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Promoting Responsible Drinking

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ALCOHOL
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compiled by

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and

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for

The Portman Group

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The Portman Group

The Group's aims are –

- to promote sensible drinking;
- to reduce alcohol-related harm;
- to develop a better understanding of alcohol misuse;
- to promote responsible marketing.

The Portman Group is not a trade association. It is a pan-industry organisation established to achieve the aims listed above.

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The Portman Group publishes *The Quarterly Review of Alcohol Research* in order to provide people interested in the psycho-social and biomedical aspects of alcohol consumption with a regular, easily-digested summary of recent research in the field. We neither select the topics for Dr Geoff Lowe and Dr Bernard Dixon to review, nor do we edit their copy.

The readership covers a great diversity of professions in many countries, including: the Police, MPs, civil servants and other policy makers, the media, the drinks industry, trade associations, academics in the field and associated fields, and health promotion and alcohol advisory professionals.

If you have any comments on the *Review*, would like to see particular papers or different subject areas covered, would like to receive additional copies each quarter, or have colleagues or associates who you feel would benefit from receiving a copy, please let me know.



David Poley
Chief Executive of The Portman Group

Definitions of moderate drinking

Many people define moderate drinking in ways that could put them, or others, at risk for short- or long-term negative consequences of alcohol use. That's the conclusion of a recent American study, which also found that people have complex beliefs about the benefits and risks of alcohol consumption.

Carla Green and her colleagues at the Kaiser Permanente Center for Health Research, Portland, interviewed a wide-ranging sample of people to find out how they define moderate drinking and to examine links between their drinking-related attitudes and beliefs, and drinking patterns. Participants included lifelong abstainers, former drinkers, low-risk drinkers, immoderate drinkers (above recommended limits, but no problems), hazardous drinkers and heavy episodic drinkers.

When the researchers analyzed these interview transcripts, the first and most general observation that emerged was that respondents voiced a very wide range of beliefs and opinions. "The diversity of the themes we found suggested a widespread lack of knowledge regarding the short- and long-term health-related risks associated with drinking, and indicated that many people have not integrated information about low-risk drinking guidelines into the ways they think about and define moderate drinking."

...people might still under-estimate the volume of alcohol in standard drinks."

This may not be too surprising, given that recommended 'sensible' levels vary between men and women and among different countries. Also, alcohol researchers have not always used consistent definitions of moderate and heavy drinking. Such inconsistencies, in combination with media stories about both risks and benefits of drinking, may well present confusing and complicated messages. Furthermore, people might still under-estimate the volume of alcohol in standard drinks. There may also be some confusion arising from differences in the way self-reported 'drinks' are defined across different countries, and between different beverages and settings.

One theme that emerged frequently in the interviews was that moderate drinking is 'individually determined', i.e. it depends on the particular individual drinker, body size, context, expectancies, etc. However, none of the participants mentioned differences in the ways that women metabolize alcohol – and there was general lack of understanding of gender differences in dose-related risk. Other themes considered moderate drinking in terms of 'not getting drunk'; 'no adverse effects'; 'control over drinking'; 'relative frequency, not quantity'; normative definitions (e.g. 'wine is OK, spirits are not').

Many respondents suggested that increased tolerance had changed their definitions of moderate drinking to include much higher levels of consumption. This could lead them to under-estimate (or ignore) the long-term risks of heavy consumption. The authors comment that public health officials (in USA) have not succeeded in conveying strong or clear messages about what constitutes low-risk drinking or about the dose-response effects of alcohol. They recommend new (and more consistent) approaches

to public education to increase knowledge and understanding about alcohol-related risks.

“Not getting tanked”: Definitions of moderate drinking and their health implications. *Drug and Alcohol Dependence* (2007), **86**, 265–273. Green, C.A., Polen, M.P., Janoff, S.L., Castleton, D.K., & Perrin, N.A., Center for Health Research, Kaiser Permanente Northwest, Portland, OR, USA; and Oregon Health & Science University, Portland, OR, USA.

Number of drinks to feel drunk

How many drinks does it take you to feel drunk? That was one of the key questions addressed by William Kerr and his colleagues in their recent investigation of the variations and trends in the meaning of subjective drunkenness.

The researchers (Alcohol Research Group, Berkeley, California) looked at three National Alcohol Surveys (1979, 1995, 2000) involving over 14,000 adult participants in the USA. Only those who reported one or more episodes of drunkenness in the past year were included in the researchers' study sample (N=3,707).

One would expect a fairly wide range of answers to the above question – due to variations in alcohol content, individual reactions to alcohol, drinking behaviour and experience, and in subjective interpretations of 'drunkenness'. For instance, other studies have reported respondents' definitions of drunkenness as 'impaired ability to drive or walk', 'being out of control', 'not being able to think clearly', or 'feeling sick or dizzy'.

Whilst physiological aspects of ethanol-biological interactions and physical responses to ethanol are likely important factors, the Berkeley researchers focused more on the meaning of drunkenness and the social, demographic and regulatory forces (e.g. alcohol policies) that may influence it.

In 1979 the average number of drinks to feel drunk was 9.8 for men and 5.7 for women. These averages

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fell to 6.6 (men) and 4.1 (women) by the latest survey (2000). Over this period alcohol-related traffic fatalities (nationally) declined substantially, and in 2000 were less than half of their 1979 level.

The proportion reporting monthly drunkenness was highest in the 2000 survey, especially in men (11.3% vs. 6.5% in 1979). Overall, individuals who drank more and had more heavy sessions reported that more drinks were needed to feel drunk (reflecting tolerance to alcohol and perhaps other factors). Older respondents (both men and women) required fewer ‘drinks to feel drunk’. African Americans were found to report fewer ‘drinks to feel drunk’ relative to Whites – especially in the under 30 age group.

Educational attainment was also found to be a major determinant of the number of drinks to become drunk, for men. In general, having less education (particularly not graduating high school) was linked with reporting more ‘drinks to feel drunk’. Other contributing factors included reductions in states’ legal BAC limits for driving.

Drinkers who consumed wine reported fewer drinks (‘to feel drunk’) than did beer and/or spirits drinkers. Heavy drinkers (those more frequently consuming 5+ drinks in a session) ‘needed’ more drinks to feel drunk.

Interestingly, despite a decline (between 1979 and 2000) in average alcohol consumption and heavy drinking days, more participants reported being drunk in the past year, and being drunk more often, in the later two surveys (1995 and 2000). The authors note that the average alcohol content of drinks may have changed over this period.

These findings reveal a wide variety in number of drinks required to reach the subjective drunkenness threshold. Significant influences included age, gender, ethnicity, education, drinking behaviour, beverage choice, and regional BAC limits for driving. Even when the researchers took into account these factors, they still observed a downward trend (1979–2000) in the average ‘number of drinks to feel drunk’. The authors view this downward trend as a positive development in public health terms, having the potential for reducing alcohol-related problems.

*“Older respondents
(both men and women)
required fewer ‘drinks to
feel drunk’.”*

How many drinks does it take you to feel drunk? Trends and predictors for subjective drunkenness. *Addiction* (2006), **101**, 1428–1437. Kerr, W.C., Greenfield, T.K., & Midanik, L.T., Alcohol Research Group, Public Health Institute, Berkeley, CA, USA; School of Social Welfare, University of California at Berkeley, CA, USA.

Young people's drinking motives

Research on drinking motives is based on assumptions that people drink in order to attain certain valued outcomes linked to personal experience, situations and expectancies.

'Enhancement motives' are defined as drinking to enhance positive emotional states and are assessed by items such as drinking to feel good, or because it's exciting or fun. 'Coping motives' refer to drinking to cope with bad feelings, to relieve stress, or to avoid social rejection.

Emmanuel Kuntsche and colleagues reviewed 82 research studies published in the last 15 years on the drinking motives of young people. The aim was to identify any overall trends emerging from all this world-wide evidence.

First, the reviewers observed a developmental trend – from general, undifferentiated (in boys and girls) drinking motives in late childhood and early adolescence, to more gender-specific motives in subsequent years. For instance, among older college students, men scored higher than women on coping motives, whereas no differences were found among younger students.

Second, two types of young people with a particular personality seemed to emerge. One type – those who drink for enhancement motives – appeared to be extraverted, impulsive, and aggressive. They tend to be sensation-seekers, to have low inhibitory control, low levels of responsibility, and a weak will to achieve. The other type – those who drink for coping motives – appeared to be neurotic, and to have a low level of agreeableness and negative views of their own self.

There was a remarkable similarity across cultures in drinking motives of adolescents. Most reported drinking for social or enhancement reasons in the sense of enjoyment. Apart from differences

in prevalence in different countries, the classification of drinking motives in enhancement, coping, social and conformity, seemed relatively stable across cultures.

Drinking motives would seem to be a useful concept for developing prevention programmes for at-risk

adolescents. The evidence suggests that targeting higher-risk youths may be more effective than targeting the general population. More specifically, attention to drinking motivation in general is relevant in late childhood, whereas social and enhancement motives are more relevant in early adolescence, and coping motives in later adolescence and early adulthood.

The findings on personality factors suggest tailored interventions for two risk groups: (a) extravert, sensation-seeking boys who drink for enhancement motives; and (b) neurotic, anxious girls who drink for coping reasons.

“In both age groups, negative reasons (e.g. to relieve stress) more strongly predicted drinking problems than did positive reasons.”

Recent findings from the University of Wales also point to more tailored interventions for young people. Miles Cox and colleagues questioned groups of secondary school students (13–18 year-olds) and university students (18–21 year-olds) regarding drinking motives, alcohol consumption and alcohol-related problems.

In both age groups, negative reasons (e.g. to relieve stress) more strongly predicted drinking problems than did positive reasons (e.g. to meet new friends, to have a good time). Younger students had a different pattern of problematic drinking than older students. So among secondary-school students, alcohol-related problems were most strongly linked to weekly alcohol consumption and, to a lesser extent, negative reasons. But among university students, negative reasons for drinking predicted problems better than did either weekly consumption or positive reasons. The researchers also noted that older students appeared to have better-established reasons for drinking, compared with younger students who discriminated less between positive and negative reasons.

These differences suggest that different approaches for reducing problematic drinking should be used with the two groups of young people. For secondary-school students, the authors recommend an intervention that aims directly to reduce alcohol consumption. For university students, however, interventions that mainly target negative reasons for drinking might be more appropriate.

Who drinks and why? A review of socio-demographic, personality, and contextual issues behind the drinking motives in young people. *Addictive Behaviors* (2006), **31**, 1844–1857. Kuntsche, E., Knibbe, R., Gmel., & Engels, R., Swiss Institute for the Prevention of Alcohol and Drug

Problems (SIPA), Lausanne, Switzerland; University of Maastricht, The Netherlands; Radboud University, Nijmegen, The Netherlands.

Motives for drinking, alcohol consumption, and alcohol-related problems among British secondary-school and university students. *Addictive Behaviors* (2006), **31**, 2147–2157. Cox, W.M., Hosier, S.G., Crossley, S., Kendall, B., & Roberts, K.L., University of Wales, Bangor, UK.

Alcohol education leaflets

Most alcohol education leaflets in the UK, Germany and The Netherlands fail to include a range of persuasive messages derived from research-based recommendations. That's according to a recent study by health psychologists at the universities of Sussex and Leicester in the UK, and the University of Potsdam, Germany.

There seems to be a general dearth of research into the content of health promotion leaflets. Charles Abraham and his colleagues wanted to find out how well messages designed to reduce alcohol consumption corresponded to research-based recommendations. Since significant numbers of drinkers in the UK and other European countries are estimated to drink heavily or binge drink, it's important to make sure that alcohol education leaflets contain effective messages based on solid research.

A key finding in social and health psychology is that people are more likely to make the effort to change their behaviour if they believe in their ability ('self-efficacy') to do so. Several approaches highlight the psychological antecedents and thought processes leading to heavy drinking. For example, the theory of planned behaviour (TPB) emphasizes intentions and perceived self-efficacy.

“...only 7% of British leaflets (German leaflets 17%, Dutch 29%) gave advice on how to set oneself drinking-related goals...”

The researchers obtained comprehensive samples of nationally available alcohol education leaflets with messages specifically directed to drinkers – 31 leaflets from the UK, 30 from Germany and 21 from The Netherlands. Independent coders carried out a content analysis to identify different kinds of messages (e.g. defining safe limits, highlighting consequences, promoting specific actions, etc).

Psychologists have already derived a set of at least 30 research-based, persuasive messages targeting the potentially modifiable cognitive antecedents (such as attitudes, others' approval, intentions, self-efficacy, etc). And yet of 31 alcohol education leaflets available in the UK, the researchers found none which encouraged readers that they have the ability to abstain or drink moderately. Similarly, only 7% of British leaflets (German leaflets 17%, Dutch 29%) gave advice on how to set oneself drinking-related goals – the kind of information that can strengthen a drinker's belief in their ability to change their behaviour.

Psychologists have also shown that people's behaviour is strongly influenced by anticipated regret, and yet only 7% of British leaflets warned readers that they were likely to regret drinking too heavily. Most of the Dutch and German leaflets also failed in this respect. Nearly all leaflets warned about the negative health consequences of excessive drinking. German (87%) and Dutch (81%) leaflets also repeatedly highlighted negative psychological consequences, but only 45% of British leaflets included such messages.

The researchers did find, in each country, some leaflets which included a comprehensive range of theory-derived and research-based messages, but these were very much the exceptions.

According to the authors, the vast majority of the leaflets examined could have been easily edited to include many more theory-derived messages and, in some cases, to exclude messages likely to undermine positive attitudes towards alcohol reduction. Their research “highlights a communication gap between, on the one hand, psychologists who apply predictive models to alcohol use and make recommendations concerning potentially effective persuasive communication and, on the other hand, health promoters who write educational leaflets designed to reduce alcohol intake.”

Without a proper research-based approach to leaflet construction, the authors conclude, the majority of nationally available alcohol-education leaflets will continue to miss out on many potentially persuasive messages.

In a follow-up study, Charles Abraham and colleagues have recently demonstrated that a short, research-based leaflet intervention promoting action-specific self-efficacy can readily influence young women who are drinking over recommended limits.

What's in a leaflet? Identifying research-based messages in European alcohol-education leaflets. *Psychology and Health* (2007), **22**, 31–60. Abraham, C., Southby, L., Quandt, S., Krahé, B., & van der Sluijs, W., University of Sussex, Brighton, UK; University of Leicester, UK; and University of Potsdam, Germany.

Reducing Friday alcohol consumption among moderate women drinkers: Evaluation of a brief evidence-based intervention. *Alcohol & Alcoholism* (2007), **42**, 37–41. Murgraff, V., Abraham, C., & McDermott, M., University of East London, UK; and University of Sussex, Brighton, UK.

Depression and drinking in young adults

There are well-established links between heavy drinking and depression. But moderate drinkers generally have better mental health than non-drinkers and heavy drinkers (a ‘J-shaped’ curve typically characterizes this relationship) – particularly in middle-aged and older adults. However, less is known about such patterns in younger adults.

Andrew Steptoe and his colleagues, at University College London, wanted to see whether this non-linear (or ‘J-shaped’) association is also present in samples of young adults – and whether this link is independent of culture, socio-economic position, and health status.

The researchers collected data from the International Health and Behaviour Survey, involving over 15,000 students (aged 17–30 years) from 20 countries. They categorized respondents into non-drinkers, moderate drinkers (1 to 4 drinks [Men], 1 to 3 drinks [Women] on a typical single occasion), or heavy drinkers (5 or more drinks [M], 4 or more drinks [W] on a single occasion).

The Beck Depression Inventory (BDI) involves 13 questions about depressive symptoms. The researchers used this to categorize respondents in terms of high level or low level depression.

More women (20%) reported depressive symptoms than did men (16%), and more women (53%) were non-drinkers compared with men (38%). Women were also less likely to be heavy drinkers (16% vs. 24%). The proportion of respondents with higher BDI scores was 19% for non-drinkers, 16% for moderate drinkers, and 20% for heavy drinkers (demonstrating more of a ‘U-shaped’ relationship). Similar findings were obtained when alcohol consumption was classified on the basis of number of drinking days per week, and also in terms of recent consumption.

Even after taking into account age, gender, living arrangements, socio-economic status (based on parental education), and self-rated health, there was still a significant ‘U-shaped’ relationship between depression levels and level of alcohol consumption. That is, moderate drinkers reported significantly lower depression compared with both non-drinkers and heavy drinkers.

“...moderate drinkers reported significantly lower depression compared with both non-drinkers and heavy drinkers.”

These results show that this ‘U-shaped’ link, previously identified in Western countries, is present in younger people from a variety of cultural backgrounds in a range of countries from Central-

Eastern Europe, South America, and Africa, as well as Western Europe and the USA.

The researchers were not able to compare different types of alcohol. So it remains to be seen

whether beer, distilled spirits, or wine have differing relationships with depression. It should also be noted that, whilst university students are an accessible group of relatively healthy young adults, they are not necessarily typical of all young people.

Alcohol consumption and symptoms of depression in young adults from 20 countries. *Journal of Studies on Alcohol* (2006), **67**, 837–840. O'Donnell, K., Wardle, J., Dantzer, C., & Steptoe, A., Department of Epidemiology and Public Health, University College London, UK.

Gender, culture and drinking behaviour

It has been almost universally observed that men drink more alcohol (and more frequently) than do women. Undoubtedly, physical factors (such as body size and fat ratio) may affect women's sensitivity to alcohol. But it is also likely that cultural factors play a part, since the size of gender differences in drinking varies greatly from one society to another.

A few years ago the European Commission (EC) set up a multi-national study on 'Gender, Culture and Alcohol Problems', questioning adults from 13 European countries. This project is affiliated to a larger research survey: 'Gender, Alcohol and Culture: An International Study' (GENACIS), which involves another 22 countries. The findings are now available and several recent studies have shown that when there is more equality between the sexes in a country, then the gender gap in drinking behaviours is smaller.

In most of the analyses the largest gender differences in drinking behaviour and alcohol-related problems were found in those countries with developing economies (e.g. Mexico, Argentina, Uganda). In contrast, Nordic countries, (followed by Western and Central European countries), had the smallest gender differences.

When gender differences do converge it is important to know whether men are drinking less or women more. However, these surveys were cross-sectional (undertaken at one time point only), so longitudinal studies are needed to address this question.

One important finding to emerge was that the gender ratios between men's and women's rates of drinking (and of its consequences) are negatively related to women's position within society. That is, the higher the women's status, the smaller the gender difference in drinking behaviours.

Regarding the family situation, two broad tendencies emerged. First, for men, living in a partnership meant lower risks for heavy drinking, compared with being single. Second, for women, living with a partner and having children was commonly the most protective role combination (against risk of heavy drinking).

Another consistent finding was that heavy drinking decreased with increasing education among men. For women in several countries (Austria, France, Germany, Switzerland), the opposite was true.

The authors suggest that women in higher job positions (usually linked with better education) more often behave similarly to men in the work world, or simply have more occasions to drink.

There were clear and consistent gender differences in all countries, but the differences in drinking behaviours between countries and regions were not as obvious. The strongest influences seemed to relate to characteristics of the social

structure, such as urbanization and the divorce rate, rather than indicators of beliefs and values, such as church attendance and 'cultural masculinity' (i.e. the values that dominate in a society).

“...when there is more equality between the sexes in a country, then the gender gap in drinking behaviours is smaller.”

The authors suggest that institutional settings and arrangements may affect regularities in drinking behaviour more than attempts to control it by moral education.

Drinking patterns and their gender differences in Europe.

Alcohol & Alcoholism (2006), **41**, Supplement 1, 8–18. Mäkelä, P., Gmel, G., Grittner, U., Kuendig, H., Kuntsche, S., Bloomfield, K., & Room, R. Alcohol and Drug Research Group, Helsinki, Finland; Swiss Institute for the Prevention of Alcohol and other Drug Problems, Lausanne, Switzerland; University Medicine Berlin, Germany; University of Southern Denmark, Esbjerg, Denmark; Centre for Social Research on Alcohol and Drugs, Stockholm, Sweden; Lausanne University Hospital, Switzerland.

The influence of societal level factors on men's and women's alcohol consumption and alcohol problems. *Alcohol & Alcoholism* (2006), **41**, Supplement 1, 47–55. Rahav, G., Wilsnack, R., Bloomfield, K., Gmel, G., & Kuntsche, S., Tel Aviv University, Israel; University of North Dakota, USA; University of Southern Denmark, Esbjerg, Denmark; University Medicine Berlin, Germany; Lausanne University Hospital, Switzerland.

Another danger of pregnancy binges

Expectant mothers who abuse alcohol during pregnancy may, by doing so, be responsible for psychiatric and personality disorders that emerge later when their children become young adults. American research, revealing this link for the first time, suggests that the risk is twice as high among binge drinkers, as in women who do not binge. The evidence comes from work that is particularly convincing because of the very lengthy period of time over which the research was carried out.

This is yet another item in a growing dossier of information on the hazards of excessive alcohol consumption in the course of pregnancy. Only last year, the known catalogue of increased risks, from foetal alcohol syndrome (FAS) and cleft lip/palate to premature birth and abortion during the first trimester (Review, Volume 10, Number 3, Autumn 2002) was extended to include heightened dangers of behavioural and mental problems in offspring at the age of seven (Review, Volume 13, Number 1, Spring 2005). The latest findings, however, indicate that psychiatric and personality problems attributable to high levels of alcohol experienced in the womb may not emerge until young adulthood.

“...psychiatric and personality problems attributable to high levels of alcohol experienced in the womb may not emerge until young adulthood.”

The US investigators obtained their basic information from an on-going, long-term study which embraced over 1500 expectant mothers when it began. They interviewed all of the women halfway through their pregnancy and asked specifically about their use of alcohol, cigarettes, caffeine, recreational drugs and medications before they became pregnant.

The researchers then selected about 500 of the offspring for particular study. This group included all of those known to have been most heavily exposed to alcohol before birth, together with a representative sample of others whose mothers had a range of different drinking habits during pregnancy, including total abstinence. Finally, 400 members of the study group were interviewed at an average age of 25.7 years. Highly specialised procedures were used in order to reveal any psychiatric or personality problems. These included not only anxiety, depression, eating and passive-aggressive disorders but also traits such as substance abuse and obsessive-compulsive disorder.

The results show that the risks of six different abnormalities of this sort were more than double in adults who had been exposed to one or more bingeing episodes while they were still in the womb. The majority of the mothers who reported bingeing would probably not have been categorised in this way according to the criteria routinely used in the mid-1970s when the study commenced. They averaged 13 drinking occasions per month and 3.5 drinks on each of those occasions. These figures compared with an average of five drinking occasions monthly and 1.3 drinks per occasion for the other mothers.

“Ninety percent of those who drank in binges during mid-pregnancy also reported binge drinking in early pregnancy. So the results of this study should not be construed to apply to mid-pregnancy or mid-pregnancy binge drinking only,” the authors write. They recommend that doctors ought to be more alert for possible signs of psychiatric disturbance among young adults with other indications of FAS. But they should also be aware, when treating young adults with conditions such as antisocial and passive-aggressive disorders, that maternal binge drinking may have been a contributory cause.

Binge Drinking During Pregnancy as a Predictor of Psychiatric Disorders on the Structured Clinical Interview for DSM-IV in Young Adult Offspring, American Journal of Psychiatry (2006), 163, 1061–1065, Barr H.M., Bookstein F.L., O’Malley K.D., Connor P.D., Huggins J.E., Streissguth A.P., Fetal Alcohol and Drug Unit, Department of Psychiatry and Behavioral Sciences, University of Washington Medical School, Seattle, WA; Department of Statistics, University of Washington, Seattle, WA, USA; and Department of Anthropology, University of Vienna, Vienna, Austria.

Abstinence and quality of life

Research on a random sample of over 12,000 older Australian women has shown that teetotalers had a significantly poorer health-related quality-of-life than women who drank in moderation. Abstainers were also more likely to die during the six years of the study.

The scientists who conducted the research wanted to understand more about the balance of evidence between the health benefits and hazards of alcohol consumption, which led them to consider whether there are optimal levels for the safe use of alcohol. They were particularly interested in women, especially older women, because they are more susceptible to the effects of drinking. They cite evidence showing, for example, that there is a stronger association between alcohol consumption and risk of injury in women than in men. Since they are generally leaner than younger people, and as their liver is less efficient in breaking down alcohol, old people are also more vulnerable to its damaging effects.

On the other hand, recent evidence indicates that moderate drinking exerts a protective effect against coronary heart disease in older adults (*Review, Volume 14, Number 2, Summer 2006*). The Australian investigators also comment that the use of alcohol can be associated with psychological and social well-being, which may be considered important outcomes in their own right.

Medical Research

One problem in determining optimal levels for safe drinking, they point out, is that many studies have been done by researchers who have taken cross-sections of populations and compared drinking habits and health between different individuals. Relatively few investigators have followed large numbers of subjects forwards over time.

This was the purpose of the Australian work, which began with 12,432 women, aged 70–75 at the outset, and monitored them up for six years. The women were selected randomly from the national health insurance database, which included almost all citizens and permanent residents regardless of age or income. They were initially asked about the quantity and frequency of their alcohol intake. Further enquiries at three and six years showed that for most of the individuals this remained stable over the six years.

The women's physical and mental health-related quality-of-life was computed through a complex series of questions and records regarding not only illnesses but also bodily pain, physical function, mental health, social functioning and other factors. These findings were aggregated into a single quality-of-life score, ranging from 0 to 100.

The outcome was that the women who abstained from alcohol, or who drank rarely, were more likely to die during the six years than those who were modest drinkers (consuming 1–2 drinks per day, 3–6 days per week). If they survived, they had significantly lower health-related quality-of-life scores, when adjusted to compensate for the effects of smoking and other potential interfering

factors. Although this study provided no specific evidence for the damaging effect of heavier drinking, the authors point to previous findings demonstrating its injurious consequences in younger women.

One limitation of the research is that there were no questions about the consumption of different types of alcoholic beverage (though previous work in Australia indicated that older women preferred wine and rarely drank beer). Another limitation was that intake data were based on participants' own estimates. While these could be under-estimates, the authors consider this is unlikely to have occurred in a population study (in contrast to one in which volunteers in a defined group are questioned closely). As well as the protective effect

of alcohol against coronary heart disease, the investigators suggest that other factors which might help to explain their findings are the social and pleasurable associations of drinking and its positive effects on appetite and therefore possibly on nutrition.

“...the women who abstained from alcohol, or who drank rarely, were more likely to die during the six years than those who were modest drinkers.”

A Drink to Healthy Aging: The Association Between Older Women's Use of Alcohol and Their Health-Related Quality of Life, *Journal of the American Geriatrics Society* (2006), **54**, 1341–1347, Byles J., Young A., Furuya H., Parkinson L., Research Center for Gender, Health and Ageing, University of Newcastle, Callaghan, Australia; and Department of Basic Clinical Science and Public Health, Tokai University School of Medicine, Kanagawa, Japan.

Sunburn after heavy drinking

While over-indulgence in alcohol is inherently a high-risk activity, it can also lead to a rich variety of other high-risk forms of behaviour. Now it seems that sunburn should be added to the diverse catalogue ranging from unplanned sexual adventures to road and other injuries.

Recent research in the USA began with the simple hypothesis that excessive sunbathing, with its secondary danger of presaging skin cancer, might follow excessive drinking. In other words, people who have taken too much alcohol might suffer from sunburn because they have forgotten or disregarded health advice or indeed have fallen asleep in the sun.

On the basis of a survey conducted among a total of just under 300,000 people in all of the states of the USA, as well as in Guam, Puerto Rico, the Virgin Islands and the District of Columbia, the hypothesis has been proved correct. The investigation was part of a wider survey designed to record and measure, through telephone interviews, several different forms of behaviour, from smoking and physical activity to fruit and vegetable consumption.

As regards alcohol, participants stated the number of days on which they had taken at least one drink over the previous month, as well as the number of

drinks consumed on those days. A drink was defined as one can or bottle of beer, one glass of wine, one cocktail or shot of spirits. Binge drinking was defined as taking five or more drinks on one occasion.

There were two questions about sunburn. Have you had a sunburn (defined as any time when even a small part of your skin was red for more than 12 hours) during the past 12 months? If so, how many sunburns have you experienced?

About a third of all respondents stated that they had experienced sunburn over the previous year. And statistical analysis established that the prevalence and number of sunburns were positively associated with heavier drinking, especially bingeing. The link remained significant even when the figures were adjusted for various socio-economic factors that could have modified the result. The link was also apparent among the many subgroups studied.

“...the prevalence and number of sunburns were positively associated with heavier drinking, especially bingeing.”

Although the results do not prove cause and effect, this is by far the most likely explanation. Rather than bingeing leading individuals to expose themselves to excessive amounts of sunlight, it is also possible that

both the imprudent exposure and imprudent drinking are the manifestations of a personality factor that makes people more likely to take both risks. However, this appears unlikely because adjustment for other plausible manifestations, such as high-risk sexual activity, did not alter the strength of the association. If the US findings are confirmed in future studies, in which subjects are monitored forwards over time, they will confirm one pathway through which heavy alcohol consumption can lead to skin cancer.

Alcohol Consumption and Self-Reported Sunburn: A Cross-Sectional, Population-Based Survey, *Journal of the American Academy of Dermatology* (2006), **55**, 584–589, Mukamal K.J., Department of Medicine, Beth Israel Deaconess Medical Center, Boston, MA, USA.

More on alcohol and heart disease

New insights continue to emerge to fill out our understanding of the way in which drinking in moderation lowers the likelihood of coronary heart disease. Recently (*Review*, Volume 14, Number 3, Autumn 2006) there was news of an additional bodily mechanism that may account for the protective effect. Now a further study has demonstrated a reduced risk even in men who follow a particularly healthy lifestyle. This was previously considered possible but was unproven.

The question has arisen because, despite the accumulation of evidence for the cardiovascular benefit of moderate alcohol intake, health authorities are reluctant to recommend the habit. They are cautious about doing so principally because of the danger that light drinkers will become heavy drinkers, with all of the attendant dangers. Instead, standard advice the world over is to stop smoking, take exercise and adopt a healthy diet. But are people who follow these guidelines likely to gain further benefit by drinking in moderation?

The subjects for the new research were male US health professionals (such as dentists and pharmacists) who were enrolled in the on-going Health Professionals Follow-up Study. Investigators selected, from a total of 51,000 participants aged 40–75, a group of 8867 men who were free of major illness and who reported four types of behaviour characteristic of a healthy lifestyle. These included a body mass index (weight in kilograms

divided by height in metres squared) of less than 25, taking moderate to vigorous activity for 30 minutes or more each day, abstinence from smoking and consumption of a favourable diet. This meant one high in vegetables, fruit, cereal, fish, chicken, nuts, soy and polyunsaturated fat, but low in *trans*-fats and red and processed meats. The men also took regular multivitamins.

Participants confirmed on biennial questionnaires that they were adhering to these aspects of lifestyle, and every four years they answered questions about their drinking habits. On each occasion, they were asked how often, on average, they had drunk beer, white wine, red wine or spirits over the past year. Estimates of the quantities consumed allowed investigators to calculate the total alcohol intake for each beverage.

During 16 years of follow-up there were 105 cases of myocardial infarction in the study group. When the researchers examined the risk in relation to drinking, they found significant reductions. Most striking was a halving of the risk, as compared with abstinence, in men taking 15.0–29.9 grams of alcohol (ie approximately 2–3.75 UK units) per day. The investigators did not report any differences as regards various types of alcoholic drink, so they presumably did not discover any.

Aside from their intrinsic importance, these findings facilitate our understanding of previous studies demonstrating a diminished risk of coronary heart disease in regular moderate drinkers. Those studies have sometimes been criticised on the grounds that investigators failed to allow for the possibility that some other

characteristic of their subjects – for example, exercise or diet – may have accounted for their results. However, the new research was based solely on non-smokers, of normal weight, who took an excellent diet and exercised regularly. Nevertheless, the link between alcohol intake and the risk of myocardial infarction was as strong as in investigations on much more mixed populations. It seems most unlikely that some other, as yet unknown, factor could have been responsible for the outcome.

Alcohol Consumption and Risk for Coronary Heart Disease in Men With Healthy Lifestyles, Archives of Internal Medicine (2006), 166, 2145–2150, Mukamal K.J., Chiuve S., E., Rimm E.B., Division of General Medicine and Primary Care, Beth Israel Deaconess Medical Center; Departments of Nutrition and Epidemiology, Harvard School of Public Health; and Division of Preventive Medicine and Channing Laboratory, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, USA.

“When the researchers examined the risk in relation to drinking, they found significant reductions.”

How alcohol can damage the brain

Longstanding awareness that alcoholics perform poorly in tests of memory and other cognitive skills is corroborated by evidence of harm to the physical structure of their brains (Review, Volume 9, Number 3, Autumn 2001). Recent concern over the health and social effects of heavy drinking and bingeing has also triggered research to discover whether people who use alcohol in these ways also suffer discernible brain damage. One clue came last year with the demonstration that binge drinkers are more likely to develop dementia later in life (Review, Volume 14, Number 1, Spring 2006) Now, Australian work has revealed abnormally high rates of atrophy (wasting away) in the brains of heavy drinkers, similar to that seen in alcoholics.

The subjects for this study were recruited through electoral rolls in three different parts of Australia as part of a wide-ranging project designed to monitor various aspects of health and fitness throughout life. Participants completed a questionnaire regarding their lifestyle and were tested for blood pressure, grip strength and other variables. From this larger group, over 600 persons in the 60–64 age group were randomly selected and invited to undergo brain scans. Of these, 385 volunteers remained after the exclusion of those unwilling to take part and those

for whom comprehensive information on alcohol consumption was unavailable.

For each participant, investigators calculated average weekly alcohol consumption based on answers to questions about frequency of drinking and the number of standard drinks (in this instance containing 10 grams of alcohol) taken on typical drinking days. There were further questions designed to reveal details of higher alcohol intake in the past.

Brain scans were based on magnetic resonance imaging (MRI), and the resulting pictures were measured to reveal changes in several different regions of the brain. These included the ventricles (four fluid-filled cavities), gray matter (the dark coloured tissue forming the cerebral cortex which comprises 40% of the brain by weight) and white matter (located within the gray matter).

Scrutiny and measurement of these images showed clear evidence of significantly higher degrees of brain damage in individuals who consumed alcohol at a harmful level. For men, this was defined as

taking more than 28 drinks (i.e. more than 35 UK units) per week. For women it was defined as taking over 14 drinks (i.e. more than 17.5 UK units) weekly. In the men, the deleterious changes were apparent in the larger quantity of gray matter and less white matter, and in an increase in size of two of the ventricles. Among the women they were seen in the white matter and also in the cerebrospinal fluid (the watery fluid that surrounds the brain and spinal cord). Other parts of the brain did not appear to be affected significantly in either case.

“...these images showed clear evidence of significantly higher degrees of brain damage in individuals who consumed alcohol at a harmful level.”

The researchers observe that low level drinking may reduce the degree of age-related brain atrophy through the beneficial effect of alcohol consumption on cardiovascular risk factors. This was not apparent from their results, although some of them were consistent with this view. The investigators may also have seen more, and more precise, evidence of brain damage had their sample contained higher percentages than the 4.6% of females and 6.6% of males who qualified as heavy drinkers.

Finally, the Australian work indicates that the brains of heavily drinking males had a smaller hippocampus (a swelling in the floor of one of the ventricles) than in moderate consumers. However, this association did not remain statistically significant when the figures were adjusted to compensate for other health factors. "It is possible that in a larger or older sample, or in a sample with more men drinking at hazardous levels, this effect would have been stronger because it is consistent with brain damage associated with long-term heavy drinking," the authors say. "The fact that this effect was evident only in males is likely the result of the larger proportion of males classified as hazardous or harmful drinkers."

*Weekly Alcohol Consumption, Brain Atrophy, and White Matter Hyperintensities in a Community-Based Sample Aged 60 to 64 Years, *Psychosomatic Medicine* (2006), 68, 778–785, Anstey K.J., Jorm A.F., Réglade-Meslin C., Maller J., Kumar R., von Sanden C., Windsor T.D., Rodgers B., Wen W., Sachdev P., Australian National University, ACT; University of Melbourne, Victoria; and University of New South Wales, NSW, Australia.*

Drinking, smoking and kidney disease

For the first time, smoking and excessive alcohol consumption have been unambiguously identified as risk factors for chronic kidney disease. Smokers and heavy drinkers each face a heightened likelihood of developing this condition, but people who indulge in both habits raise their chances of kidney disease five-fold as compared to people who neither smoke nor drink heavily.

In chronic kidney disease, the network of tiny blood vessels within the kidney fails to fulfil properly its job of filtering waste products out of the blood and producing urine. The condition worsens progressively, and the patient will die unless treated with regular sessions on a dialysis machine (or given a transplant). Causative factors include hypertension, diabetes and obesity. There have, however, been very few attempts to determine the possible involvement of smoking or drinking. Some of the sparse data that have appeared in medical journals have been contradictory.

In an effort to clarify the situation, researchers conducted two complementary investigations in a town in Wisconsin. One was an analysis of a cross-section of the adult population at a particular moment in time. The other was a survey in which people were monitored over five years. Just under 5000 people took part in the first study and 3400 in the second study.

Medical Research

The subjects were all examined at the outset when they were aged 43–86. They provided samples of blood to be tested to show the normality or degree of abnormality of their kidney function, and answered detailed questions regarding smoking and drinking. Although participants were asked separately about beer, wine and spirits, researchers recorded their answers simply in terms of “servings” of alcohol. In addition to noting any cases of chronic kidney disease that emerged during the five year study, investigators repeated the kidney function tests at the end of the five years.

When the researchers combined the data from their two studies, they found a significant association between chronic kidney disease and smoking, which remained significant even when allowance was made for other factors such as hypertension and diabetes. They also found an independent, significant association between the disease and heavy drinking (defined as four or more servings of alcohol per day). But the most pronounced effect was in those who combined both practices. People who drank heavily and also smoked were five times more likely to develop kidney disease than those who did neither. The increased risk was synergistic – greater than the sum of the two individual risks.

There are several plausible explanations for these findings. Perhaps the most likely is that high concentrations of alcohol exacerbate the harmful effect of constituents of tobacco smoke on the kidney tissue. Alcohol could have a direct toxic action on kidney cells, or it could damage them through the secondary effect of raised blood pressure.

As regards the actual prevalence of chronic kidney disease in the Wisconsin town being studied, 10% of it was apparently attributable to smoking and 5% to heavy drinking. While this may indicate that health education measures aimed at reducing smoking in the general population would be the most effective strategy, the authors recommend that doctors counselling individual patients should try to dissuade them from both habits.

“People who drank heavily and also smoked were five times more likely to develop kidney disease than those who did neither.”

The Association Among Smoking, Heavy Drinking, and Chronic Kidney Disease, *American Journal of Epidemiology* (2006), **164**, 263–271, Shankar A., Klein R., Klein B.E.K., Division of Epidemiology, Department of Community, Occupational, and Family Medicine, National

University of Singapore, Republic of Singapore; and Department of Ophthalmology and Visual Sciences, University of Wisconsin Medical School, Madison, WI, USA.

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Promoting Responsible Drinking

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