

study in the absence of electrocardiographic criteria is not necessarily generally applicable. Unless thrombolysis is restricted to those presenting early and with classic symptoms of infarction, the proportion of alternative diagnoses (2.2%) is unlikely to be substantiated. For example, phase 1 of the myocardial infarction triage and intervention project found only one in six confirmed infarctions among those evaluated before admission to hospital.<sup>1</sup>

The statement that "even in an urban area there would be a temporal advantage in the general practitioner giving thrombolytic therapy in the home" is untested and cannot be extrapolated from the present study. A 1999 call and shortening of the delays in hospital would have reduced the difference between home and hospital treatment substantially. We have shown that in an urban area the time of administration of thrombolytic treatment after the onset of symptoms was reduced to a median of 150 minutes by the introduction of a "fast track" system.<sup>5</sup>

Until these issues are resolved it may be premature to advise the widespread implementation of pre-hospital thrombolysis without electrocardiographic confirmation.

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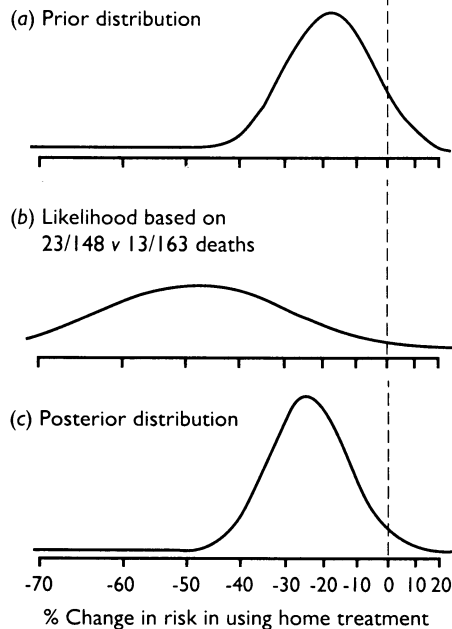
- 1 GREAT Group. Feasibility, safety, and efficacy of domiciliary thrombolysis by general practitioners: Grampian region early anistreplase trial. *BMJ* 1992;305:548-53. (5 September.)
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EDITOR.—Much publicity has been, and will be, given to the finding of the Grampian region early anistreplase trial that patients who received thrombolytic treatment (anistreplase) at home had 49% fewer deaths than those who received it in hospital.<sup>1</sup> Unfortunately, the trial was really too small to estimate reliably any reduction in mortality, and so significance could be achieved only if (because of either chance or bias) an implausibly large treatment difference was observed. In such circumstances a bayesian analysis provides a useful interpretation by setting a surprising finding in the context of more cautious prior belief.<sup>2</sup>

First one expresses prior belief about the proportionate reduction in mortality due to thrombolysis at home. Given the known benefits of early thrombolysis<sup>3,4</sup> and the average two hours saved in time to treatment, it could be argued that a 15-20% reduction in mortality is highly plausible, while the extremes of no benefit and a 40% reduction are both unlikely. The figure (a) shows such a distribution of prior belief. This prior is compatible with the results of the European myocardial infarction project, in which the same drug was given to over 5000 patients.

In the Grampian region early anistreplase trial 23 of the 148 patients who received home thrombolysis died within three months compared with 13 of the 163 who received hospital thrombolysis. This is displayed in the figure (b). The observed 49% reduction is the mode of this distribution, and the 2% tail area beyond no effect indicates  $p=0.02$  one sided. The widely spread distribution illustrates the inevitable uncertainty with only 36 deaths in total.

Using Bayes's theorem, we have combined the prior belief and likelihood to produce a posterior belief distribution (figure (c)). This quantifies how opinion on the efficacy of home thrombolysis should be affected by the limited amount of highly positive data in the Grampian region early anistreplase trial. The peak of the posterior distribution is a 25% reduction in mortality, with a 95% confidence interval from no effect to a 43% reduction. Thus belief is shifted in a positive direction, but not by much, and, specifically, a halving of mortality remains implausible.



Bayesian analysis of data from Grampian region early anistreplase trial

Perhaps the Grampian region early anistreplase trial was just lucky. For instance, based on the figure (a) a difference of 23 versus 13 deaths or more should occur with probability 0.1. We are also concerned, however, about the emphasis on three month mortality (not a predefined end point), the lack of independent monitoring of data, the randomisation method, and the early stopping of the trial.

Overall, such an important therapeutic issue requires larger scale trials which can quantify the treatment effect precisely. Here we seem faced with publication bias. A small positive trial (the Grampian region early anistreplase trial) gets emphasised while another larger trial of the same issue (the European myocardial infarction project) remains unpublished. On a broader note, we would encourage a wider use of bayesian methods in reports of clinical trials, especially when a small trial is claiming a large treatment benefit.

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## On site medical services at major incidents

EDITOR.—Matthew W Cooke<sup>1</sup> and D G Nancekivill<sup>2</sup> emphasise the need for better organisation and training for hospital staff in providing on site medical services when a major incident occurs.

A hospital coping with a deluge of casualties from a major incident might be overstretched in providing one or more appropriate teams as well as a doctor senior enough to be the medical incident officer (the Department of Health has abandoned the term site medical officer). Cooke highlights the paucity of training in this role. Wide ranging discussions have taken place in London with representatives of the London accident and emergency consultants' group, the London Ambulance Service, the British Association for Immediate Care, and health emergency planning officers from each Thames regional health authority with the aim of creating a cadre of 40-50 trained and accredited medical incident officers. This scheme relieves the main receiving hospital of the onerous duty of providing all the resources required at the site. The scheme has been approved by all participants, but, in view of its variation from guidance from the Department of Health, individual units will retain the option of making their own arrangements.

Two established training courses for doctors are available nationally. A one day course is run by the British Association for Immediate Care each year in Cambridge, and a three day course on the medical management of major incidents is run jointly by the Royal Postgraduate Medical School and the British Association for Immediate Care at Hammersmith Hospital. This course is multi-disciplinary and combines lectures, seminars, and practical training for NHS staff called on to work as medical incident officers or with mobile medical and nursing teams. In the two years that the course has been run, 102 people have been trained. The participants undertake an assessment at the end of the course, a major function of which is to allow the course organisers to assess the effectiveness of the training offered in key principles.

Though advanced trauma life support courses offer excellent training in clinical aspects, specific training is required for all prehospital care, including elements of safety and working with the emergency services.

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- 1 Cooke MW. Arrangements for on scene medical care at major incidents. *BMJ* 1992;305:748. (26 September.)
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EDITOR.—We agree with D G Nancekivill that both medical incident officers and site medical teams for major incidents need to be trained and to be familiar with the procedures of the other emergency services.<sup>1</sup> We disagree that training is a problem. The British Association for Immediate Care has been training doctors in this work for many years.

The association produced its first guide to managing major incidents in 1985,<sup>2</sup> and the skills of doctors trained by the association were recognised in the report on the railway accident at Clapham.<sup>3</sup> The association's interservice and disaster liaison committee has been working with the ambulance, police, and fire services and the armed forces, coastguard, mountain rescue services, and, latterly, the Home Office adviser on civil emergencies on all aspects of managing major incidents. The association hopes to produce guidelines on the medical aspects of managing major

incidents jointly with the British Association for Accident and Emergency Medicine.

The association organises courses on major incidents, and the five day course on immediate care includes formal training on the same subject. The diploma in immediate medical care of the Royal College of Surgeons of Edinburgh examines candidates on skills gained in these courses. The courses and the diploma are much more relevant to on site medical services at major incidents than the much promoted advanced trauma life support courses, which relate to the care of a single patient by a single doctor in hospital.<sup>1</sup>

We believe that the key issues are, firstly, that the person serving as medical incident officer must be properly trained in managing major incidents and must participate regularly in exercises with colleagues from other services; and, secondly, that members of site medical teams must regularly work outside hospital on the many cases of trauma seen in day to day practice.

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## UK major trauma outcome study

EDITOR,—D W Yates and colleagues provide evidence on deficiencies in the trauma system in the United Kingdom.<sup>1</sup> It cannot be assumed, however, that all the observed excess mortality occurs in patients with severe injury. In the major trauma outcome study in the United States the mortality in the group of less seriously injured patients (injury severity score 1-8) was 0.37% (24/6557 patients altogether; 18/4816 with blunt injury only).<sup>2</sup> In the study in the United Kingdom the death rate was 1.8% (93/5019, excluding patients with fractured neck of femur). If the death rate from the United States was applied to the numbers in the United Kingdom 19 deaths could be expected, signifying 74 excess deaths in patients with minor injury.

The reason for the excess mortality in this group may be poor care, but the more likely explanation is a difference in the type of patients in the dataset. Even if patients with fractured neck of femur and penetrating injuries are excluded the number of patients injured by a fall was much greater in the British study (4990/10745; 46%) than the American study (2736/11482; 24%).<sup>2</sup> This group contains many elderly patients injured by simple falls. The TRISS method of determining the probability of survival makes no allowance for the appreciable pre-existing morbidity in this group. Previous work has cast doubt on the validity of using TRISS methods where such patients form a considerable part of the caseload.<sup>3,4</sup>

This hypothesis, however, may explain only part of the difference in mortality between the two countries. There is excess mortality in the seriously injured group, and efforts should continue to improve the trauma systems in Britain.

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- 1 Yates DW, Woodford M, Hollis S. Preliminary analysis of the care of injured patients in 33 British hospitals: first report of the United Kingdom major trauma outcome study. *BMJ* 1992;305:737-40. (26 September.)

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EDITOR,—D W Yates and colleagues' preliminary analysis of the care of injured patients shows that only one hospital in the United Kingdom is fit (by the standard of the United States Trauma Research Center in 1987) to admit patients with trauma.<sup>1</sup> The report confirms the report of a working party of the Royal College of Surgeons in 1988 that at least 2000 to 3000 patients die unnecessarily from trauma each year and it is therefore not unreasonable to expect that many more patients are unsatisfactorily treated. Indeed, this argument may be carried further: surely, the treatment of the most seriously ill patients must be a not unreasonable indicator of health care in a hospital.

To put the figures into perspective, we can now assert on a good statistical basis that for every consultant neurosurgeon in Britain one patient dies unnecessarily of a head injury every five weeks and, similarly, for every consultant in accident and emergency one patient dies unnecessarily from multiple trauma every month.

Clearly, when considering the health of the nation the government must not only try to prevent accidents, which cost all of us a large amount of money, but look at our whole hospital care system.

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- 1 Yates DW, Woodford M, Hollis S. Preliminary analysis of the care of injured patients in 33 British hospitals: first report of the United Kingdom major trauma outcome study. *BMJ* 1992;305:737-40. (26 September.)
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EDITOR,—D W Yates and colleagues chose to compare the performance of accident departments in the United Kingdom with that of similar units in the United States.<sup>1</sup> Perhaps they should also compare the cost per patient.

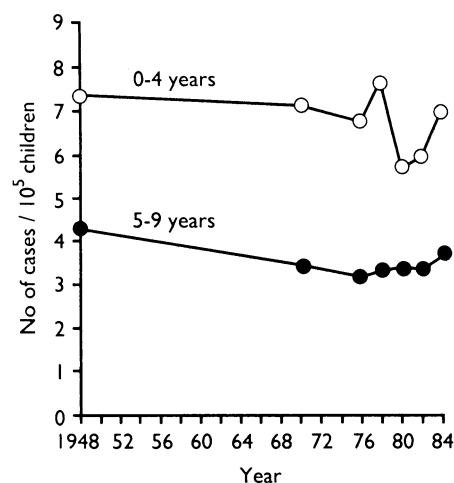
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## Vitamin K and childhood cancer

EDITOR,—Jean Golding and colleagues report that vitamin K given intramuscularly at birth may double the incidence of leukaemia and perhaps other cancer in children under 10 years old.<sup>1</sup> In raising questions about the study G J Draper and C A Stiller call for large cohort studies to be carried out as rapidly as possible to settle the issue.<sup>2</sup> Before such studies are conducted consideration should be given to data from the United States, where since 1961 almost all children have been given intramuscular vitamin K at birth as recommended by the American Academy of Pediatrics.<sup>3</sup> No increase in the incidence of leukaemia occurred in 1969-84 compared with 1947-50 (figure). The data, collected for the second and third national cancer surveys (1947-50; 1969-71) and the surveillance, epidemiology, and end results programme of the National Cancer Institute (1973-84), are from five areas combined: the cities of Atlanta, Detroit, and San Francisco-Oakland and the states of



Incidence of leukaemia over time among white children in United States

Connecticut and Iowa (6-7% of the American population).<sup>4</sup>

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- 1 Golding J, Greenwood R, Birmingham K, Mott M. Childhood cancer, intramuscular vitamin K, and pethidine given during labour. *BMJ* 1992;305:341-6. (8 August.)
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EDITOR,—The use of vitamin K to prevent haemorrhagic disease of the newborn and its implication as a risk factor in the development of childhood cancer have been widely debated in the medical journals and popular press over the past year. Paediatricians are now often summoned to the delivery unit to discuss the need for vitamin K and the best route of administration. These discussions with parents can last up to an hour.

The recommendations of A W McNinch and colleagues and Jean Golding and colleagues are well known.<sup>1,3</sup> From the recent letters of Beverley A Lawrence Beech and H P Dunn it seems that there could be a shift in treatment.<sup>4,5</sup> At best there will be an increase in oral prophylaxis; at worst only those thought to be at risk will be treated. Both options could have tragic results, and parents must be counselled.

In a two month period two babies with confirmed haemorrhagic disease of the newborn were referred to Addenbrooke's Hospital. Both had been born at another hospital where no vitamin K prophylaxis was given. Neither baby had any risk factors, both had had normal vaginal deliveries at full term, and both were breast fed. They had been well until about 6 weeks of age. The first had warning bleeds for three days before presenting unconscious at the local hospital. The second presented with a two day history of lethargy, poor feeding, and then focal fits. In both cases intracranial haemorrhages were diagnosed and the babies were transferred for paediatric and neurosurgical intensive care. Both babies survived; the first required evacuation of intracranial blood clots on two occasions, and the second required monitoring of the intracranial pressure. Follow up computed tomography showed appreciable cerebral atrophy, and both children may have some handicap.

Our paediatric practice of giving vitamin K intramuscularly remains unchanged. If parents