were also unable to demonstrate adverse effects on mortality, bone histology, anaemia, peripheral neuropathy, or rehabilitation score, though plasma creatinine, urea potassium, and the need for phosphate binding agents increased.

Both the Newcastle and Brighton authors discuss patients assessed during shortened treatment hours but do not mention patients in whom this was not possible. We would like to emphasise that, of 66 patients who entered this latter phase of our study, the hours of treatment were effectively reduced in 55. Reasons for the failure to maintain short-hour dialysis treatments were commonly related to inadequate ultrafiltration; hypertension occurred in only two patients (3% of total).

With the proviso that we may not have studied our patients for long enough, the limitation to short treatments seems to relate more to difficulties in ultrafiltration in a minority than to the medical or surgical complications of hypertension, or indeed of other consequences of uraemia. As dialysis hours continue to be pruned, it seems clear that an inflexible approach in recommending treatment regimens should change and that the tailoring of treatment to best balance the priorities of the patient's well-being, the acceptability of treatment, and economy will have to be established.

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¹ Paton, S, *et al*, *Proceedings of the European Dialysis and Transplant Nurses' Association*, 1978, 6, 14.

*. We sent copies of this letter to the authors of the two papers, whose replies are printed below.

SIR,—As in Oxford, we have had no significant problem with blood pressure during the period in which we have progressively shortened dialysis. Our experience also has been of a reduced number of patients needing hypotensive therapy.

The mean dialysis time per week for all patients in 1978 was 9.16 hours, the range being 6–15. We thus agree entirely with the Oxford workers' comments that an inflexible approach to treatment regimens should change and that the tailoring of treatment to strike the best balance between the patient's well-being and the acceptability of treatment as well as cost will have to be established.

It has been shown many times that, even at the price of certain side effects, patients prefer to have their number of hours on any machines reduced. The resistance to very short dialysis comes therefore from doctors and not from patients and is another reason why no regimen can be standard and that both the patient's concern and the clinical opinion have to be taken into account.

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SIR,—Sue Paton and her colleagues wonder whether the increase in exchangeable sodium and need for antihypertensive drugs in our patients studied in 1978 could have been due to factors other than a reduction in weekly hours of dialysis. If the 1973 "high sodium dialysate" and 1978 groups are compared it will be seen that in both cases dialysis was given thrice weekly against dialysate of sodium concentration 136 mmol/l. In 1973 all patients

were using the Meltec multipoint cuprophane 12 m dialyser and in 1978 the Meltec multipoint was used by 23 patients and the Rhone Poulenc six by 3 patients, so that there was little change in dialysis equipment. In both 1973 and 1978 the patients studied were taken from a pool of 30–40 patients on long-term hospital haemodialysis. Selection was random except that patients who lived a long distance from the dialysis centre were not approached. The mean age of patients in 1978 was 42 ± 11.75 years, with 17 males and 9 females. In 1973 mean age was 41 ± 11.8 years with 14 males and 4 females. The patient populations are therefore comparable. The only non-dialytic factor likely to effect sodium loading is the amount of salt in the diet and, as stated in our paper, this aspect of patient management did not change between 1969 and 1978—that is, patients were advised to avoid salty foods and not to add salt at the table.

Paton *et al* in their study of 53 patients found a small but significant rise in blood pressure and a fall in the proportion of patients taking antihypertensives when dialysis was shortened. Exchangeable sodium was not measured. We are not told whether the patients were selected or how many had had bilateral nephrectomy performed. Dialysate sodium was unchanged, but one wonders whether this was low, and if so whether the patients had troublesome cramps or symptoms of disequilibrium. It would also be of interest to know whether sodium intake was severely restricted in their patients. These factors would minimise sodium overload when dialysis was shortened and might explain why hypertension was not a serious problem in their patients.

It seems to us that in the Newcastle patients the only reason for the higher exchangeable sodium levels and the increased need for antihypertensive agents in the 1978 group compared with the 1973 "high-sodium dialysate" group was the shortening of dialysis time. In some patients this accumulation of sodium will be accompanied by severe hypertension and, of course, we agree that a flexible approach is necessary when deciding on the duration of dialysis in individual cases.

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Health problems of anaesthetists and their families

SIR,—The critics of my article "Health problems of anaesthetists and their families" (24 March, p 779) appear to have missed the key points. These were that there were more health problems in the families of anaesthetists than occur in the general population and that conventional statistical assumptions are biased against the findings of a health hazard in investigations dealing with safety.

Contrary to Sir Richard Doll's belief (21 April, p 1078), I did state in my article what types of cancer there were among the adult anaesthetists. I regret that I did not discuss in detail his study of cancer in male anaesthetists, but since my article did not dwell on cancer in male anaesthetists I did not consider it appropriate. I did not conclude that there was an increased risk of breast cancer solely on the basis of two cases occurring in 78 female anaesthetists, but when they are combined with those reported by Corbett¹ to give 17 cases in 601 predominantly young women then that conclusion

emerges. I agree that the use of the annual incidence of cancer of the breast in all ages is not an ideal base for comparison—but this choice, based on simplicity and including many older normal subjects (in whom the risk is increased), would have probably produced a bias to make my conclusions an underestimate.

Dr M P Vessey and Professor C M Conway (pp 1078–9) appear concerned about the low birth weight of the children born to non-exposed parents. This concern is misplaced as this particular group contains an excess of first-born children (67%) and hence they have a lower mean birth weight than the normal population. This was why I compared the birth weights of children of the exposed parents (43.7% were first born) with the established norms of the population. The only reason for including data about the non-exposed children was to determine if my method of sampling yielded results comparable with established values—for example, for abortion rate and congenital abnormality rate. It did.

Professor Conway's criticisms (p 1079) do him less than justice. He criticises my statistical calculations—for example, my observed incidence of female children occurring twice as commonly as male children in the offspring of female anaesthetists. Serious students of the pollution problem are aware that this was originally suggested in one of the first reports about pollution—from Russia, where the majority of anaesthetists were female. Since there has not been a report about a significant excess of male children there was an *a priori* reason to expect an excess of females. The exact test of significance gives the probability of my observation occurring by chance as 0.042 single tail. The result was only included since it confirmed the original observation but its clinical significance is trivial and, contrary to Professor Conway's assumptions, has no bearing on my final conclusions. He seriously misquotes and attempts to ridicule my report in that I did not claim solely on the basis of two cases of cancer occurring in 277 children that this risk is increased. I referred to the findings by Corbett² and specifically used the words "combined incidence." It is customary when rare events occur to combine results with those from other comparable series. On this aspect I considered Corbett's study to be the only one published that is comparable with mine.

The cavalier treatment of my results by Dr Mary Vowles and others (p 1079) is disconcerting. They wish to disregard a number of my cases in table 3 of the article. Of these case 2, fully described in the text, cannot be considered a normal child. Case 3 had a congenital tumour and died—their study included congenital tumours. Cases 6 and 18 had lesions that standard textbooks describe as congenital or familial in origin. West's syndrome, present in Case 10, is of unknown aetiology but birth trauma has been implicated in only 33% of the reported cases,³ and no external aetiological factor has been found in more than half. Cases 12 and 13 occurred in the same family. The remaining four cases they wish to disregard because they were not treated vigorously, which assumes a common standard of treatment across the country. This is highly unlikely, but even if they are disregarded this leaves a congenital abnormality rate that is still much higher than they found occurring in the normal population.

Dr J F Nunn and others (p 1079) accuse me of totally ignoring recent experimental studies. On this aspect I cited only four references, dated 1967, 1968, 1976, and 1978. I would draw their attention to two recent publications in which it is stated that exposure of experimental animals to trace concentrations of halothane⁴ and nitrous oxide⁵ had adverse effects on the fetuses. The effects observed were not dissimilar to my observations—small size, musculoskeletal system deformities, and fetal loss⁵—that is, the experimental evidence is not quite as they would imply.

I accept Dr Nunn's strictures on my statement "Several anaesthetics are carcinogenic," citing only one reference—the study by Corbett on isoflurane.⁶ I apologise for omitting references to two other studies—one by the National Cancer Institute, in which trichlorethylene was found to be carcinogenic,⁷ and the study by Winslow and Gerstner⁸ on chloroform, both of which are available in this

country. The fact that isoflurane was not found to be carcinogenic in another laboratory would seem to be indicative of a variation in strain susceptibility—I have been led to understand that this is a common occurrence in cancer studies. Corbett's original observations of 15 hepatic neoplasms in 67 male mice with none in his control animals cannot be dismissed as lightly as Dr Nunn and his colleagues would wish.

Finally, I am accused of taking the Health Departments to task (Drs A A Spence and R P Knill-Jones (28 April, p 1144)) in my article. In fact, the opposite is true. In view of their previous criticisms of me—I was called vexatious—I deliberately made no criticism of the activities of the Health Departments and any reference to these activities was strictly factual. But Dr Spence does raise an interesting question: are the Health Departments to be regarded as being immune from any criticism?

Clearly, the question of health hazards arising out of pollution is an emotive subject; but resolution of this problem will not be helped by hyperbole, distortion, or misrepresentation. As someone who has had to help colleagues, both senior and junior, who had children with congenital abnormalities, including those whom I have encouraged in the specialty, I have no wish to see more children affected if this can be prevented. Since the children are still being born if my results are applicable to the entire country, and several of the affected children I described were born outside the West Midlands, then this means that if this problem is not treated with urgency at least one more child every month will be born with a congenital anomaly in an anaesthetist's family. This, of course, ignores the other workers in our operating theatres and their families.

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¹ Corbett, T H, *et al*, *Anesthesiology*, 1973, **38**, 260.

² Corbett, T H, *et al*, *Anesthesiology*, 1974, **41**, 341.

³ Jeavons, P M, *et al*, *Epilepsia*, 1973, **14**, 153.

⁴ Dripps, R D, Eckenhoof, J E, and Vandam, L O, in *Introduction to Anaesthesia*, p 147. Saunders, W B, London, 1977.

⁵ Viera, E, *British Journal of Anaesthesia*, 1979, **51**, 283.

⁶ Corbett, T H, *Annals of New York Academy of Sciences*, 1976, **271**, 58.

⁷ National Cancer Institute, NCI CG TR2, 1976.

⁸ Winslow, S G, and Gerstner, H B, *Drug and Chemical Toxicology*, 1978, **1**, 259.

Training in urology

SIR,—The urology members of the Association of Surgeons in Training are becoming increasingly concerned with their prospects of obtaining "full-time" urological consultant jobs in the immediate future. The bottleneck is because the planned expansion in consultant urological posts is not taking place.

There are apparently 127 full-time urological consultants in England and Wales, and 31 senior registrars. (It is not known whether this figure also includes lecturers.) This gives a ratio of 4:1 instead of the more realistic 7 or 8:1. The latter figure is based on an average consultant "surviving" 30 years and a higher surgical training programme of three years for urologists. The senior registrars in urology at present in post have three options. (1) They can apply for full-time urology posts. (2) They can apply for "mixed" consultant jobs (those advertised as general surgical-urological posts). (3) They can stay in their present posts until consultant vacancies occur.

With regard to the second and third options, just as we (the Association of Surgeons in Training) feel that it is wrong that urology should be carried out by surgeons not trained at a higher level in urology (a point I will return to later), we are against senior registrars in urology, with no

higher surgical training in general surgery, being appointed as consultants to a post where they are expected to carry out general surgical procedures of an elective or an emergency nature. Many of the present senior registrars in urology have no general surgical experience beyond that at a registrar level. The third option—of remaining in their present jobs until a suitable consultant post becomes available—may entail a wait of many years. The danger in this is that some health authorities (health boards in Scotland) may use completion of higher surgical training as a reason for dismissal. One health authority (Avon) has already stated this in writing to a senior registrar. This letter has subsequently been withdrawn, but it shows that the administration is thinking along these lines.

The fate of the senior registrar jobs when they are vacated by their present occupants also poses some interesting problems. The Scottish Home and Health Department has already decided to axe two of them, one in Aberdeen and one in Glasgow, and this fate may befall other posts when they come up for renewal. In view of the job prospects it would be to our minds unwise to fill all of the posts with registrars committed to full-time urology; enough of the jobs should, however, obviously be filled to match the number of consultant vacancies and the expansion planned over the next few years. This will still leave some senior registrar jobs in urology vacant. What should be done with them? In the ideal Health Service all urology should be done by urologists—just as all vascular surgery should be done by vascular surgeons, and all orthopaedic surgery by orthopaedic surgeons. While this ideal is possible in nearly all teaching hospitals, there are many hospitals throughout Great Britain where urology is not only carried out at the present time by the general surgeons but will continue to be for many years. The expansion in the consultant urology grade planned many years ago has not taken place and it seems unlikely in the present financial climate that it will take place in the foreseeable future. As urology forms roughly a quarter to a third of a general surgeon's workload it would seem logical to us to train potential general surgeons in urology, at a higher surgical training level.

At the present time, with few exceptions, the facilities for this type of training are not available. With the recent advances in the diagnostic, therapeutic, and surgical treatment of urological cases, considerable expertise is now required. This is particularly so in the art of using the resectoscope, where it has been well shown that the use of this instrument in prostatic work leads to reduced morbidity and hospital stay. As 95% of prostates can be dealt with this way, its widespread use by those trained with it would lead to considerable saving in bed occupancy and therefore reduce waiting lists throughout the country. This expertise can really only be learned in units where urology is practised full time. Could these vacant senior registrar posts not be used to train general surgical senior registrars in urology? If this is not possible could rotations between senior registrars in urology and general surgeons not be set up in some teaching hospitals? This would allow urology senior registrars to gain some training at a higher surgical training level in general surgery and thus be able to apply for "mixed" jobs.

As I have already stated, it seems unlikely that the deficiency in consultant urologists throughout Great Britain will be corrected in the foreseeable future. In view of this it seems logical to give further training in urology to those of us who are likely to practise general surgery in non-teaching hospitals. This would not only benefit ourselves but also lead to better care of our patients. The present situation should not be allowed to continue indefinitely.

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Minor tranquillisers and road accidents

SIR,—I read with interest the article "Minor tranquillisers and road accidents" (7 April, p 917). I note that in table II the relative risk (point estimate) of traffic accident is recorded as 5.2 for sedative and tranquilliser takers, and that the corresponding figure for oral contraceptive takers is 5.6. The authors discuss the association of traffic incident or accident with antihistamine ingestion (relative risk 1.8), but do not comment on the finding regarding the pill. While one assumes that these women may have been taking other drugs, including sedatives or alcohol or both, the high relative risk is difficult to understand. Even allowing chauvinism a hand by pointing out these were women drivers, there were matched controls. I wonder if the authors have an explanation.

Finally, and on a completely different line of thought, with this evidence to hand of the risk of road accidents in sedative takers should one include in the insurance medical examination for driving licences a history of sedative swallowing?

A P PRESLEY

Quedgeley, Glos

SIR,—It is debatable who constitutes the greater hazard on the road, the anxious, nervous patient or the tranquillised patient. As Dr D C G Skegg and others rightly point out in their paper (7 April, p 917), the association which they demonstrated between the prescription of tranquillisers and accident risk may just as well have been due to an association between the illness being treated and accident risk.

As it is the usual custom in general practice to warn patients of the possible effects of tranquillisers on driving skills, it is possible that the latter is the more likely explanation. It is common practice to tell the patient to try the effects of the tranquilliser at some time when they will not be driving their motor vehicle, and only to do so if no drowsiness or other untoward effect results. It could well be that the sample described in the paper may have contained an appreciable portion of such patients and, unless it is postulated that tranquillisers produce subtle effects undetected by the patient, then I would suggest that the higher accident risk was in fact related to the underlying affective disorder.

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*.*We sent copies of these two letters to the authors, whose reply is printed below.—Ed, BMJ.

SIR,—Our paper, as Dr Presley points out, showed that more drivers had received oral contraceptives before their accidents than would have been expected from the experience of the controls. We did not specifically refer to this in the text, however, as the difference did not approach statistical significance ($P > 0.10$) and may well have been due to chance. In studies involving small numbers, the P value is more informative than the point estimate of relative risk. We highlighted the association between minor tranquillisers and road accidents because, firstly, the association was statistically highly significant and, secondly, there was a prior hypothesis that such drugs would impair driving ability. Similar considerations led us to discuss anti-