

vision of all those who care for patients with trauma (a prime example being more widespread acceptance of and adherence to the teaching of advanced trauma life support) rather than in the pursuit of increasingly dramatic but unproved methods of management.

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Authors' reply

EDITOR,—As D W Maclean and colleagues point out, we had hoped to isolate the effect of the helicopter and team from the effects of the major developments at the Royal London Hospital as well as assessing the effect of the helicopter emergency medical service as a whole. We were unable to do this with any reasonable power because too few control patients (those attended by an ambulance) who met our inclusion criteria were taken to the hospital during the 21 months of the study ($n=40$), not because too few patients were flown to the hospital by helicopter.

The power of the study is largely unaffected by the sampling strategy we used, and, with 336 patients attended by the helicopter and 466 ambulance patients, this was one of the largest studies of the effectiveness of emergency care provided by helicopter. It is disingenuous to mention that the central estimate for major trauma was 13 lives saved a year without also pointing out that the central estimate for the whole caseload of the helicopter emergency medical service was no lives saved; therefore if the lives of patients with major trauma are being saved there may be lives of patients with comparatively minor trauma being lost.

We agree with John N Wilden that the term helicopter does not accurately convey the meaning that the helicopter emergency medical service does, but that term was chosen by the *BMJ*. Furthermore, recognising the importance of outcomes in survivors, we assessed disability and general health six months after the incident in 116 helicopter patients who survived and 157 ambulance patients who survived. After adjustment for casemix there was some weak evidence that disability was worse in the helicopter patients but no evidence of any difference in general health.

While we agree with Garry J Wilkes's conclusion that there is little evidence to support the use of a medical helicopter in London, the central estimates are not of disbenefit in both major and minor trauma. As the footnote to table IV states, after weighting was applied to the stratified samples of patients flown by helicopter to the Royal London Hospital and the other helicopter patients to give a true representation of the helicopter service's whole caseload, the relative risk of death for the helicopter service's patients compared with the ambulance service's patients with injury severity scores of 16-24 was indeed 0.8, as we reported.

Finally, whether or not the helicopter represents the emperor's new clothes as John Bache suggests, at £1.2m a year to operate it is a very expensive suit and may not be a good buy.

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Mortality associated with wines, beers, and spirits

Australian data suggest that choice of beverage relates to lifestyle and personality

EDITOR,—Morten Grønbaek and colleagues suggest that mortality is lower in association with a moderate intake of wine, unchanged in association with a moderate intake of beer, and increased in association with a moderate intake of spirits.¹ In their study they used a different reference group of subjects for each beverage considered—a group comprising teetotallers and beer and wine drinkers for the spirits comparison and a group comprising teetotallers and spirits and beer drinkers for the wine comparison—which makes the findings difficult to interpret. More importantly, they consider that confounders are unlikely to explain their results. In a group of working men in Western Australia, however, we found that their preference of beverage was related to both volume of ethanol consumed and lifestyle factors linked with cardiovascular risk.

In 1986, 343 working men aged between 25 and 51 took part in a health screening programme. They recorded the type and amount of alcohol that they drank over seven days and completed questionnaires related to smoking habits, dietary patterns, occupation, educational level, and personality characteristics. Their preferred beverage was taken as the beverage that contributed the greatest proportion of their weekly alcohol intake. After exclusion of the seven men who preferred spirits, 83 non-drinkers, 166 drinkers who preferred beer, and 87 drinkers who preferred wine were studied.

Total consumption of ethanol was significantly greater among the men who preferred beer (mean 249 (SEM 14) ml/week) than among those who preferred wine (163 (16) ml/week). When ethanol intake was examined in relation to recommended safe drinking levels,² with intakes of not more than four standard drinks a day considered to be safe, there were 200 safe and 53 unsafe drinkers; 44 of the unsafe drinkers preferred beer. Consumption of ethanol was lower in men with professional occupations (180 (12) ml/week) than in non-professional workers (259 (17) ml/week). Professional men drank 57% of total ethanol as beer, 38% as wine, and 15% as spirits, while the respective proportions for non-professional men were 81%, 16%, and 3%. Consistent with these findings was the finding that consumption of wine was related to years of education (11.0 (0.2) years in the non-professional group and 12.0 (0.2) years in the professional group).

Forty eight (29%) of the 166 men who preferred beer smoked, compared with 11 (13%) of the 87 who preferred wine. Grønbaek and colleagues also found that smoking was a confounder. A preference for wine was related to healthier dietary choices, including greater consumption of fruit and vegetables and bread and the habit of trimming fat from cooked meat. Adding salt to prepared food and eating meat, fried foods, and eggs more commonly were associated with a preference for beer. A preference for beer was associated with higher scores for extraversion (mean 14.3 (0.3) in those who preferred beer *v* 12.4 (0.4) in those who preferred wine), resentment (2.1 (0.2) *v* 1.5 (0.4)), and verbal hostility (3.1 (0.1) *v* 2.9 (0.2)).

In this group of men the preference of beverage was associated with lifestyle and personality. Men who preferred beer drank larger volumes, had a higher rate of smoking, and chose a less healthy diet than those who preferred wine. The effects of these differences in lifestyle on cardiovascular risk limit the interpretation of any analysis attempting to relate the type of beverage drunk to mortality from cardiovascular disease. People's preference of alcoholic beverage may be associated with demographic, personality, and lifestyle dif-

ferences, which could influence the outcome of cardiovascular disease.

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- 1 Grønbaek M, Deis A, Sorensen TIA, Becker U, Schnohr P, Jensen G. Mortality associated with moderate intake of wine, beer, or spirits. *BMJ* 1995;310:1165-9. (6 May.)
- 2 National Health and Medical Research Council. *Is there a safe level of daily consumption of alcohol for men and women?* Canberra: Australian Government Publishing Service, 1992.

Inappropriate groups were used to calculate relative risk

EDITOR,—The effect of consumption of alcohol on mortality is an issue with a high profile, and questions about it are often asked in general practice. In their study Morten Grønbaek and colleagues compared the relative risks for wine drinkers by using those who never drank wine as the reference group¹; this is very different from using teetotallers as the reference group and may lead to misunderstanding—certainly, the presentation in the media implied a comparison of wine drinkers with those who never drank at all.

We are concerned that very heavy drinkers were excluded from the analysis on the basis of too few deaths in some groups, although in total there were 275 deaths, which is considerable. Inclusion of very heavy drinkers might have had an appreciable effect on the trend in mortality among wine drinkers, as very heavy beer drinkers probably do not drink wine. Inclusion of this group might therefore have increased the deaths in those who did not drink wine. Another important factor that may have an effect on mortality is diet, but this is not discussed.

Finally, because the confidence intervals widen with increasing numbers of drinks, the analysis for wine intake does not exclude the possibility of a U shaped curve. This would contradict the main finding of the paper.

Although we appreciate the importance of the results and the need to stimulate more research, we are concerned by the public health message of this paper. Do we advise patients that they can safely consume 35 units of wine a week?

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Binge drinkers should have been identified separately

EDITOR,—In Morten Grønbaek and colleagues' paper on the effects of different alcoholic beverages on mortality it is not clear whether the monthly and weekly drinkers included binge drinkers.¹ It has been suggested that binge drinking may negate the possible attenuating effect of alcohol on coronary artery disease.² If these subjects were excluded the relative risk for monthly and weekly drinkers may be even lower than that observed.

More importantly, the authors compared the effects of different levels of drinking with those of not drinking only that particular type of alcoholic beverage. For example, wine drinkers were compared with a heterogeneous reference group

consisting of non-drinkers, beer drinkers, spirits drinkers, and beer and spirits drinkers. The drinkers, again, could have ranged from those who drank beer or spirits only once a month to those who had more than five drinks a day. This would falsely increase the risk among those who did not drink wine and give a falsely low risk for those who did drink wine. Indeed, it is difficult to believe that a drink of wine only once a month can reduce the risk of cardiovascular death by 31%. If this is true it supports the premise that drinking wine may be associated with other favourable traits that influence cardiovascular risk.³

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2 Gruchow HW, Hoffman RG, Anderson AJ, Borboriak JJ. Effects of drinking patterns on the relationship between alcohol and coronary occlusion. *Atherosclerosis* 1982;43:393-404.

3 Klatsky AL, Armstrong MA, Kipp H. Correlates of alcoholic beverage preference: traits of persons who choose wine, liquor or beer. *Br J Addict* 1990;85:1279-89.

Risk function had peculiar properties

EDITOR.—Morten Grønbaek and colleagues' study of mortality associated with moderate intakes of wine, beer, or spirits presents relative risks of death as functions of consumption of each type of beverage.¹ Apparently none of the first order interactions between levels of consumption of different beverages were significant. Ignoring interactions, however, leads to a model with peculiar properties, for it implies that one can simply multiply the relative risks for each type of beverage.

Thus the authors' estimates imply that a person drinking three to five drinks daily of each of wine, beer, and spirits (a total of nine to 15 drinks daily) has a relative risk of death from coronary heart disease of 0.43 compared with someone who never drinks alcohol. For deaths from other causes the relative risk between these two extreme groups of people is 0.82. Such estimates are hard to take seriously, so the model clearly cannot be extrapolated this far. Even at lower consumptions for the separate beverages, however, an absence of interaction seems unlikely.

Since one of the study's main conclusions rests on the upturn of the risk function for the highest category of consumption of spirits it seems important to ensure that the model estimates are valid not just for moderate consumption but for the highest category considered. We wonder how sensitive the conclusion about spirits is to the assumption of no interaction.

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Study confounded by lack of correction for social class

EDITOR.—Morten Grønbaek and colleagues' paper on the possible health benefits of drinking wine¹ attracted wide attention in the media in Norway. It might be wise to obey the slogan "never check a

good story." However, the reporting of associations between risk factors and health outcomes in the medical literature is plagued with the various interpretations of causation, and the media made no exception this time.

No one who knows the social habits of Scandinavians should overlook the possible confounding of wine drinking by social class and related lifestyles. It is a pity, then, that this well conducted study leaves some doubt about whether social class or social status was controlled for properly. Classification by social class is not done in standardised ways in the Scandinavian countries,² yet mortality in most European countries shows a strong (and increasing) gradient with social class.^{2,3} The Danish paper presents education and income (loosely named "socioeconomic conditions") as covariates, only to leave us with the intriguing statement, "We found that wine intake was positively correlated with social class variables (data not shown), but the protective effect of wine, with regard to mortality, was not significantly weakened when we controlled for this factor."

In this case, I think that the data, on one or both factors, should have been shown so that we could more easily rely on any biological mechanism and not feel compelled to maintain healthy lifestyles most prevalent among affluent people.

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Authors' reply

EDITOR.—Our paper had some impact in the media, most of which was beyond our control. We admit that we were cautious about inferring causation.

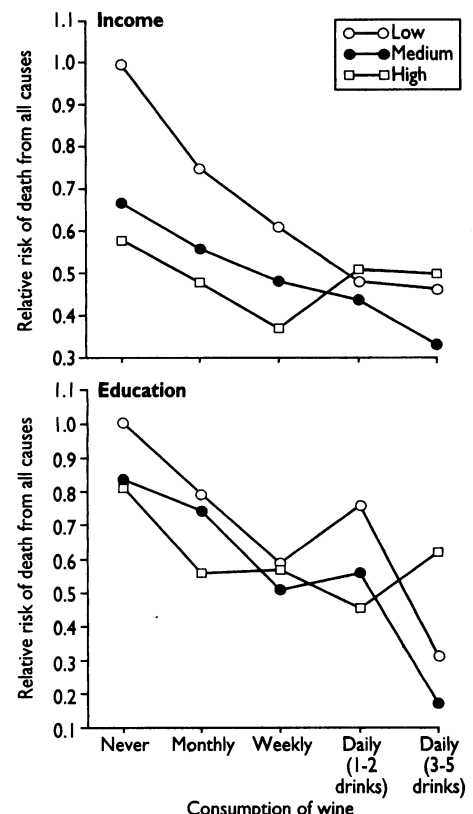
To simplify interpretation of our analyses we excluded people who drank more than five units of any beverage daily. Victoria Wilson and colleagues are concerned that we thereby introduced bias by excluding beer drinkers who were not wine drinkers. In analysis of crude data this group might increase the mortality among those who do not drink wine. In our analysis, however, we controlled for the intake of other types of beverages, which implies that we estimated the effect of wine intake within each category of intake of other types of beverages. We found no significant interaction between the three types of beverage in their effects on mortality, which suggests that the effect of wine is the same irrespective of the habit of drinking beer and spirits.

There probably is a U shaped relation between wine intake and mortality, but this would not contradict our conclusion about a different mortality at moderate intakes of beer, wine, and spirits. Indeed, wine may be the only beverage exhibiting this pattern.

Steiner Westin is concerned about confounding by social class. Intake of wine was strongly corre-

Percentages of people drinking wine weekly or more frequently by income and education

	Income			Education		
	Low	Medium	High	Low	Medium	High
Men	9.4	18	35.4	11.9	19.1	35.0
Women	11	17.8	31.5	10.2	20.0	35.5



Relative risk of death from all causes by income and education, according to consumption of wine

lated with income and education (table). The figure shows the relative risk of death from all causes by income and education. For all the curves the reference group (relative risk set at 1) is people who never drank wine in the groups with low income and a low level of education. Generally, consumption of wine seems to have a beneficial effect on mortality independent of socioeconomic conditions.

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Performance indicators for general practice

Emphasis is changing from quality assurance to continuous quality improvement

EDITOR.—Performance indicators have long been used in the United States as a tool of quality assurance programmes and are now being promoted in Britain.¹ The emphasis of quality assurance on identifying "problems" and the "bad apples" in medicine is, however, now being viewed in the United States as counter productive. Unsurprisingly, it is difficult for a negatively oriented process to engender the enthusiasm and capture the support of health care professionals. That is not to say that standards are not required, but in the United States the emphasis is changing from quality assurance to continuous quality improvement.

The Joint Commission on Accreditation of Healthcare Organisations has used performance indicators as part of its quality assurance programme and will continue to do so, but it is placing increasing emphasis on continuous quality improvement.² Many general practitioners must fear