remaining patients in the study who, by definition, had not attended at least two Alcoholscreen consultations. It can thus be concluded that a version of Hypothesis 1 above has been confirmed.

Confidence that this result is not merely a statistical artefact is increased by the observations of a similar difference in GGT levels at the twelve month follow-up point and by a tendency in the same direction on self-reported consumption at the six month follow-up point, both of which differences approached statistical significance. This finding is similar to that reported by Heather (1987) in the evaluation of the DRAMS package in Scotland.

There are, of course, at least two ways of explaining this finding. First, it can be argued that the second Alcoholscreen visit, which combines patient education and motivational interviewing and could be regarded as the first intervention proper in the Alcoholscreen Program, is necessary for benefit from the program to occur. In other words, those patients who did not attend the crucial second visit could not be said to have received the program at all. Alternatively, it can be suggested that those patients who returned for the second Alcoholscreen visit were a self-selected group defined by their higher degree of motivation to reduce excessive drinking and that these patients would have shown a superior outcome with any intervention or no intervention.

Evidence against the second of these explanations is the fact that the two groups of Alcoholscreen attenders and non-attenders differed initially only in terms of socio-economic status; they did not differ on any other demographic or alcohol-related variable and, most notably, on three explicit measures of motivation to cut down. The difference on socio-economic status could be related to motivation to reduce drinking but could also be associated merely with greater compliance with the GP's instructions to return the following week, thus favouring the first of the two explanations above. Moreover, the fact that outcome was not related to increasing number of Alcoholscreen visits attended beyond two argues against a motivation-type explanation for the finding because it would be expected, if such an explanation were true, that an increasing tendency to return for follow-up visits would be linked to an even higher degree of motivation and hence probability of cutting down.

As suggested above, assuming that counselling sessions such as the second Alcoholscreen visit or the first GP intervention in the Wallace *et al.* (1988) study are effective for many excessive drinkers, the difference between positive and negative evaluations of GP-based brief intervention will depend on what proportion of patients actually receive the intervention among those allocated to it.

However, although there are reasons for believing the superior outcome among Alcoholscreen attenders to be a genuine effect of the program, it must be borne in mind that this is a *post hoc* finding not originally predicted in the hypotheses of the study and that it should therefore be treated with caution. Although the two groups being compared may not have differed in any important ways obviously related to outcome of intervention, they may have differed on unmeasured variables. Perhaps the safest conclusion is that the finding in question provides *prima facie* evidence of the effects of Alcoholscreen attendance on alcohol consumption which requires replication and exploration in further research.

Sex differences

Previous studies (Scott & Anderson, 1991; Anderson & Scott, 1992; Babor & Grant, 1992) have reported sex differences in response to brief intervention. In both these studies, female patients showed significant reductions in alcohol consumption but did so in both intervention and assessment-only control groups. A possible explanation for these findings is that women are more likely to cut down drinking than men and that all that is needed is an alcohol-related assessment to encourage them to do so.

The present study also found a sex difference in the results but of a different kind to that reported previously. There was a non-significant tendency in the results for men in Alcoholscreen group to show greater benefits from the program than men in control groups but no such tendency among women. Across all groups, males showed a significantly greater reduction in consumption at follow-up than females. Further, while men showed a drop in consumption over time, women showed no decrease whatever (see Figures 3 and 4). Since the numbers of men and women entering the study were not greatly dissimilar, it is unlikely that this was due to low statistical power for the analysis of female consumption levels. It should be borne in mind, however, that this differential sex effect was not replicated in the GGT analysis.

Thus, contrary to the implications of the previous studies cited above, the present results suggest that female excessive drinkers identified in primary care settings are less likely to reduce consumption than men. This is also in direct contrast to clinic-based studies of controlled drinking treatment that have found women to have a better outcome than men (Duckert, 1987; Miller & Joyce, 1979; Robertson *et al.*, 1986; Sanchez-Craig, Leigh, Spivak & Lei, 1989; Sanchez-Craig, Spivak & Davila, 1991). An explanation for these conflicting findings is not obvious.

Methodological strengths and weaknesses of the present study

An interpretation of the findings of this study must be made in the context of its methodological strengths and weaknesses. An obvious methodological weakness is that it was deemed impractical, in a study conducted in routine general practice, to randomly allocate individual patients to study groups and randomized weekly blocks of group allocation were used instead. Although it is not clear precisely how such a procedure might have introduced systematic bias into the assignment of patients to the three groups given assessment, the absence of true randomization always leaves open this possibility. It may be, for example, that despite the fact that GPs were instructed to use a standard consent procedure when recruiting patients into Groups AS, MI and NI, it was described somewhat differently to prospective participants depending on the study condition in operation at the time and the characteristics of patients consenting to take part may have differed from one condition to another. In the case of the group not given assessment (Group NA), this was almost certainly the case since these patients were recruited in a different fashion from those in the other groups and may therefore have included patients who would not have consented to take part if the study had been explained to them more fully.

Study groups were found to differ at initial assessment on measures of GGT activity, level of physical dependence, age, marital status and number of alcohol-related problems. However, the only variable among those showing initial group differences to demonstrate a significant association with changes in alcohol consumption over time was level of physical dependence and this was therefore used as a covariate in all analyses involving continuous measures of alcohol consumption in the attempt to control for potentially confounding baseline differences. It should also be noted that study groups did not differ initially on level of alcohol consumption, measured either by quantity-frequency or by a previous week diary method.

Follow-up attrition is unlikely to have been a problem in the present study because follow-up rates did not differ between groups. Moreover, when those patients entering the analysis for continuous variables were considered, with those lost to follow-up excluded, only one variable distinguished significantly between groups (number of alcohol-related problems) and that variable was not associated with changes in alcohol consumption from initial assessment to follow-up (in contrast to the finding that changes in MAST scores were significantly correlated with changes in consumption).

A more serious methodological problem arose from the fact that patients in Groups AS, MI and NI were assessed only after they had seen the GP and been entered in the study - the reverse of the conventional procedure. In the case of Group AS, patients had received the introductory session to the Alcoholscreen program and in the case of Group MI, they had received the complete minimal intervention. The danger here, of course, is that the previous advice or counselling the patient had received may have influenced his or her responses to the assessment. In particular, patients in AS and MI groups may have been led to underestimate their alcohol consumption because their attention had been drawn to the fact that the project was concerned with drinking and that they had been identified as drinking at higher than recommended levels. This would have the consequence of making it less likely that any potential effects of intervention would be detected when follow-up consumption was compared with baseline.

There are two reasons, however, why this factor is not considered a serious limitation with respect to the analysis of changes in consumption:

- (i) The analysis of covariance involving all four study groups took as its baseline measure of consumption the quantity-frequency index recorded at screening before the patient knew anything about the nature of the study;

(ii) The lack of significant effect of intervention seen on self-reported consumption measures was replicated in the analysis of GGT levels. The analysis of GGT levels is also relevant to any suggestion that there may have been systematic bias between groups in self-reported consumption at follow-up.

With respect to the finding that patients offered AlcoholScreen showed greater reductions in alcohol-related problems as measured by the MAST, it might conceivably be argued that patients in the AlcoholScreen group, having been alerted to the topic of excessive drinking by the GP, were led to exaggerate the number of problems they had experienced at initial assessment. It is true that the level of MAST scores in the AS group at initial assessment was significantly higher than in the other two groups receiving assessment. However, the same sensitization to the topic of alcohol-related problems must have occurred in the minimal intervention group. Thus this factor is unlikely to have contributed to the observed superiority of the AlcoholScreen intervention compared with the minimal intervention with respect to their effects on alcohol-related problems.

The methodological weaknesses of the study were all consequences of the attempt to increase the external validity of the findings by conducting research into brief interventions under naturalistic conditions of routine general practice. As against these weaknesses, the study had the following methodological strengths: it employed a large sample of excessive drinkers resulting in adequate power to detect effects of intervention that have been reported in the literature; it involved a large sample of general practitioners from all regions of Sydney and could thus claim to have been representative of urban Australian GPs; it used blind follow-up; it supported self-reports of consumption by measurement of GGT; in assessing the effects of a type of intervention that has been studied in previous investigations (Wallace *et al.*, 1988; Anderson & Scott, 1992), it controlled for the effects of any alcohol-related intervention by

including a 5-minute minimal intervention; and it was the first study of GP brief intervention to attempt an examination of the effects of assessment alone.

Implications for applications of brief interventions in practice

The evidence presented here that Alcoholscreen resulted in a significant reduction in alcohol-related problems from initial assessment to follow-up and that patients who received the second Alcoholscreen consultation reduced drinking more than those who did not provides justification for the continued application of Alcoholscreen in practice. Although the interpretation of the latter finding is equivocal, it is plausible that the superiority in outcome observed is, at least in part, a genuine effect of Alcoholscreen attendance. Accepting this evidence leads to the expectation of an additional 14% of patients reducing drinking to below NHMRC recommended levels one year after intervention if the second Alcoholscreen visit is attended. The finding concerning alcohol-related problems leads to the expectation that offering Alcoholscreen results in a reduction in problems of approximately 25% six months after intervention compared with no reduction in the absence of Alcoholscreen.

The findings also suggest that it is important to find ways of increasing compliance with the program in terms of a return for the crucial second visit. This could itself be the topic of applied research. On the other hand, there seems little point in maintaining any of the three additional scheduled visits since these appear to have no effect on outcome and were, in any case, attended by less than 20% of those allocated to Alcoholscreen.

Another result that is important to bear in mind is the collection of differences between those patients successfully followed up and those who were not. As in previous studies of brief intervention, those lost to follow-up were found to be heavier drinkers (Elvy, Wells & Baird, 1988; Wallace, Cutler & Haines, 1988; Babor & Grant, 1992;) and younger (Wallace *et al.*, 1988). They were also less well-educated, more likely to report smoking and less likely to report

exercising regularly. Thus these patients appear to be in more need of effective brief intervention for excessive drinking, and more general advice regarding lifestyle behaviours, than other patients. One implication here is that GPs should be alert to the needs of these individuals and make special efforts to encourage them to comply with brief intervention programs. A surprising finding of the present study was that, among those who remained in contact, younger age was associated with larger reductions in consumption, thus encouraging the view that if younger individuals could be persuaded to comply with brief intervention, beneficial effects could occur.

Another finding worthy of note was that larger reductions in consumption were predicted by the stated intentions of the patient at initial contact with respect to cutting down drinking and by the degree of confidence the patient had that he or she would succeed in doing so. This again emphasises the importance of increasing both motivation and self-efficacy in brief interventions (Bien, Miller & Tonigan, 1993).

Implications for future research into GP brief interventions

The experience gained in conducting the present study has reinforced the point that research into brief interventions in general practice settings is exceedingly difficult (see Heather, 1988). The fact that 19% of patients who met consumption criteria were missed for a variety of reasons and not asked to join the study (see Figure 1) is but one illustration of these difficulties. The individual reports from the ten countries taking part in the WHO multicentre trial of brief interventions (Babor & Grant, 1992) reveal problems in recruiting subjects or implementing the core design in all the participating centres.

These difficulties are exacerbated if the attempt is made, as in the present study, to evaluate brief interventions under naturalistic conditions of general practice. The main methodological weaknesses of the study (lack of individual random assignment, consent and intervention before

assessment) were direct consequences of this attempt. Nevertheless, it is contended that the effort to conduct naturalistic evaluations with high external validity should continue. This is because, if it is true that brief interventions lose some of their effectiveness when translated from special research conditions to their natural environments, then there is a danger that they will eventually lose credibility with GPs and be abandoned. This is especially likely if, as suggested above, far fewer patients return for intervention in the natural environment than in specially-designed research studies. At the very least, research should pay more attention to the issue of how brief interventions found effective in controlled trials can be moulded to suit the exigencies of routine general practice while retaining their effective components.

Ingenuity should be used to solve the major design problems of the present study in future naturalistic evaluations of GP brief intervention. For example, participating GPs could be confined to those who are prepared to tolerate random assignment, and are prepared and able to switch from one mode of intervention to another from patient to patient. The further problem here, however, is that such GPs are likely to be a highly selected group. With regard to the placement of the research assessment and consent procedure, eligibility for the study could be confined to those patients who, following identification as excessive drinkers from screening, are willing to undergo a brief assessment before seeing the doctor for the presenting complaint. Thus the consent procedure and random allocation to groups could be carried out in the conventional manner. Again, selective factors are likely to be in operation in this situation but this may be preferable to the alternative of postponing the assessment until after the patient has seen the GP.

As a final point, we note a tendency in the literature to conclude that, since brief interventions have been found to be effective, research should now concentrate on discovering the best ways to encourage GPs and others to implement them in practice (Babor & Grant, 1992). As one of us has argued elsewhere (Heather, 1993), the evidence in favour of the effectiveness of brief

interventions is not sufficiently strong to justify the abandonment of research evaluations, particularly if brief interventions are seen as representing a family of principles and techniques that should be matched to particular intervention settings and characteristics of excessive drinkers. While not wishing in the least to dampen enthusiasm for implementing brief interventions in practice, we suggest that it is essential to continue research evaluations of brief interventions and controlled comparisons of different forms of intervention in order to understand how they work and how they might be made more effective.

Acknowledgments

During the conduct of this large community trial, many people have given their time and efforts to the completion of the project. These include: nine research assistants and 119 general practitioners and their receptionists from 40 groups practices throughout Sydney. To all these people go our grateful thanks. We are also most grateful to all the patients who completed the screening questionnaire and to the 378 who consented to take part. Douglas Laboratories generously assayed the GGT samples free of charge. The Drug and Alcohol Directorate of the NSW Department of Health partially supported the project. The study was funded by the Drug and Alcohol Research and Education Committee of the Commonwealth Department of Health, Housing, Local Government and Community Services as part of the National Campaign Against Drug Abuse and by the National Health and Medical Research Council.

References

- Anderson, P. & Scott, E. (1992). The effect of general practitioners' advice to heavy drinking men. *British Journal of Addiction*, **87**, 891-900.
- Babor, T. & Grant, M. (1992). *Project on the Identification and Management of Alcohol-related Problems. Report on Phase II: A Randomized Clinical Trial of Brief Interventions in Primary Health Care*. Geneva: Programme on Substance Abuse, World Health Organization.
- Bien, T.H., Miller, W.R. & Tonigan, J.S. (1993). Brief interventions for alcohol problems: a review. *Addiction*, **88**, 315-336.
- Chick, J. & Duffy J. (1981). *Drinking Survey*. Edinburgh: Alcohol Research Group, University of Edinburgh.
- Chick, J., Lloyd, G. & Crombie, E. (1985). Counselling problem drinkers in medical wards: a controlled study. *British Medical Journal*, **290**, 965-967.
- Cohen, J. (1987). *Statistical Power Analysis for the Behavioral Sciences* (revised edition). Hillsdale NJ: Lawrence Erlbaum.
- Daniel, A. (1983). *Power, Privilege and Prestige: Occupations in Australia*. Sydney: Longman Cheshire.
- Duckert, F. (1987). Recruitment into treatment and effects of treatment for female problem drinkers. *Addictive Behaviors*, **12**, 137-150.
- Elvy, G.A., Wells, J.E. & Baird, K.A. (1988). Attempted referral as intervention for problem drinking in the general hospital. *British Journal of Addiction*, **83**, 83-89.
- Ewing, J.A. (1984). Detecting alcoholism: the CAGE Questionnaire. *Journal of the American Medical Association*. **252**, 1905-1907.
- Heather, N. (1987). DRAMS for problem drinkers: The potential of a brief intervention by general practitioners and some evidence of its effectiveness. In T. Stockwell & S. Clement (eds), *Helping the Problem Drinker: New Initiatives in Community Care*. London: Croom Helm.
- Heather, N. (1988). Lessons from a controlled evaluation of a general practice minimal intervention for problem drinking. *Australian Drug & Alcohol Review*, **7**, 317-328.
- Heather, N. (1990). DRAMS: A reply from Professor Heather. Letter to the Editor. *Drug & Alcohol Review*, **9**, 290.
- Heather, N. (1993). Brief interventions for excessive drinkers identified in general medical

practice: What does the evidence show? Keynote speech at Ninth International Conference on Alcohol, University of Liverpool, UK, 16 September.

Heather, N. (in press). Brief intervention strategies. In R.K. Hester & W.R. Miller (eds), *Handbook of Alcoholism Treatment Approaches: Effective Alternatives* (revised edition). New York: Pergamon.

Heather, N., Champion, P., Neville, R. & Maccabe, D. (1987). Evaluation of a controlled drinking minimal intervention for problem drinkers in general practice (the DRAMS Scheme). *Journal of the Royal College of General Practitioners*, **37**, 358-363.

Heather, N. Richmond, R., Webster, I. & Wodak, A. (1989). *A Guide to Healthier Drinking*. Sydney: Clarendon Printing.

Heather, N., Rollnick, S., Bell, A. & Richmond, R. (submitted). Effects of brief counselling among male heavy drinkers identified on general hospital wards.

Kristenson, H., Öhlin, H., Hulten-Nosslin, M-B, Trelle, E. & Hood, B. (1983). Identification and intervention of heavy drinking in middle-aged men: Results and follow-up of 24-60 months of long-term study with randomised controls. *Alcoholism: Clinical & Experimental Research*, **7**, 203-209.

Miller, W.R. & Joyce, M.A. (1979). Prediction of abstinence, controlled drinking and heavy drinking outcomes following behavioral self-control training. *Journal of Consulting & Clinical Psychology*, **47**, 773-775.

Miller, W.R. & Marlatt, G.A. (1984). *Manual for the Comprehensive Drinker Profile*. Odessa FL: Psychological Assessment Resources Inc.

Miller, W.R. & Rollnick, S. (1991). *Motivational Interviewing: Preparing People to Change Addictive Behavior*. New York: Guilford.

Morgenstern, R. & Vlastelica, D. (1976). Automated kinetic determination of gamma-glutamyl transpeptidase. *Clinical Chemistry*, **22**, 1224.

Nilssen, O. (1991). The Tromsø Study: Identification of and a controlled intervention on a population of early-stage risk drinkers. *Preventive Medicine*, **20**, 518-528.

Pols R. & Hawks, D. (1992). *Is There a Safe Level of Daily Consumption of Alcohol for Men and Women? Recommendations Regarding Responsible Drinking Behaviour* (revised edition). Canberra: Australian Government Printing Service.

Richmond, R.L., Webster, I.W., Elkins, L., Mendelsohn, C. & Rollnick, S. (1991). *Smokescreen for the 1990s: A Stop Smoking Programme for General Practitioners to Use with Smokers*. Sydney: NSW Department of Health.

- Richmond, R.L., Makinson, R.J., Kehoe, L.A., Giugni, A.A. & Webster, I.W. (1993) One-year evaluation of three smoking cessation interventions administered by general practitioners. *Addictive Behaviors*, **18**, 187-199.
- Robertson, I., Heather, N., Dzialdowski, A., Crawford, J. & Winton, M. (1986). A comparison of minimal versus intensive controlled drinking treatment interventions for problem drinkers. *British Journal of Clinical Psychology*, **25**, 185-194.
- Romelsjö, A., Andersson, L., Barrner, H. *et al.* (1989). A randomized study of secondary prevention of early stage problem drinkers in primary health care. *British Journal of Addiction*, **84**, 1319-1327.
- Sanchez-Craig, M., Leigh, G. Spivak, K. & Lei, H. (1989). Superior outcome of females over males after brief treatment for the reduction of heavy drinking. *British Journal of Addiction*, **84**, 395-404.
- Sanchez-Craig, M., Spivak, K. & Davila, R. (1991). Superior outcome of females over males after brief treatment for the reduction of heavy drinking: replication and report of therapist effects. *British Journal of Addiction*, **86**, 867-876.
- Scott, E. & Anderson, P. (1991). Randomized controlled trial of general practitioner intervention in women with excessive alcohol consumption. *Drug & Alcohol Review*, **10**, 313-321.
- Selzer, M.L. (1971). The Michigan Alcoholism Screening Test: the quest for a new diagnostic instrument. *American Journal of Psychiatry*, **127**, 89-94.
- Suokas, A. (1992). *Brief Intervention of Heavy Drinking in Primary Health Care: Hämeenlinna Study*. Academic Dissertation, Research & Treatment Unit for Alcohol Diseases, University of Helsinki. Helsinki: University Printing House.
- Szasz, G. (1968). A kinetic photometric method for serum γ -glutamyl transpeptidase. *Clinical Chemistry*, **15**, 112-136.
- Wallace, P., Cutler, S. & Haines, A. (1988). Randomised controlled trial of general practitioner intervention in patients with excessive alcohol consumption. *British Medical Journal*, **297**, 663-668.
- Wallace P. & Haines A. (1984). General practitioners and health promotion: what patients think. *British Medical Journal*, **289**, 534-536.
- Wodak, A., Richmond, R., Webster, I., Scanlon, K. & Solomon, M. (1991). Alcoholscreen: Detection, assessment and minimal intervention for problem drinkers in general practice. In J. Bell & L. Wyndham (eds), *Screening for Drug Abuse: A Community Challenge*. Clinical Biochemist Monograph No. 5. Maylands, WA: Australian Association of Clinical Biologists.

