surveillance could achieve, were published only six months ago and their effectiveness cannot yet be estimated. The fact that the Committee on Safety of Medicines virtually requires such studies to be conducted on new chemical entities indicates that it has some faith in them, which must not be undermined by Professor Langman's comments.

F O WELLS

Association of the British Pharmaceutical Industry, London SW1A 2DY

1 Joint committee of ABPI, BMA, CSM, and RCGP. Guidelines on postmarketing surveillance. *Br Med J* 1988;**296**:399-400.

The MD and MS degrees in Britain

Quite independently of the survey by Dr I C McManus (9 July, p 115) I have been preparing an invited chapter on the construction of theses from the results of a questionnaire sent to the academic surgical departments of all 18 universities in the United Kingdom. When there were several such departments in a single city I chose only one. My intention was to discover the options open to a graduate (MB, FRCS) who sought to obtain a higher degree in surgery. I collated replies referring to a master of surgery degree (MS, MChir, or equivalent) and all those referring to a doctor of medicine degree (MD) only when an MS was not available. The table shows the results.

Appointments committees have generally come to assume that not only is an FRCSEd equivalent to an FRCS, but an MD in Newcastle is no different from a ChM in Bristol. Do the contents of the table endorse this idea?

I should hesitate to suggest that some universities are offering softer options than others, but certainly some degrees are constructed in such a way that they are more hazardous to attempt; compare the multiple safeguards organised by Dundee with their paucity at Nottingham.

In their covering letters returning the questionnaires professors of surgery in the United Kingdom were divided on the place of supervision in the MS degree. About one third said that they were proud that the MS is unsupervised and said that this makes it a really "senior" degree. Another third operated a varying amount of supervision. The remaining third indicated that they were increasingly unhappy about the lack of supervision for the MS degree, which, with the increasing complexity of research science, was erecting an inappropriate hurdle for even the best surgical trainees.

A strong case can be made for the proposition that no senior trainee, already a fellow of one of the royal colleges of surgeons, should have to submit to examiners who do not themselves hold the qualification for which they are examining. If the content of work is so obscure or laboratory based that two masters of surgery cannot be found to examine it surely the title should not be accepted for the degree of MS and the candidate should be encouraged to attempt an MD or PhD?

It is hard to see how any academic institution can justify the total lack of an appeals procedure for something as important and as multifactorial as a thesis for a higher degree. Judgment must be at least partly subjective, and two people should not be placed in a position to destroy several years' work with no redress and, as in one university, be able to do so completely anonymously.

Many trainees find themselves in a position to choose between at least two universities when submitting a thesis for a higher degree: their university of origin and the place where the work was carried out. At present such candidates would do well to study the table closely.

M J KELLY

Leicester General Hospital, Leicester LE5 4PW

Skeletal effects of oestrogen and testosterone in postmenopausal women

Though the title of the impressive paper by Mr M Savvas and others (30 July, p 331) refers only to the skeletal effects of oral and implanted oestrogens, I am somewhat surprised that they provide no information on adverse effects associated with the treatments beyond a reference to the absence of evidence (not itself provided by the authors) of harmful effects of hormone implants on blood pressure, coagulation of blood, and glucose tolerance. Symptoms of oestrogen deficiency—for example, hot flushes, vaginal dryness, and so on—must have been more frequent in the control group. Were they absent in both treatment groups? What was the prevalence of osteoporotic fractures in the three groups?

Aside from these rather fundamental questions, it is well known that oestradiol implants are not universally well tolerated for various reasons, and hormone implants sometimes extrude; furthermore, it would be surprising if none of the women receiving implants of 100 mg testosterone every six months experienced unwanted androgenic effects such as acne, increased growth of facial and body hair, and even deepening of the voice, which unlike the other effects is irreversible on stopping treatment.

It therefore seems an important omission not to have recorded the total population from which each of the treatment groups was drawn, the prevalence of adverse effects, and the numbers withdrawing from treatment because of such effects. Mr Savvas and others comment on the not infrequent occurrence of non-compliance by women given oral hormone treatment; for the women given implants they say nothing about non-compliance due to failure to return for reimplantation. Surely this must have occurred sometimes? Though the authors provide clear evidence of the superiority of implants over hormones given orally in maintaining postmenopausal bone density, without information on the above mentioned matters it is difficult to form an opinion of the overall superiority, in practice, of one method over the other.

G I M SWYER

London NW3 6PD

Mr M Savvas and others claim that subcutaneous oestrogen implants for osteoporosis provide "more physiological (premenopausal) serum oestradiol concentrations" than oral conjugated oestrogen preparations, although this is not confirmed by their data (30 July, p 331).

After the implant of oestradiol 50 mg ("rarely 75 or 100 mg," numbers not provided) combined with testosterone 100 mg (origin not provided) the mean serum oestradiol concentration was 725 pmol/l (range 372-2370) compared with 170 pmol/l (30-651) during Prempak C or Cyclo-progynova treatment (doses not recorded). The normal ranges for serum oestradiol in premenopausal women are: follicular phase 110-440 pmol/l; midcycle 550-1300 pmol/l; luteal phase 365-770 pmol/l. Therefore oestradiol values after subcutaneous implants were generally substantially higher than those in the normal follicular phase, approximating to mid-cycle peak values or above. Physiologically mid-cycle peak values may be maintained for 24-36 hours each 28 days but not continuously. The contribution to circulating oestradiol concentrations from the conversion of testosterone was not determined nor were data offered on the effect of testosterone or dihydrotestosterone in increasing bone density. The total serum testosterone concentrations after the implant were surprisingly lower than those reported previously with similar doses of oestradiol and testosterone (Organon Laboratories Ltd), when values of 0·9-6·8 nmol/l (normal 0·7-2·8) were recorded over six months.[1]

Since patients with osteoporosis may receive sex hormone replacement treatment for 40 years and oestrogens are linked with malignant breast disease, it will be essential to define for an individual the minimum effective dose of sex hormone replacement treatment (*a*) for long term safety and (*b*) to protect and stimulate the skeleton, while (*c*)

MS and MD degrees in the United Kingdom. When both degrees are available data refer to MS degree

University	MS	MD	Title acceptance required	Detailed outline needed	Published work acceptable	Examiners' names secret	Examiners have MD or MS	Warning of problems with thesis before oral	Clinical examination	Appeal mechanism	Supervision
Aberdeen	+	+	+	+	+	Not formally notified	–	–	–	+	–
Belfast	+	+	+	+	+	–	–	+	–	+	–
Birmingham	–	+	+	+	+	Till afterwards	–	–	–	+	+
Bristol	+	+	+	+	+	Till oral	–	–	Occasionally +	+	Adviser
Cambridge	+	+	+	+	+	+	–	+	+	–	–
Cardiff	+	+	+	–	+	–	+	+	–	NK	–
Dundee	+	+	+	+	+	Till oral	+	+	–	+	+
Edinburgh	–	+	+	+	+	+	–	+	–	+	Adviser
Glasgow	–	+	–	–	+	+	–	+	–	+	–
Leeds	+	+	+	+	+	–	+	+	–	+	–
Leicester	–	+	+	+	+	–	+	+	–	–	–
London	+	+	+	–	+	Varies	+	–	–	+	Own professor
Manchester	+	+	+	+	+	+	+	+	–	NK	Adviser
Newcastle	–	+	–	–	+	+	–	–	–	+	–
Nottingham	–	+	–	–	–	–	–	+	–	–	–
Oxford	+	+	+	+	+	Till oral	–	–	+	+	–
Sheffield	+	+	+	+	+	+ Or at oral	–	–	Occasionally +	+	–
Southampton	+	+	+	+	+	+	+	–	–	+	–

NK = Not known.

relieving the symptoms of the postmenopausal syndrome. Meanwhile, perhaps it would be wise to maintain circulating concentrations of oestradiol above 150 pmol/l, since this has been shown to relieve the postmenopausal syndrome and arrest bone loss,[2] but below 440 pmol/l. Such an approach may enable the maximum clinical benefit to be obtained from replacement treatment with the minimum of risk.

C H MORTIMER
W PERRY

Osteoporosis and Menopause Clinic,
Endocrine and Dermatology Centre,
London W1N 1AH

1 Thom MH, Collins WP, Studd JWW. Hormonal profiles in postmenopausal women after therapy with subcutaneous implants. *Br J Obstet Gynaecol* 1981;88:426-33.
2 Selby PL, Peacock M. Dose dependent response of symptoms, pituitary, and bone to transdermal oestrogen in postmenopausal women. *Br Med J* 1986;**293**:1337-9.

Defence subscriptions for general practitioners

The imminent approval by the Department of Trade and Industry of the Medical Practitioners' Defence Society has raised the spectre of the first crack in the longstanding common rate structure for medical liability insurance in Britain. The plan presumes that the apparent saving to individual general practitioners of over £300 on current rates will induce them to desert their defence societies, with a consequent increase in the burden falling on hospital doctors, particularly those in specialties at high risk of litigation.

The question of whether the size of this saving is more apparent than real has not been raised. Given the complexity of the present reimbursement arrangements many general practitioners may be forgiven for failing to realise that existing subscriptions are recognised fully in the calculation of expenses in the pay review system. The estimate of allowable expenses on which the pool is calculated reflects the actual expenditures of a representative sample of general practitioners. Any move towards lower expenditures on liability insurance will reduce the size of the pool. If all general practitioners were to insure at the lower rate their reimbursable expenses would be reduced by the same amount as their apparent saving. Any individual gain from a change of insurer is likely to be short term if present arrangements continue.

General practitioners may wish to balance this transient advantage against the other benefits of defence society membership, particularly the quality of advice and representation available for other legal matters such as General Medical Council or family practitioner committee hearings or disputes over contracts. If enough of them do so it may upset the nice calculations of the new insurers.

PAUL FENN
ROBERT DINGWALL

Centre for Socio-Legal Studies,
Wolfson College,
Oxford OX2 6UD

CHRIS HAM

Kings Fund Institute,
London NW1 7NF

Achieving a balance

The impact of the Joint Planning Advisory Committee's intention to reduce the number of career registrars is likely to differ considerably between specialties. We have a special concern about its effect on the provision of cardiological services.

We sought to gain some idea of cardiology registrars' present contribution to the clinical service by sending a questionnaire to 23 registrars in 11 specialist NHS centres that were selected as being representative of the United Kingdom. The questionnaires were for completion during the week beginning 9 May 1988, and registrars currently in research appointments were not approached. Each registrar was asked to state which of 24 defined categories of activity occupied each of the 168 hours (to one place of decimals where appropriate).

The 21 completed returns (two registrars were on leave) showed an average of 92·3 hours on duty or on call, of which 64·4 were spent in hospital. An average of 17·5 hours were taken up with technical tasks including cardiac catheterisation, pacemaker implantation, and emergency procedures. Inpatient work occupied 20·3 hours, outpatient clinics 8·0 hours, and clinical administration 7·7 hours, leaving 7·2 hours for training, teaching, and research and 3·0 hours for sustenance, relaxation, and informal discussion.

Registrar posts are intended for training, whether for NHS or academic medicine. Training, particularly in cardiology, requires much practical experience, added to which the opportunity for interpolated research appointments must be provided. From these findings it seems that cardiology registrars are making a considerable and appropriate contribution to the specialist workload. There is little spare capacity in our cardiac units now. The proposed reduction in the number of career registrars would have a considerable effect on clinical throughput unless they were adequately replaced—in terms of numbers and calibre appropriate for such demanding work. On present plans and projections this will not be achieved, and the inevitable results will be a damaging reduction in the clinical service.

A H HENDERSON
M D JOY
D A CHAMBERLAIN
G E SOWTON

Council of the British Cardiac Society,
London NW1 4LB

Crisis in the maternity services

Ms Marion Hall is right to highlight the crisis in midwifery staffing (20-27 August, p 500). Unfortunately, like the vast majority, she is under the impression that the new clinical grading structure offers an opportunity finally to award midwives a salary commensurate with their additional training and clinical responsibility.

Since the review body pay award midwives have found themselves trying to slot their role into a pay scale based on nursing. There is no recognition for the fact that midwives require an additional qualification to enable them to become practitioners in their own right. Most midwives will find themselves only slightly or no better off after regrading. In comparison, a district nurse, who is not a practitioner in her own right and can achieve this position much more quickly, may well find herself on a higher grade than the midwife, including the community midwife.

Recruitment of student midwives will be affected because once the student midwife becomes a qualified midwife her salary will equal that of a newly qualified nurse, regardless of her previous service and experience with the NHS. Morale and staffing levels are already low, and the new clinical grading structure can only make them worse. Ms Hall says, "Paying midwives more will not be enough," but it would be a step in the right direction.

JANE E O'HARA

Liverpool L30 7PP

Children and apartheid

In the past I have heard community medicine defined, somewhat cynically, as the use of medicine for political ends. Dr Naomi Richman's personal view "Children and apartheid" (13 August, p 495) suggests that this role has now been taken over by psychiatry. Although she says that the Psychiatric Association of South Africa maintains "silence on these issues," Professor Ben-Arie and others have made it clear that the Society of Psychiatrists of South Africa is strongly critical of the psychiatric aspects of apartheid.[1] Presumably its members are included among those "Doctors, psychologists, and others who . . . put their jobs, and even their lives, at risk," and for my part I believe that they deserve our professional support in their struggle to help those with mental disorders, not ostracism.

T L PILKINGTON

Cawood,
North Yorkshire YO8 0TP

1 Ben-Arie O, Nash ES, Gillis LS. Academic boycotts of South Africans. *Br Med J* 1986;**293**:1370.

Computer viruses

Computer viruses have recently become a popular topic for discussion (23 July, p 246; 6 August, p 432; 13 August, p 488), but I have not yet seen a full description in a medical journal of the many forms of destructive computer software, other than viruses, which also exist.

Although they have received much attention and are potentially serious, computer viruses are rare. Much more common are "bugs" or unintended side effects. Many programs have subtle coding errors which may come to light only after many years of satisfactory use and others are not compatible with certain forms of hardware. I have erased my personal computer's hard disk twice through this form of incompatibility. Secondly, there are programs known as "Trojan horses" which claim to perform one task but which actually do something else (possibly as well as their stated function). These programs do not spread themselves from disk to disk but rely on a human vector. Finally, there are the true viruses. Viruses tend to lie low before becoming active, and Trojans may do the same. It is this feature which makes them dangerous and which may cause Minerva problems.

Minerva sets out a good set of directions to protect her computer from malicious code (p 432) but fails on one important point. It is virtually impossible to ensure that a disk is free of viruses or Trojans, and that uncertanty extends to the backup disks, so her plan of "sterilisation and reseeding" may only reinfect her system. The only sure way to avoid viruses is to avoid the use of resident code store—that is, suspect software should be run on a computer which has neither a hard disk nor much battery backed random access memory, and this computer should be switched off (not just reset) after finishing with the program.

I would also like to take issue with Dr John Croall (p 488): although it is theoretically possible for a virus or any other program to arise by random substitution, the chances of such an event are astronomically remote. In an effort to understand viruses and vaccinate my system I attempted to write my own (benign) virus. This required considerable effort. I estimate the shortest possible IBM personal computer virus to be 97 bytes long. If everyone on earth had an IBM personal computer and seeded all its memory with random values once every nanosecond this virus would be generated once every 10^{212} years. Even if this figure is out by a factor of a billion billion I will still sleep easily in my bed tonight. The assertion that viruses might arise de novo is guaranteed only to provide ammunition for various anticomputer factions.

PATRICK J R HARKIN

Department of Pathology,
University of Leeds,
Leeds