with trauma is improved, the London helicopter emergency medical service may be a relatively equitable and efficient means of providing high quality care for such patients in Greater London. The issue of the effectiveness of the helicopter compared with other modes of transport has not been adequately assessed.

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**Peter Greengross was a registrar in the London helicopter emergency medical service in 1993-4.

Design of study predisposed to type II error

EDITOR,—In their paper on the London helicopter emergency medical service J P Nicholls and colleagues, of the University of Sheffield's medical care research unit, mention several concerns[1] that we expressed at the time that the unit published its first report on the service to the Department of Health in 1994.[2]

The helicopter is part of an integrated specialist trauma service, and it is unfortunate that the unit looked at parts of the service separately. In doing so the unit isolated the effect of the helicopter from the effect of the hospital. We believe that patients require a continuum of care, such that separation of these effects is misleading. The study group contained only a third of all the patients treated by the London helicopter emergency medical service and transferred to the base hospital, and the unit's original report admitted that "Plainly these numbers are too small to establish whether there is any benefit associated with the [Royal London Hospital] in terms of survival."[2] This is borne out by the wide confidence intervals in Nicholls and colleagues' paper. It would be expected that any benefit from the entire system would be best seen in those patients taken to hospitals with a full range of trauma facilities when the nearest hospital does not have appropriate facilities for definitive care. To reduce the size of this group by ignoring two thirds of the patients brought to the Royal London Hospital predisposes to a type II error.

Other important factors include the fact that the study period included the greater part of our learning curve; the evident mismatching in terms of anatomical severity of injury and physiological response of the patients attended by the London helicopter emergency medical service and those attended by the London ambulance service; and the delay in publication, which means that the data are two years out of data. Even when these factors are allowed for, the paper points to benefits of the system, which are clearly stated in the abstract. The service is considerably busier now than it was at the time that the data were collected and is more accurately targeted. We are therefore encouraged that the study shows that 13 patients a year are alive who would have died if treated by the conventional system. This figure is now almost certainly higher. The fact that the confidence intervals include zero merely reflects the low power of the study.

We are also encouraged that in its original report the medical care research unit found that the helicopter emergency medical service "usually triages patients appropriately," although this comment is not in Nicholl and colleagues' paper. This finding agrees with our analysis of our triage decisions.[3] These results support the continuation of this important initiative to redress the poor outcome of trauma care in Britain.[4]

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Helicopters do not care for patients

EDITOR,—J P Nicholl and colleagues' paper shows some of the misconceptions that develop when an expensive piece of machinery such as a helicopter is associated with medical care.[1] A helicopter is a machine that flies through the air and can be used to transport personnel and equipment. It does not deliver medical care: the personnel and equipment do. The misconception that the helicopter delivers care pervades the literature on this subject, and this paper is no exception. To state that "we have assessed the effectiveness of the London helicopter" is wrong. The sole purpose of the helicopter personnel and equipment is to provide rapid resuscitation in the field.[2] What the authors should have assessed is the effectiveness of rapid resuscitation in major trauma. The difference between the treatment groups was the difference in personnel and equipment provided to achieve resuscitation.

Unfortunately, the paper does not define resuscitation and therefore fails to establish the number of patients requiring resuscitation. No criteria are given for "achieving resuscitation," so the number of patients who were resuscitated was not measured. Presumably some patients in the helicopter group did not need resuscitating since they were taken to hospital by ambulance and were not accompanied by a member of the helicopter personnel. Hence one would not expect a difference in outcome between this group and the ambulance group, but the design of the study meant that such patients were regarded as being in the helicopter group.

Since 26·9% of patients in the helicopter group had a triage revised trauma score of ≤ 9, compared with 16·6% in the ambulance group, probably more patients in the helicopter group required resuscitation because their trauma was more severe. Consequently, the two cohorts were not comparable in terms of patients who were severely injured, as the authors acknowledge. The number of patients who were resuscitated and recovered to have an acceptable quality of life was not measured. Quality of life is a crucial issue but was not addressed by this study.

My conclusions are that the design of the study was flawed and that the crucial outcome measurements were not made. The paper raises more questions than it answers and is certainly not a comprehensive assessment of the London helicopter emergency medical service.

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2 Wilden JN. Rapid resuscitation in severe head injury. *Lancet* 1993;342:1378.

Miscalculation exaggerated benefits

EDITOR,—J P Nicholl and colleagues estimate that an extra 13 patients with major trauma (injury severity score ≥ 16) could survive each year if attended by the helicopter emergency medical service in Greater London.[1] This seems to be based on an arithmetical error. For patients with an injury severity score of 16-24 the relative risk of death associated with being attended by the helicopter versus an ambulance is reported as 0·8 but should be 1·1 on the basis of the figures in table IV. This in turn represents a relative risk of death of 1·2 for all patients with a score of ≥ 16 and 1·1 for patients with a score of 16-40.

The suggestion that extra lives could be saved is not supported by the data presented. With only one preventable death being averted by the presence of a doctor in 337 attendances by the helicopter and a higher relative risk of death for both minor and major trauma, there is no justification for sending up medical crew on helicopter missions in Greater London.

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Dramatic management of trauma may be counter productive

EDITOR,—J P Nicholl and colleagues report that analysis of trauma and injury severity scores showed that 16% more deaths than predicted occurred in patients with trauma attended by helicopter but only 2% more in patients attended by land ambulances crewed by paramedics.[1] On average the helicopter patients arrived in hospital 10-20 minutes later than the ambulance patients. They were managed more intensively at the scene and spent an average of six minutes longer there.

The authors suggest that the comparatively longer time spent at the scene of the incident by helicopter patients may lead to poorer outcomes in some patients. This supports the theory that "scoop and run" is preferable to "stay and play." Is the helicopter patients' more intensive management directly related to the drama engendered by the arrival of the helicopter? Is such drama counter productive?

Over the past decade the management of major trauma in Britain has become increasingly dramatic, with the introduction of paramedics, thoracotomy in the field, helicopters, trauma centres, etc. Despite this, convincing evidence of the advantages of such dramatic approaches is lacking. Yet to question such "progress" has been regarded as Luddite. For example, Purkiss *et al* found that none of 18 patients with trauma survived resuscitative thoracotomy.[2]

The dramatic approach to trauma does not necessarily equate with improved survival: there may even be an inverse relation between the two. Those interested in the management of major trauma await the overdue conclusions resulting from the Department of Health's survey that compared results in a trauma centre with results in more conventional accident and emergency departments. Could it be that the establishment of a trauma centre does not result in the expected improvement in survival?

I suggest that helicopters and thoracotomy in the field are examples of the emperor's new clothes. The key to the successful management of trauma lies in improved education, training, and super-

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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2 Purkiss SF, Williams M, Cross FW, Graham TR, Wood A. Efficacy of urgent thoracotomy for trauma in patients attended by a helicopter emergency medical service. *J R Coll Surg Edinb* 1994;39:289-91.
3 Hamilton J. *The emperor's new clothes.* New Lanark: Tarantula Books, 1993.

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 Grønbæk 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. Grønbæk 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 differences, which could influence the outcome of cardiovascular disease.

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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 Grønbæk and colleagues compared the relative risks for wine drinkers by using those who never drank wine as the reference group[1]; 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 Grønbæk 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