economic deprivation are highly correlated with the proportion of the population from ethnic minorities. Ethnic group is also a strong risk factor for tuberculosis. As such, ethnic group is potentially an important confounder of the relation between tuberculosis and social deprivation, which was not accounted for in this analysis. The authors state that the increase in rates of tuberculosis in Britain is confined to the most socially deprived areas. This is potentially misleading because the geographical distribution of the increase could reflect the ethnic composition of the populations rather than population levels of social deprivation.

The analysis of local data shows that the number of notifications increased in the groups classified as white or of Indian subcontinent or West Indian origin. The assertion that the sizes of these groups in Hackney remained stable over the study period is said to be based on comparison of census data for 1981 and 1991. The 1991 census was the first to include ethnic group as a variable, so it is unclear how changes in the sizes of the populations were ascertained.

Nearly half of the increase in notifications in Hackney occurred among newly established refugee and immigrant populations. Estimates of the size of these populations are likely to be highly inaccurate. Newly established populations are said by the authors to be unusually large in Hackney even when compared with those in other socioeconomically deprived boroughs. For this reason, immigration is thought likely to have played only a small part in the national increase. As we are not told the numbers and ethnic mix of refugees in other socioeconomically deprived districts it is difficult to predict how important their contribution to the increase in notifications may be.

We believe that caution should be used in interpreting the results of the national ecological study and in extrapolating the results from Hackney to other socioeconomically deprived districts. This analysis has provided valuable information about the epidemiology of tuberculosis in Hackney, but different factors may be important in other districts.

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1 Bhatti N, Law MR, Morris JK, Halliday R, Moore-Gillon J.
Increasing incidence of tuberculosis in England and Wales: a
study of the likely causes. *BMJ* 1995;310:967-9. (15 April.)

The 10 commandments of accident and emergency radiology

EDITOR,—A H Troughton and I Kendall¹ and T F Beattie and colleagues² comment on our article giving 10 commandments of accident and emergency radiology.³ As we stated in the introduction, the article was written for inexperienced senior house officers working in accident and emergency departments. The authors of the letters either did not read this or are unaware that, commonly, inexperienced accident and emergency doctors work without direct supervision.⁴

In answer to Troughton and Kendall's comments, we wish to point out the following. Rules 1, 2, and 3 emphasise the need to assess the patient first and order a radiograph only if an underlying abnormality is considered. Radiographs of joints with long bones should not be obtained if the joints are clinically normal. The article states the need to have "an accessible library of normal radiographs in the accident and emergency department as well as reference books that show normal variants."

Radiographs must be obtained before foreign bodies are removed because only in this way can the most appropriate anaesthetic and operative procedure be chosen.

In contrast with what Beattie and colleagues imply, the Royal College of Radiologists' recommendations state, "The one possible exception [for comparison views] is the opposite elbow when there are strong clinical signs of fracture with no radiological evidence and no available radiologist." No further radiographs are required while the patient is in the x ray department if the initial radiograph is normal or obviously abnormal. Rule 9 emphasises that inexperienced doctors should seek experienced advice when a radiograph does not look quite right but no specific diagnosis can be made. Beattie and colleagues' statement that "the diagnosis of subtle fractures around the elbow joint will not necessarily change the clinical management" is a dangerous concept for inexperienced senior house officers. In our experience this can be interpreted as, "If you do not see an abnormality it is not important." Both statements rely on an experienced clinician viewing the radiograph.

Owing to lack of space, several points that we wished to incorporate in our article had to be deleted. They included the comment that variation in the alignment of joints is important to note (when comparing two sides) because it may obscure abnormalities. The subsequent publication, the *ABC of Emergency Radiology*, includes this comment.⁵

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- 1 Troughton A, Kendall I. Accident and emergency radiology. *BMJ* 1995;310:1605. (17 June.)
- 2 Beattie TF, Hendry M, McPhillips M, MacKenzie S. Accident and emergency radiology. *BMJ* 1995;310:1605. (17 June.)
- 3 Touquet R, Driscoll P, Nicholson D. Teaching in accident and emergency medicine: 10 commandments of accident and emergency radiology. *BMJ* 1995;310:642-5. (11 March.)
- 4 National Audit Office. *NHS accident and emergency departments in England*. London: HMSO, 1992.
- 5 Nicholson D, Driscoll P. *ABC of emergency radiology*. London: BMJ Publishing Group, 1995.

Differences in mortality after fracture of hip

Doubt remains over anticoagulant prophylaxis for deep venous thrombosis

EDITOR,—Anticoagulant prophylaxis may reduce the incidence of venous thromboembolism in hospital, but C J Todd and colleagues' study does not dispel doubts about its overall effect on mortality.¹ There was no significant difference between the survival rate at 90 days (82.2% at the four hospitals that routinely gave such prophylaxis (to 79.5% of patients)) and 82.0% at the other four hospitals (prophylaxis given to only 16.1%) despite the fact that 62.3% of patients in the former hospitals had surgery within 24 hours (favourable to outcome) compared with only 50% in the latter ($P < 0.01$, χ^2 test). Hospital 4, which gave prophylaxis to the highest proportion of patients (91%), showed joint lowest 90 day survival (76%). In hospitals 5 and 8, in which only 10.5% of patients were given prophylaxis, 83% survived despite 4% dying of pulmonary embolism. None of the 13 patients diagnosed at necropsy as having fatal embolism was taking anticoagulants, but we wonder how many of these patients had recognised contraindications,² especially other conditions

rendering them particularly prone to thromboembolism. Haematoma with subsequent infection is a worry with anticoagulants, and wound infection occurred in 9.8% (25/256) of patients in the hospitals that routinely gave anticoagulants compared with 4.9% (15/304) in the others ($P < 0.01$).

There is a danger of relying on anticoagulants in hospital and neglecting to teach patients and carers about mechanical prophylaxis, including postures to increase the velocity of femoral vein blood,³ the avoidance of bad postures, and the value of leg movements, since the risk of thrombosis continues after discharge from hospital.² Either infection or venous stasis would predispose to thromboembolism after discharge: did all 82 patients who died undergo necropsy?

Another factor that can affect outcome is the packed cell volume: lower values indicate lower viscosity (a value ≤ 0.33 discourages thromboembolism⁴) and better tissue oxygenation than at higher values. Thus it would be interesting to know whether thromboembolism and survival correlated with differences in policy concerning transfusion of red cells or haemodilution. The report by the Thromboembolic Risk Factors Consensus Group can be criticised for omitting to mention posture or packed cell volume.⁵ The decision whether to give anticoagulant treatment to a patient should take into account many factors, including the risk of haemorrhage as well as the risk of thrombosis. For many patients, mechanical methods to increase the peak velocity of femoral vein blood combined with haemodilution (for example, not replacing red cells lost) could be safer overall, especially if monitored by routine post-operative venography or colour-duplex scans and if clinically important thromboses are treated. Raising the legs moderately can enhance the blood velocity³ and is easily continued after discharge. We agree that more research is needed, particularly large scale trials of alternatives to anticoagulant treatment.

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- 2 Kakkar VV, Cohen AT, Edmondson RA, Phillips MJ, Cooper DJ, Das SK, et al. Low molecular weight versus standard heparin for prevention of venous thromboembolism after major abdominal surgery. *Lancet* 1993;341:259-64.
- 3 Ashby EC, Ashford NS, Campbell MJ. Posture, blood velocity in common femoral vein, and prophylaxis of venous thromboembolism. *Lancet* 1995;345:319-21.
- 4 Duruble M. Prophylaxie des thromboses veineuses profondes. *Phlebologie* 1982;35:143-72.
- 5 Thromboembolic Risk Factors (THRIFT) Consensus Group. Risk of and prophylaxis for venous thromboembolism in hospital patients. *BMJ* 1992;305:567-74.

Casemix factors may not have been considered sufficiently

EDITOR,—The results of C J Todd and colleagues' audit report on 90 day mortality after admission to hospitals in East Anglia with fractured hip seem to suggest an impressive survival advantage if a patient is admitted to one particular hospital (hospital 6).¹ The authors state that this is probably due to factors associated with the care provided at that hospital.

How can the authors be sure that other casemix factors did not account for the observed differences in 90 day mortality? The favourable "process" measures reported for hospital 6 (low rates of pressure sores and wound infections and the early mobilisation of patients) may have reflected excellent care but could equally have been a result of less sick patients being admitted in the first place and this not being detected with the casemix measures

used in the multivariate analysis. For instance, could social class factors (smoking history, body mass index) or other factors (drug treatment) have varied among the hospital populations and affected the results? Similarly, could the large observed differences between the sexes indicate particular comorbidities that were not measured?

The proportion of the total variability in 90 day mortality that was due to the casemix factors used in the model is not stated. If this proportion was small there may have been other casemix factors that were not taken into consideration; the modelling process used by the authors could be better judged if all the factors considered were stated and the extent of the total variability in 90 day mortality explained by the model was recorded. It seems implausible that treatment in hospital 6 should have exerted such a pronounced protective effect.

Appreciable variations in survival due to differences in the processes of care among hospitals are difficult to identify after adjustment for casemix.² Adequate adjustment for casemix is difficult, and many studies tend to collect few data with which to attempt such adjustments. This study may have considered too few casemix factors for any reliable comment to be made about the effect of the processes of care in the different hospitals.

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- 2 Gulliford MC, Petrukevitch A, Burney PGJ. Survival with bladder cancer, evaluation of delay in treatment, type of surgeon, and modality of treatment. *BMJ* 1991;303:437-40.

Patients' nutritional status is not recorded

EDITOR,—C J Todd and colleagues found considerable differences among hospitals in mortality, length of stay in hospital, and the development of pressure sores in patients with hip fracture.¹ Although the patients from the eight hospitals are said to have been well matched, no information is provided on the patients' nutritional status on arrival or on their subsequent nutritional care.

Simple anthropometric variables, such as weight in relation to height, the circumference of the mid-upper arm, and triceps skin fold thickness, have been used to assess nutritional status in patients with hip fracture and have proved to be predictors of mortality and length of stay in hospital.^{2,3} Malnourished patients receiving supplemental oral or enteral nutrition have shown fewer complications, a shorter stay in hospital and lower mortality.^{2,5} For example, patients receiving an oral supplement of 250 ml daily in one study had a median hospital stay of 40 days, compared with 24 days in a group not given the supplement.⁴

Clearly, differences in nutritional management can be important not only for outcome but also for hospital costs.

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- 2 Brown KM, Seabrook NA. Nutritional influences on recovery and length of hospital stay in elderly women following femoral fracture. *Proc Nutr Soc* 1992;51:132A.
- 3 Bastow MD, Rawlings J, Allison SP. Benefits of supplementary tube feeding after fractured neck of femur: a randomised controlled trial. *BMJ* 1983;287:1589-92.
- 4 Delmi M, Rapin C-H, Bengo J-M, Delmas PD, Vasey H, Bonjour J-P. Dietary supplementation in elderly patients with fractured neck of the femur. *Lancet* 1990;335:1013-6.
- 5 Tkatch L, Rapin C, Rizzoli R, Slosman D, Nydegger V, Vasey H, *et al*. Benefits of oral protein supplementation in elderly patients with fracture of the proximal femur. *J Am Coll Nutr* 1992;11:519-25.

Overall survival rate is most important measure

EDITOR,—The audit of hip fracture in East Anglia concludes that anticoagulant prophylaxis against thromboembolism reduces the frequency of fatal pulmonary embolism.¹ The haemorrhagic side effects of such treatment may, however, be important in a group of patients known to have a high prevalence of coexisting cardiovascular and gastrointestinal disease.² The overall mortality rather than the mortality related to pulmonary embolism should therefore be recorded.

When hospital 6, which seemed to confer an idiosyncratic benefit to patients, is excluded the 90 day survival was marginally lower in the hospitals in which pharmaceutical thromboprophylaxis was used routinely than in those in which it was not (table). The mortality from causes other than pulmonary embolism was significantly higher in the hospitals in which prophylaxis was used routinely ($\chi^2=5.5$, $P=0.02$).

90 Day survival and mortality from pulmonary embolism according to use of prophylaxis (figures are numbers (percentages))

Hospital	No of patients	90 Day survival	Death due to:	
			Pulmonary embolism	Other
<i>Prophylaxis given routinely</i>				
1	79	60 (76)	0	19 (24)
2	24	19 (79)	1 (4)	4 (17)
4	80	61 (76)	0	19 (24)
<i>Prophylaxis given occasionally</i>				
3	79	63 (80)	2 (3)	14 (18)
5	80	68 (85)	3 (4)	9 (11)
7	79	65 (82)	2 (3)	12 (15)
8	78	63 (81)	5 (6)	10 (13)

In a Danish prospective clinical trial of 542 patients randomised to receive either low molecular weight heparin or placebo after total hip replacement the survival was lower in the group given low molecular weight heparin, regardless of the benefit against thromboembolism (B S Andersen *et al*, proceedings of the 13th international congress on thrombosis, 1994).

We believe that the discrepancy between reduced overall survival and reduced mortality from pulmonary embolism should be clarified before the conclusions of this study are accepted, since the data suggest that anticoagulant treatment may have introduced deaths due to other causes.

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- 2 Perez JV, Warwick DJ, Case CP, Bannister GC. Death after proximal femoral fracture—an autopsy study. *Injury* 1995;26:237-40.

Antithrombotic prophylaxis had little effect on overall mortality

EDITOR,—C J Todd and colleagues report that antithrombotic prophylaxis significantly reduces the incidence of fatal pulmonary embolism.¹ From their remarks in their results section, I assume that their diagnoses of fatal pulmonary embolism were made at postmortem examination. It would be interesting to know what the rate of postmortem examination at each hospital was for this review as this would have a bearing on the number of deaths due to pulmonary embolism.

With regard to their figures for mortality, it is also important to look at other causes of death, such as bleeding and complications arising from wound sepsis.² How many deaths were due to these problems? In figure 1 they indicate that hospitals 3, 5, 7, and 8 were low users of antithrombotic prophylaxis. The 90 day survival curves indicate, however, that there was little difference in overall mortality between the hospitals other than hospital 6 (if there was any, hospitals 3, 5, 7, and 8 seem to have had slightly better survival than hospitals 1, 2, and 4). The authors' data show that the overall mortality in hospitals 1, 2, 4, and 6 (which used antithrombotic prophylaxis more frequently) was 20% at 90 days while that in hospitals 3, 5, 7, and 8 was 18%. Thus while fatal pulmonary embolism may be more common when antithrombotic prophylaxis is not used, overall mortality may not be very different between patients in whom it is used and those in whom it is not. It would thus be interesting to know what the overall mortality was in each group of patients.

An important concern regarding routine use of antithrombotic prophylaxis is an increase in the incidence of complications related to the wound. Was there any difference in the overall infection rate between the patients who had antithrombotic prophylaxis and those who did not?

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Author's reply

EDITOR,—Many factors contribute to mortality after hip fracture, and our audit could not consider all the possible factors. The correspondents suggest several interesting variables, which we were unable to report on because our audit depended on information routinely collected in the units studied.

David Warwick and Michael Freeman, J Calder and E C Ashby, and K C Kong request information on rates of complications related to thromboembolic prophylaxis. Of the eight patients with infections of the hip joint, seven received no prophylactic anticoagulant treatment (2.3% of the 305 who did not receive it) but only one received some prophylaxis (0.4% of the 261 who did) (Fisher's exact one tailed test, $P=0.055$). For wound infection the corresponding data are 21/305 (6.9%) and 18/261 (6.9%) ($\chi^2=0.0$, $df=1$, $P=1.00$). The rate of wound infection was highest in hospitals 1, 2, and 4. There was a correlation (Spearman's $r=0.74$, $P=0.042$) between the rate of wound infection and 90 day mortality. Wound infections may arise for numerous reasons, many of which are not directly attributable to anticoagulant treatment.

Our paper was based on total mortality, and we attempted to explain the striking differences in this. Warwick and Freeman's central point is that anticoagulant treatment may have increased mortality, but they have excluded 80 patients post hoc. A more valid analysis includes these 80 patients; then there is no significant difference in mortality ($\chi^2=0.87$, $df=1$, $P=0.35$). Overall mortality was not significantly different between those who received no prophylaxis and those who did (56/301 (18.6%) and 42/261 (16.1%) respectively (data are missing on 14 patients, of whom six died); $\chi^2=0.36$, $df=1$, $P=0.55$). Inspection of causes of death gives no reason to believe that any additional deaths are associated with anticoagulant treatment. Neither the recorded causes nor the temporal pattern of deaths suggests any general or haemorrhagic postoperative complication. None the less, those patients who did and those who did not receive prophylactic anti-