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.

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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.

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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.

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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.

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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.

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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.

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