Alcohol and the heart in perspective

Sensible limits reaffirmed

SUMMARY OF THE REPORT OF A WORKING GROUP OF THE ROYAL COLLEGES OF PHYSICIANS, PSYCHIATRISTS AND GENERAL PRACTITIONERS

Introduction

Alcohol contributes substantially to as many as 40,000 deaths each year, compared with estimates of 100,000 from cigarette smoking and 2,000 from cervical cancer. Heavy drinkers have a mortality rate at least twice that of the normal population, and the financial burden of alcohol in terms of lost production and costs to the medical and social services in caring for individuals with drinking problems has been calculated to be nearly £2,500 million per year, with costs to the health services of £150 million of which £2.8 million was to general practice. The Department of Health’s Health of the Nation document identified alcohol as a risk factor in four out of five of the key areas, and specified, as a national target, a reduction in the proportion of men drinking more than 21 units of alcohol per week from 28% in 1990 to 18% by 2005, and of women drinking more than 14 units per week from 11% in 1990 to 7% by 2005.

In the UK, 1 unit of alcohol equals 8g of ethanol. In terms of drinks this is taken to be 1/2 pint (284ml) of ordinary strength beer or cider, 1/4 gill (24ml) of spirits, 1 glass (125ml) of wine or 1 glass (50ml) of fortified wine.

The Royal Colleges of Physicians, Psychiatrists and General Practitioners have all endorsed a graded approach to risks of alcohol consumption: ‘low risk’ (0–14 units/week for women, 0–21 units/week for men), ‘increasing risk’ (15–35 units/week for women, 22–50 units/week for men) and ‘harmful’ (>35 units/week for women, >50 units/week for men). In health education messages this has been translated as ‘sensible’ limits (14 units for women, 21 for men). The question has arisen as to whether these sensible limits should be relaxed in view of data suggesting that moderate intake of alcohol protects against coronary heart disease (CHD).

A working group representing the three Royal Colleges has reviewed the evidence on alcohol and cardiovascular disease including coronary heart disease. The evidence was considered in the light of data on all-cause mortality, psychosocial risks, and on the possibility that recommendations that led to an overall increase in alcohol consumption would also increase the number of heavy drinkers.

Cardiovascular disease

Cardiovascular disease, including raised blood pressure, coronary heart disease (CHD) and stroke (CVA), is responsible for more than one-third of all deaths in men and women in Great Britain. There is a substantial difference between the sexes, with men suffering more frequently than women. A protective effect of alcohol in relation to cardiovascular disease could thus have important implications. Against the possibly protective effect of low-to-moderate alcohol consumption on CHD has to be set the direct effect on blood pressure level and the possible effect of alcohol consumption on stroke risk. A detailed assessment was beyond the scope of this report, but ‘heavy drinking is associated with increases in cardiac arrhythmias, cardiomyopathy, and sudden coronary death, though the evidence is still insufficient to determine a dose–response relationship’.

Blood pressure

Several studies have shown a relationship between alcohol consumption and blood pressure level. Overall, after taking account of confounders, men who were non-drinkers had systolic blood pressures 2.7 mmHg lower than consumers of 300–499 ml of alcohol per week (4–6 units/day), and 4.6 mmHg lower than consumers of 500+ ml of alcohol (7+ units/day). Allowing for misclassification of alcohol intake would strengthen the association. There is no evidence that the size of the association varies between the sexes or across age groups.

It is possible that the way alcohol is consumed may influence its effect on blood pressure. Seven drinks in a single day may have a different effect from one drink each day for seven days. There is some suggestion from the INTERSALT study that, among heavier drinkers, those with more variable consumption had higher blood pressures than those whose daily consumption varied less. This is consistent with a larger effect of binge drinking, but this issue has not been
sufficiently explored, nor have the possible effects of type of beverage and of drinking with or between meals.

Cerebrovascular disease

Overall, moderate/heavy alcohol consumption appears to be associated with a relative risk of stroke in the range 1.3–2.0. As with other diseases, it is difficult to be precise as to the level above which the risk increases. In addition to the effect of habitual consumption on stroke, there may be an effect of acute consumption/binge drinking. This awaits confirmation.

Stroke—all types: ‘Chronic alcoholics’ (drinking >52 units/week) are at greater risk of all forms of stroke. For ‘moderate drinkers’ the relative risks were not significantly different from 1.0, and ‘light’ drinking (<3 units/day) was associated with a reduced risk.

Ischaemic stroke: The findings of four cohort studies suggest that alcohol consumption at levels of up to 3 units/day is associated with a relative risk of between 0.6 and 0.4—a reduction in risk of between 40% and 60% compared with non-drinkers.

Haemorrhagic stroke: Four out of five large cohort studies showed an association between consumption >2 units/day and increased risk. There was a suggestion in some studies that risk might increase at consumption below this level.

Conclusions

It seems reasonable to conclude that alcohol consumption is not associated with increase in risk of overall stroke except at quite high levels (in excess of 35 units/week). This level of consumption is not associated with increase in risk of ischaemic stroke, and consumption of up to 3 units/day may be associated with decreased risk. There is, however, an increased risk of haemorrhagic stroke at 3 or more units/day. Binge drinking may be associated with an increased risk of overall stroke.

Coronary heart disease

An international study in 18 countries showed a strong inverse association between a country’s average wine consumption and mortality from CHD, but other studies have not confirmed one type of alcohol to be more protective than another.

Studies of individual risks have also shown that low-to-moderate drinking of alcohol, variously defined, is associated with a lower risk of CHD than in non-drinkers (Fig 1). The findings of the most recent study, of British doctors, showed about one-third reduction in CHD mortality in drinkers compared with non-drinkers, but there was no dose–response relationship. Drinking more than 21 units/week conferred no greater protection than drinking less than this amount.

The studies do not consistently show higher rates of cardiovascular disease in heavier drinkers than in moderate drinkers. The U-shaped curve describing the link of alcohol to mortality rates comes from the higher rate of death from a variety of other causes in heavy drinkers.

Confounding

Most studies have directly controlled for smoking when examining the higher rate of CHD in non-drinkers. The degree to which the effect of other risk factors has been allowed for varies greatly, but none of the studies has been able to account for the observations by confounding.

One special factor should receive attention: social class. An apparent protection from wine, more than any other beverage, could arise from the fact that low-to-moderate drinkers of wine tend to be of higher social class than non-drinkers. That alone is associated with lower risk. The Whitehall and British Regional Heart studies controlled for this directly, and the apparent protection has been found in a variety of

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**Fig. 1.** Results of prospective studies showing the relationship between alcohol and coronary heart disease. Risk ratio for moderate drinkers (up to 5 units/day) vs. non-drinkers. Risk ratio with 95% confidence interval where available.
different cultures where the factors associated with social class are likely to vary.

Pathways

Alcohol adversely affects cardiovascular disease by raising blood pressure. As noted above, this is seen at intake levels above 2–3 drinks a day. This may, in part, account for an increased risk of stroke. At higher levels, alcohol is associated with cardiomyopathy.

Low-to-moderate consumption is associated with increased levels of HDL cholesterol. Numerous studies have shown that higher levels of HDL cholesterol are associated with reduced CHD risk. In the American Lipid Research Clinics (LRC) study, and the Honolulu heart study, about half the association between non-drinking and CHD could be accounted for, statistically, by the lower levels of HDL cholesterol.

Alcohol is also associated with lower levels of plasma fibrinogen and with reduced platelet activity, and hence with a lower probability of thrombosis.

Alcohol and all-cause mortality

The relationship between alcohol consumption and all-cause mortality is shown in Figs 2 and 3. These data come from a heterogeneous collection of studies. Nevertheless some generalisations are justified.

Nearly all studies show that non-drinkers have higher relative risk of mortality than drinkers.

The magnitude of mortality differences is difficult to assess. The relative risk in low-to-moderate drinkers is about 0.75 in most studies (ie there is a 33% excess mortality in abstainers). There is less concordance over relative risk for the heaviest drinkers but a figure of 1.2–1.5 is a reasonable summary (ie there is a 60–100% excess mortality over low-to-moderate drinkers who have a relative risk of 0.75).

The studies on women are quite concordant. They suggest that the consumption level at which relative risk of mortality starts to rise is lower than in men (about 16g per day).

Nearly all these studies have been done on middle aged cohorts. The only study that was done specifically on young people (Swedish conscripts) showed no benefit for light drinkers over abstainers. The only other study to include large numbers of people under the age of 40 also showed the mortality in low-to-moderate drinkers to be no lower than in abstainers.

In summary, mortality risk appears to rise in men taking more than 3 units/day and in women taking more than 2 units/day. The recently published study.

Fig. 2. Results of 15 studies showing the relationship between alcohol consumption and all-cause mortality in men.

![Fig. 2](image1)

Fig. 3. Results of four studies showing the relationship between alcohol consumption and all-cause mortality in women.

![Fig. 3](image2)
of British doctors concluded that above 21 units/week there is a dose–response relationship between alcohol consumption and mortality.

**Alcohol and psychosocial problems**

The social costs of alcohol misuse are high and include the costs to industry arising from reduced productivity, sickness absence and unemployment, road traffic, domestic and other accidents, and fires. There is also the cost of criminal activity and damage, including police involvement and court costs, and the cost to social services and other agencies of alcohol related family disputes, child neglect etc. The children of parents where one or both have alcohol related problems experience a great deal of distress and have a greatly increased risk of emotional and behavioural difficulties. Many of the social costs are ‘externalities’, being borne by those who surround the drinker. It has been estimated that alcohol misuse is associated with 60% of parasuicides, 40% of cases of domestic violence, 20% of child abuse cases, 15% of deaths from road traffic accidents, 26% of deaths by drowning, about one-third of domestic accidents and 39% of deaths in fires. The bulk of alcohol related harm caused in society occurs amongst those who do not invariably exhibit the characteristics of the heavy or dependent drinker.

Experimental studies show that driving impairment is evident at levels of 20–30 mg/dl. These levels could be reached by consuming one or two units of alcohol prior to driving. Advice rather than general guidelines seems most appropriate in this instance.

However, there is also a relationship between level of habitual consumption and likelihood of driving after having too much to drink. One study found that amongst men 5% of ‘low-to-moderate’ drinkers (1–21 units/week in men, 1–14 in women) reported driving home after drinking 5 or more units of alcohol, whereas this was admitted by 14% of ‘fairly high’ drinkers (22–35 units in men, 15–25 units in women) and 20% of ‘high’ drinkers. A similar trend was evident for women. It is also evident that those who drink more alcohol during the week are in general more likely to drink more frequently and heavily at each occasion. If those who drink more frequently and/or more heavily are more likely to take social risks, then guidelines about ‘sensible drinking’ should apply to these phenomena in the same way as they do to the more familiar health hazards.

A study in three areas of Britain showed that while only 7.7% of individuals reporting drinking less than 20 units per week reported various social and psychological problems related to alcohol, this contrasts with 15.8% of those drinking between 21 and 50 units. A study conducted amongst male company directors showed that the frequency of family problems attributed to drinking began to rise at 25 units of alcohol per week. Research in Canada has shown that risk curves for harm in six life areas rose steadily with the respondent’s reported volume of alcohol consumption. The relationship observed was roughly linear and there was no clear threshold of volume of drinking for experiencing alcohol related problems. At very low levels of consumption men were more likely to experience harm than women, but above a level of half a drink a day the gender difference disappeared. The report also demonstrated that at any volume of consumption the pattern of drinking (for example regularity of taking five or more drinks in a session) strongly affects the probability of harmful consequences.

Social class is also a mediating factor in that those with most resources may protect themselves against some of the more socially visible and economically damaging consequences of drinking, particularly at moderate levels of consumption.

Aggregate data show a clear relationship between level of consumption and accidents, assaults, suicides and other alcohol related problems. Hence a rise in per capita consumption which might follow the introduction of more liberal guidelines is likely to result in increasing harm.

It has been estimated in England that 35,000 children under the age of 16 consume alcohol in excess of the current ‘sensible’ limits (Health Update 1993). Young people are more prone to experience social harm and accidents as a consequence of drinking.

The Department of Health has stated that alcohol misuse plays a significant part in up to 65% of suicide attempts. Reducing the overall rate of suicide by 15% by the year 2000 is one of the targets for Health of the Nation; its achievement could be adversely affected by changing guidelines for consumption.

The impact of alcohol use on younger people and the psychological and social harm which it may cause may offset any gains accruing to the older population by a reduction in coronary heart disease.

**Areas of uncertainty**

In making recommendations, it is important not to assume a level of precision greater than the evidence can support. There is no question that increasing levels of alcohol consumption are associated with increased risk of physical and psychosocial hazards. The level of consumption at which the balance of risk and benefit is adverse is subject to some imprecision. On the one hand there may be under-reporting of alcohol consumption. This could lead to an increase in risk at an apparently lower level of consumption than is actually the case. On the other hand, a glass of alcoholic beverage in Britain is likely to contain more than 8 g of alcohol. Therefore, if people drink 3 glasses in the belief that they are drinking 3 units, they could be consuming not 24 g of alcohol but as much as 36 g.

This is not necessarily a reason to change the health education message which is simple and widely known.
It is a reason to be cautious in the extreme about relaxing the ‘sensible limits’ guideline as it would mean recommending a higher limit of consumption of absolute alcohol than the number of units would suggest.

**IMPLICATIONS AND CONCLUSION**

**Coronary heart disease**

The evidence suggests that low-to-moderate consumption of alcohol, 1–3 units/day, is not associated with cardiovascular harm and may actually protect middle aged men from CHD. Because CHD is a less important health problem in younger people, there is little evidence to suggest a protective effect that might balance the other harmful effects of alcohol in this age group. Although the data in women are more limited than in men, women who are low-to-moderate drinkers appear also to have lower risk of CHD. The evidence suggests that this relationship is causal, ie there is a protective effect of alcohol. Although there has been much speculation that wine, particularly red wine, may be more protective than other alcoholic beverages, most studies have failed to confirm this. If subsequent evidence does support a special role for wine, this may relate not only to the non-alcoholic content of wine, anti-oxidants and bioflavonoids for example, but also to the manner in which wine is consumed compared with other beverages. For example, binge drinking may carry risks that are over and above those associated with regular daily drinking.

**Net benefit?**

Whether there is net benefit to the health of individuals from drinking 1–3 units/day (men) or 1–2 units/day (women) will depend on all the other risks related to these levels of alcohol consumption.

- **For middle aged men**, CHD is the major cause of death. A protective effect of 1–3 units/day may therefore confer an overall advantage.

- **For younger men** the major cause of death is accidents and violent deaths, some sizable proportion of which are alcohol related. Any increase in alcohol consumption in this section of the population could have markedly adverse consequences.

- **For pre-menopausal women**, breast cancer is a more important cause of death than CHD, and there may be a narrow window of benefit before a protective effect against CHD is balanced by a deleterious effect on breast cancer. Recommendations to pre-menopausal women to drink in order to reduce their already low risk of CHD could therefore have the consequence of increasing risk of breast cancer.

For all-cause mortality the risk in men increases from about 3 units/day, and in women from 2 units/day. For the individual, then, the window of benefit appears narrow. The evidence reviewed indicates that the current ‘sensible’ limits of 21 units/week for men and 14 units for women should be retained. If an individual has reasons for being a non-drinker, we would not recommend that he or she start drinking in order to prevent CHD.

Within the blanket conclusion that low-to-moderate alcohol consumption is not harmful and may protect against CHD, it must be remembered that there are circumstances in which even moderate alcohol consumption is too high. Before driving a car, using machinery, climbing mountains, for example, the appropriate level of alcohol is zero. During pregnancy it should be very restricted. The effects of alcohol may be greater in old age.

For these and other reasons, a public health recommendation stressing the positive effects of alcohol would be likely to do more harm than good. At the level of populations there is a clear association between mean quantity of consumption and indicators of harm. At the individual level, above 3 units/day there is evidence of harm, biological as well as social. Although the relationship between mean alcohol consumption and the prevalence of heavy drinking has been much debated, an analysis from the INTERSALT study supports the population approach to control of drinking. Among 52 populations worldwide the correlation between mean level of consumption and the prevalence of heavy drinking (>30 units/week) was greater than 0.9. It suggested that raising mean consumption by only 15 ml of alcohol (approximately 1.5 units) per week would be associated with a 10% increase in the prevalence of heavy drinking. Hence anything that increases the mean level of consumption may well have an effect on the prevalence of heavy drinking.

**Conclusion**

The working group concluded that relaxing the ‘sensible limits’ guideline for alcohol would have detrimental effects on individual risks. The group also concluded that there would be an adverse effect on the public health from any recommendation that increased the overall level of consumption in the population. If the mean increases, the proportion of people drinking in higher risk categories is likely to increase, with consequent increased risk of alcohol associated harm.

The working group concluded, therefore, that to change the definition of low risk for alcohol consumption would benefit neither individuals nor the population. It recommends no change in the health education advice that 21 units/week for men and 14 units for women are sensible limits.
Membership of the working group

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References

A comprehensive list of references on which the findings of this report are based appears in the full report.

Key references are:

1. Office of Population Censuses and Surveys. General Household Survey 1992. Series GHS No. 23. London: OPCS, 1995.
2. Royal College of General Practitioners. Alcohol—a balanced view. London: Royal College of General Practitioners, 1986: 1–57.
3. Department of Health. The Health of the Nation—a strategy for health in England. London: HMSO, 1992.

4. Royal College of Physicians. A great and growing evil—the medical consequences of alcohol abuse. Report of a working party. London: Tavistock, 1987.
5. Royal College of Psychiatrists. Alcohol—our favourite drug. London: Tavistock, 1986.
6. Marmot MG, Brunner EJ. Alcohol and cardiovascular disease: the status of the U-shaped curve. Br Med J 1991; 303: 565–8.
7. Abel EL, Agarwal DK, Algra A et al. Health issues related to alcohol consumption. Washington and Brussels: ILSI Press, 1993.
8. Marmot MG, Elliott P, Shipley MJ, Dyer AR et al. Alcohol and blood pressure: the INTERSALT study. Br Med J 1994; 308: 1263–7.
9. Boffetta P, Garfinkel L. Alcohol drinking and mortality among men enrolled in the American Cancer Society prospective study. Epidemiology 1990; 1: 342–8.
10. Maynard A, Hardman G, Whelan A. Measuring the social cost of alcohol misuse. Br J Addict 1987; 82: 701–6.
11. Kendell RE. Drinking sensibly. Br J Addict 1987; 82: 1279–88.

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