examinations, and some radiologists would say for all examinations. I do not think that this is reasonable or necessary. The ionic agents that have been in use for the past 20 years are reasonably safe with a death rate similar to that of penicillin.²

The death rate from intravenous urography is not known with any accuracy as it is derived from national surveys all of which are subject to statistical faults. While it is generally accepted that the death rate is about one in 40 000, some surveys have given much lower rates³: one department in observations on 300 000 patients has found a death rate of one in 75 000 for ionic media.² We cannot know the death rate from non-ionic media as insufficient experience has accumulated, but Professor Grainger supposes it will be from one in 40 000 to one in 80 000 or possibly one in 100 000.¹ This is then much the same as for ionic media.

The casual reader might suppose that much is known about deaths occurring after contrast media injections, but this is not so. It is not known, for example, how many of the deaths are due to idiosyncratic reactions, direct toxicity, or natural causes. The number of examinations carried out each year is estimated by Professor Grainger at between a half and one million, but the true figure is not known.

Ansell pointed out in 1970 that the death rate had not been reduced compared with previous trials despite the reduction in systemic toxicity.³ This implies that once unduly toxic media such as acetrizate are eliminated there is a constant risk, and one is not entitled to infer that the risk of death is lower because the median lethal dose is raised. This hypothesis gains support from Professor Grainger's suggestion that the maximum safe dose at one examination should remain at 200 ml for non-ionic media as well as ionic media.

The hypothesis that the low osmolality of the medium is the cause of most severe adverse reactions is widely accepted because it was the hypothesis that guided the production of the non-ionic media. The observations of Märe refute the osmolality hypothesis: he found that pulmonary oedema was not induced by injections of mannitol urea or saline at the same osmolality as diatrizoate.⁴ Furthermore, ioxaglate produced more pulmonary oedema and iopamidol as much as diatrizoate. I do not see why Professor Grainger states that nausea and vomiting are due to hyperosmolality¹ as ioxaglate is notorious for causing this problem. I think that the different sensations and adverse reactions are mediated by different mechanisms and so cannot be related to one characteristic of a contrast medium.

The sensations experienced by patients undergoing angiography or urography are certainly reduced in intensity and incidence when non-ionic media are used but are not abolished, and some patients still spontaneously complain of the side effects. There is no doubt that non-ionic media produce better angiograms, but this is not true for urograms.

Work in my department on some 1300 patients has shown that the incidence of spontaneous complaints was the same for ionic and non-ionic media, and only specific questioning showed a difference. The only important difference was in the sensation of nausea or incidence of vomiting, but particular patients experienced these even when non-ionic media were used.

When working in Bristol on the problem of contrast media reactions I made the observation that some patients had rashes which appeared 12 to 24 hours after the examination and lasted for some days and some patients had a flu like illness in the days following urography.⁵ These reactions have been investigated by Dr Philip Panto and myself using a questionnaire, and we have found the incidence to be the same for ionic and non-ionic agents. The incidence of idiosyncratic reactions and iodism is the same for both groups of agents.

In our trials the urograms produced by non-ionic agents were appreciably worse than those produced by sodium containing ionic agents. The pelvic-renal system was opacified later and was less distended so there were more undiagnostic

examinations and many more second injections were required.

Like Dalla Palma *et al*⁶ I can see no reason for changing to non-ionic media for routine urography or computed tomography. Only a small percentage of special cases require non-ionic media. Less than 5% of patients at increased risk of an idiosyncratic reaction actually suffer from one,⁵ and I have already indicated that this risk may not be reduced by using non-ionic agents. I do not think it wise to perform urography in any patient with overt cardiac failure using any medium, and if possible urography should be deferred in any extremely ill patient—except perhaps in patients with acute renal failure, when the urographic findings may be of the highest importance.⁷ Some workers prefer to use ultrasound for diagnosis in renal failure and so eliminate the dangers of urography.

There is no indication at present for using non-ionic media for urethrography, cystography, sinography, peroperative cholecystography, percutaneous biliary drainage, or nephrostomies.

The problem is considerably more complex than Professor Grainger suggests. For his argument to be valid we need to know much more precisely how many and what type of procedures were performed, how many deaths occurred, and what was the aetiology. Numerators and denominators which may vary by a factor of two render arithmetical arguments nugatory.

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- ¹ Grainger R. The clinical and financial implications of the low osmolar radiological contrast media. *Clin Radiol* 1984;35:251-2.
- ² Hartman GW, Hattery RR, Witten DM, Williamson B. Mortality during excretory urography: Mayo Clinic experience. *American Journal of Roentgenography* 1982;139:919-22.
- ³ Ansell G. Adverse reactions to contrast agents. *Invest Radiol* 1970;5:374-84.
- ⁴ Märe K. *Contrast media induced pulmonary oedema*. 2nd ed. Göteborg: Barbro och Staffen Cederblom, 1983.
- ⁵ Davies P, Roberts MB, Royle J. Acute reactions to urographic contrast media. *Br Med J* 1975;ii:434-7.
- ⁶ Dalla Palma L, Rossi M, Stacul F, Agostini R. Iopamidol in Urography. A comparison between ionic and non-ionic contrast media in patients with normal and impaired renal function. *Urol Radiol* 1981;4:1-3.
- ⁷ Davies P. Urographic appearances in renal failure due to intraluminal ureteric obstruction. *J R Soc Med* 1982;75:768-71.

SIR,—Professor Ronald G Grainger ably summarises the potential role of low osmolar radiological contrast media in reducing the incidence of adverse reactions (21 July, p 188). The reduced cardiotoxic activity of these media is probably the main factor leading to a reduction in severe and fatal reactions.

While there is some evidence to suggest that these media are also likely to lead to a lower incidence of "allergic like" phenomena they are not entirely devoid of this activity. Indeed, I have heard of several such reactions, including delayed ones, after low osmolar media.

Professor Grainger mentions steroid prophylaxis and suggests that it could be used in patients at high risk receiving conventional ionic contrast media. I believe that even with the new low osmolar media there is still a case for considering steroid prophylaxis in certain patients at higher risk—for example, asthmatic patients and those who have had a previous serious reaction. Sodium cromoglycate may also have a place in prophylaxis.

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Leptospirosis in cattle and man

SIR,—We have recently reported two cases of human infection with *Leptospirosis interrogans* serovar *hardjo*¹ which were remarkably similar to those described by Dr R J C Hart and others (30 June, p 1983). Two male dairy cattle workers presented with a flu like illness associated with severe frontal headache and meningism. Although they both milked the same herd, their infections occurred five years apart. A serological survey of the herd performed after the second case showed that one third of the animals had evidence of *L hardjo* infection. Both patients recovered, although only one received antibiotics.

A review of published accounts produced only two other cases of *L hardjo* meningitis in which cerebrospinal fluid cell counts were reported.² Dr Hart and others' second patient did not have meningism, and the findings in the cerebrospinal fluid would be in keeping with a traumatic lumbar puncture rather than meningitis. The reported findings in the cerebrospinal fluid in *L hardjo* meningitis (table) are likely to be similar to those in other forms of leptospiral meningitis. Despite

Findings in the cerebrospinal fluid of patients infected with *Leptospirosis interrogans* serovar *hardjo*

Day of illness	Protein (g/l)	Cell count/ μ l (polymorphonuclear leucocytes, lymphocytes)	Reference
5	400	213 (32/68)	2
7	300	230 (50/50)	2
7	750	523 (pmn + lym)	1
8	803	244 (75/25)	1
8	not given	330 (9/91)	BMJ (30 June, p 1983)
6	not given	6 (3/3) + 240 red blood cells	BMJ (30 June, p 1983)

meningism the cell count may not rise until the fifth day of the illness after which a rapid polymorphonuclear response is seen.³ Over the next week the cell count becomes predominantly lymphocytic. Cerebrospinal fluid cell counts must therefore be interpreted in relation to the duration of the illness. Since *L hardjo* infection in cattle seems to peak at the same time (autumn) as enteroviral meningitis in man misdiagnosis may be common in this occupational group.

Although antibiotic treatment of leptospirosis is controversial, Mackay-Dick's extensive but uncontrolled studies in Malaysia showed that early and high dose intravenous benzylpenicillin dramatically reduced morbidity.⁴ While reports on the use of amoxycillin are only anecdotal, doxycycline has been shown to be effective in both the prophylaxis and treatment of leptospirosis.^{5,6} *L hardjo* was not one of the serotypes causing infection, but doxycycline did reduce the duration of illness, severity of symptoms, and occurrence of leptospiruria. Furthermore, as some patients may unpredictably go on to develop jaundice and renal failure and then die⁷ we suggest that doxycycline treatment be considered in those at occupational risk with appropriate symptoms.

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¹ Shaunak S, Brettle RP, Inglis JH, Holmes L. Leptospirosis. *Communicable Diseases Report (Scotland)* 1984;18 No 16:7-9.

² Sakula A, Moore W. Benign leptospirosis: First

reported outbreak in the British Isles due to strains belonging to the *Hebdomadis* serogroup of *Leptospira interrogans*. *Br Med J* 1969;i:226-8.

¹ Carghill WH, Beeson PB. The value of spinal fluid examination as diagnostic procedure in Weil's disease. *Ann Intern Med* 1947;27:396-400.

² Mackay-Dick J. Some aspects of leptospirosis in the jungles of Eastern and Western Malaysia: A hazard of military significance. Edinburgh: University of Edinburgh, 1969. (MD Thesis.)

³ Takafuji ET, Kirkpatrick JW, Miller RN, et al. An efficacy trial of doxycycline chemoprophylaxis against leptospirosis. *N Engl J Med* 1984;310:497-500.

⁴ Bruce J, McClain L, Ripley Ballou W, et al. Doxycycline Therapy for Leptospirosis. *Ann Intern Med* 1984;100:696-8.

⁵ Waitkins S. Laboratory diagnosis of leptospirosis. *Laboratory Technology* 1983;178-84.

SIR,—Since you published our report of an outbreak of leptospirosis in cattle and man (30 June, p 1983), our attention has been drawn to the report of an outbreak due to strains belonging to the *hebdomadis* serogroup by Dr Alex Sakula and the late Dr William Moore, which you published in 1969.¹ Four stockmen working on two dairy farms in Surrey developed aseptic meningitis with serological evidence of infection by the *hebdomadis* subgroup, and 15 out of 20 random serological samples from the cows showed antibodies to the *hebdomadis* subgroup. Several abortions occurred in the cattle. Blood from the only two fetuses examined contained antibodies to the *hebdomadis* subgroup.

Serological investigations have become more specific since this paper was written. We consider it likely that the organism involved was *Leptospira interrogans* serogroup *Hebdomadis* serotype *hardjo* and the similarity of this report of the first outbreak in the British Isles to the one we described should have been mentioned in our paper.

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¹ Sakula A, Moore W. Benign leptospirosis: first reported outbreak in the British Isles due to strains belonging to the *Hebdomadis* serogroup of *Leptospira interrogans*. *Br Med J* 1969;i:226-8.

How might we improve surgical services for rural populations in developing countries?

SIR,—I worked as a surgeon in the rural and semirural areas of eastern India as well as a teacher of one of the biggest medical institutions (Prince of Wales Medical College and Hospital, Patna), and I fully agree with Professor Samiran Nundy (14 July, p 71-2) about surgical neglect in villages and the inconvenience to the poor villagers when they have to come to town for treatment. But I cannot agree with the rest of his article.

In India health centres in villages already exist but they are far below the standard necessary to carry out caesarean sections and similar operations. Patients are not educated (or motivated) enough to come forward early for treatment, there are no proper arrangements for anaesthesia, asepsis, and sterilisation, and if anything goes wrong the local politicians make a big fuss.

The solution to the surgical neglect is not to produce a "new kind of doctor" who will try to tackle the surgical problem in the village under the most inconvenient, undesirable, and dangerous circumstances. What is needed are

improvements in doctors' working conditions in the villages, better communications and power supplies, more health education and literacy (specially among women), better nutrition, and more disease prevention and health promotion. Already there are many surgically trained doctors who would be willing to work in the villages if adequate conditions existed.

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SIR,—I accept that many patients requiring surgery in rural India (including infants with congenital abnormalities) are not dealt with quickly (14 July, p 71). But India has enough facilities at all levels, and the real problems are: (a) health education, letting the rural community know that surgical aid is available; and (b) organisation to get the patient to the surgical centre.

The three tiers mentioned by Professor Samiran Nundy must be modified. The lowest first tier is not the primary health centre for 100 000 people but the subcentre for 5000 and the health post for 1000. In a project in Tamil Nadu (South India) where the permanently resident housewife manning a health post has been given adequate health education and the right to refer patients there is increasing attention to surgical problems.

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Medical education

SIR,—There have been several comments on our open letter to the General Medical Council (19 May, p 1507), and this reply cannot do justice to them all. It will, instead, reiterate the essentials of our argument and correct a misunderstanding.

We see the two years after qualification as crucial in preparing doctors for the medicine of the future. Until this stage is effectively organised it will not be possible to achieve in the undergraduate years a satisfactory balance between training and that "critical study of principles and the development of independent thought" repeatedly advocated by the General Medical Council. The Medical Act of 1978 has provided the opportunity for organising this stage by giving the council responsibility for coordinating all stages of medical education.

The current proposals of the council have as their aim "a broad education beyond the stage of graduation and into the period when the qualified doctor is assuming responsibility for patient care." This aim, in our opinion, is right, but it is unlikely to be achieved under the title "basic specialist training" or without more clearly defined educational objectives for these years. We also need an organisation capable of resisting in the name of education the pressures of service and of premature specialisation.

We suggest that there should be three broad aims for this period. It should enable the graduate:

(1) To take a share under supervision in caring for a wide range of illnesses and people—an experience much less available to medical students today than in the past. This will help the graduate understand people as well as diseases and medicine.

(2) To review the knowledge and skills acquired during the undergraduate course in the light of growing clinical experience and so to identify gaps and weaknesses.

(3) To study through formally organised learning and teaching those problems which

become fully meaningful only when the house officer has begun to experience a doctor-patient as opposed to a doctor-student relationship. Therapeutics, communication, and team work are examples.

More than one respondent interpreted "formally organised teaching" to mean lectures and formal assessments (one writer thought that we wanted classified honours examinations at postgraduate level). We failed to make clear that we are not advocating lectures any more than one to one or group discussion. We are not pressing for any particular method of teaching, but only that it should be formally organised so as to ensure that house officers are given adequate time for an education which relates closely to their current experiences. Dr Trisha Greenhalgh (2 June, p 1689) makes the need for this poignantly clear. Nothing less than organisation, at national, regional, and local levels, pursuing clear objectives will compete with forces which currently defeat the efforts of graduates to gain full value from whatever education is now available to them in those years.

We realise, of course, that effective organisation of this important stage of education is not going to be easy, but it should not add a day to the total length of preparation of any doctor. We can see no reason why it should be any more difficult or costly to provide the general professional training which we suggest than the basic specialist training proposed by the General Medical Council.

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Private rest homes

SIR,—Following Dr Keith Andrews's article (19 May, p 1518) I have been looking at all the private rest homes in the catchment area of the Royal Liverpool Hospital—that is, an inner city area.

There are nine registered homes in the area, and all except two (which were opened in 1981 and 1983) were opened in the late '50s and early '60s. As in Manchester the homes are small (average 15 residents) and most of the residents (90%) are women (mean age 80). The average costs for a week are lower than in Manchester—£93 single and £91 shared as opposed to £131 single and £120 shared in Manchester. Five of the homes would not accept residents with wheelchairs or those who were incontinent, and one would accept neither confused people nor those with dressing difficulties. Nevertheless, residents often subsequently became confused, incontinent, or both, and they are not usually asked to leave.

The care attendant to resident ratio was lower in Liverpool than Manchester—the average for the day was 0.18 and for the night 0.06 as opposed to 0.3 for the day and 0.16 for the night in Manchester. The staff was mostly untrained, although many problems arise that require nursing skills. The facilities and activities offered are similar to those in Manchester, and 40% of residents came direct from their homes without any assessment. Eight of the homes advertised (in *Yellow Pages*, *Police Gazette*, etc), and 39% of the residents were funded by the DHSS. None of the homes had a room specifically for residents and their visiting relatives to be alone.

My impression of the homes was that they varied greatly—three are homely places, clean and warm, where personal possessions are encouraged and where there appears to be