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● *All letters must be typed with double spacing and signed by all authors.*

Peaks and troughs in demands on hospitals

SIR,—Some of the alleged "inefficiencies" of the National Health Service may be, paradoxically, the direct effect of the so called "efficiencies."

The authors of performance indicators were at pains to point out that they should be used to promote a questioning of current practice but should not be used as targets. Recently the Secretary of State was quoted as having contrasted two surgical departments with turnover intervals of one and three days, suggesting presumably that the former was performing better than the latter, yet such an analysis takes no account of the capacity to accommodate emergencies.

Although clinicians have always been aware of the peaks and troughs in demand for their services, this phenomenon appears to have attracted little attention from planners and managers. While some specialties such as ear, nose, and throat surgery and ophthalmology have only modest demands made on them by emergencies (less than 20% of all admissions), others are heavily committed to providing emergency services. In Ipswich about 90% of all medical admissions are "immediate," as are nearly 50% of general surgical cases, and in traumatic and orthopaedic surgery the figure is over 60%.

In these three specialties we looked at the distribution of daily emergency admissions. In general medicine the daily average was 13 (range 1-30, SD 3.6); in general surgery 9 (range 1-20, SD 2.94); and in traumatic and orthopaedic surgery 4.4 (range 1-11, SD 2.13).

The frequencies showed roughly normal distributions so it was reasonable to conclude that unless the general medical department planned to carry 16 empty beds at the beginning of each day it would be unable to accommodate its emergency demands on a third of occasions (the mean + 1 SD), which means, of course, having to "borrow" beds about twice a week. If, however, the department has 21 empty beds it will be in difficulty only about one day in every three weeks. Similarly, general surgery should plan its work to carry 15 empty beds to cope with emergencies on all days except one every three weeks, and in trauma and orthopaedic surgery nine beds would be needed to

meet the same standard. Failure to appreciate this results in frequent cancellations of elective procedures at very short notice since emergencies have to be dealt with at once.

In obstetrics we have an average of about 10 births a day, but an examination of the number of births notified each day during a single month showed as few as two and as many as 19. The mean was just under 11 (SD 3.8). Thus unless the unit is of sufficient size and is staffed and equipped to cope with 15 births a day it will fail to meet demands more than once a week.

Unless more attention is given to the fluctuating demands on those clinical departments which deal with large numbers of urgent cases and less given to securing the highest possible throughput the service to patients will deteriorate, and the pressures on medical and nursing staff will become increasingly intolerable. It is, of course, true that for every peak there is a trough, and there would be an apparent underuse of hospital beds, but it is the compensatory pauses in hospital activity that allow the services, and indeed the staff, to recuperate sufficiently to maintain high standards of care.

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Should the pill be stopped preoperatively?

SIR,—I could not disagree more with the conclusion of Mr H Sue-Ling and Professor L E Hughes (13 February, p 447) that "the pill should not be withheld from young women who require abdominal operations." As the author of your earlier leading article¹ I submit that the moderate policy proposed both there and in the *British National Formulary*² is rational (comparing known risks against benefits), prudent ("primum non nocere"), and practical, despite the problems of "our stretched health service."

My recommendations were that combined oral contraceptives should be discontinued four weeks (not six weeks) before major elective surgery or

surgical procedures to the legs and that when discontinuation was not possible subcutaneous heparin should be considered. Deep venous thrombosis and pulmonary embolism are potentially fatal. The onus of proof is on those who seek to change a widely accepted policy. Absence of evidence is not evidence of absence, and there is evidence, some of it in the references selectively quoted by the authors.

It is undisputed that: (a) major surgery increases the risk of postoperative deep vein thrombosis and pulmonary embolism; (b) associated prothrombotic changes occur³; (c) the older higher oestrogen combined pills increased the risk of idiopathic deep vein thrombosis and pulmonary embolism by a factor of 2 to 11^{3,4} and postoperative deep vein thrombosis and pulmonary embolism up to sixfold^{3,4}; and (d) there are potentially synergistic prothrombotic changes in the blood of women using every marketed combined pill.^{4,6} Mr Sue-Ling and Professor Hughes have faith in the modern low oestrogen pills, but how much better they are is unknown. The risk ratio of 11 for deep vein thrombosis and pulmonary embolism among users of such pills in a very recent study suggests that the problem has not gone away.⁷

It seems imprudent avoidably to put together two risks—major surgery and oestrogen consumption. Moreover, there is an undiagnosed group with procoagulopathies such as hereditary protein C deficiency. If the routine policy of discontinuing the pill perioperatively were abandoned the consequences for them could be fatal.

Absence of statistical significance in Vessey *et al*'s 1986 paper⁸ does not mean absence of risk: indeed, their risk ratio estimate² is probably about right. The attributable risk is not negligible, at about 1 in 1000 cases of postoperative deep vein thrombosis and pulmonary embolism in current users per month.⁴

The low incidences in the first two¹²⁵I fibrinogen scanning papers^{9,10} quoted may be due to exceptional features (known and unknown) of the populations studied. Tso and others⁹ quote several references for their statement that deep vein thrombosis and pulmonary embolism "seldom occur in

the Chinese." But despite the low local background risk table I of their report supports my case: a significant 10-5% of leg scans were positive after major surgery for benign conditions in those taking the pill (excluding the minilap sterilisations), not 4-6% as quoted. Among those not taking the pill there was not a single postoperative positive ¹²⁵I fibrinogen scan for deep vein thrombosis in that study or in the London study, which showed a 20% rate in those taking the pill. Sagar *et al* concluded, "Women on oral contraceptives constitute a high risk group for postoperative thromboembolism."¹¹

Mr Sue-Ling and Professor Hughes rightly emphasise the other side of the risk-benefit equation—unwanted pregnancy. But given a United Kingdom maternal mortality of less than 1 in 10 000¹² it is far from obvious that more women would die. Moreover, the choice implied is not correct: it is not "the pill" or "unwanted pregnancy." There are other effective methods, including injectable contraceptives, such as medroxyprogesterone.¹ At the Margaret Pyke Centre we now routinely offer this (with counselling). One or more injections each lasting three months will cover the time on any waiting list. The oral contraceptive may be resumed two or more weeks after surgery without regard to the time of the last injection. Progestogen only pills also do not increase the risk of deep vein thrombosis and pulmonary embolism and have a failure rate above age 35 of less than 1 per 100 woman years.¹³

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SIR,—We agree with Mr H Sue-Ling and Professor L E Hughes (13 February, p 447) that epidemiological studies showing an association between the combined oral contraceptive and venous thromboembolism can be criticised both for their methods and because the diagnosis of thromboembolism was made clinically.¹ Case-control and cohort studies, however, have almost uniformly found a positive association between the combined oral contraceptive pill and idiopathic venous thromboembolism. Furthermore, morbidity due to venous thromboembolism fell after the introduction of low dose oestrogen pills and the concomitant reduction in the use of higher dose pills.²

Venous thrombosis is the result of blood coagulation and fibrin deposition in the presence of venous stasis. The incidence of spontaneous and postoperative thromboembolism is unknown. One study has shown that 20% of women taking the combined pill developed a deep venous thrombosis, diagnosed by ¹²⁵I fibrinogen scans, after surgery.³

The new combined pills containing 30 µg ethinylloestradiol together with the latest "third generation" progestogens (desogestrel or gestodene) alter the coagulation system, although to a lesser extent than older, higher dose formulations.⁴ We have shown recently that triphasic combined oral contraceptives containing ethinylloestradiol (mean dose 32.4 µg) in combination with either levonorgestrel (mean dose 92.4 µg) or gestodene (mean dose 78 µg) induced prothrombotic changes which were apparent after the first treatment cycle and were consistent over the six cycle study period. Both these preparations induced increases in biological activities of procoagulant factors VII, X, XII, and fibrinogen and decreased activity of antithrombin III compared with pretreatment levels ($p < 0.05$ to $p < 0.001$). Furthermore, protein C activity remained unchanged. It is well documented that decreased antithrombin III or protein C activity is associated with thromboembolism. Our findings indicate that the procoagulant factor increases induced by oral contraceptives are not balanced by increased biological levels of the two most important coagulation inhibitors—antithrombin III and protein C. The extent to which these changes are balanced by changes in the fibrinolytic system is unknown.

Venous thromboembolism is life threatening, causes long term morbidity, and has serious implications for future pregnancies. When major surgery is planned the combined oral contraceptive pill should be stopped four to six weeks preoperatively and an alternative method of contraception provided. This will enable the changes in the coagulation system to revert to normal and thereby not add to the risks of thromboembolism already present. In view of the morbidity and mortality associated with thromboembolism, we recommend prophylaxis with subcutaneous heparin when major surgery is unavoidable while a woman is taking the combined oral contraceptive pill. Surgery such as laparoscopy, dental extraction, and tonsillectomy, however, where the woman is mobile immediately, does not necessitate any alteration in contraceptive practice.

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SIR,—We would like to confirm the comments of Mr H Sue-Ling and Professor L E Hughes on the risk of pregnancy caused by the advice to stop oral contraceptives before surgery. We have a practice of 14 000 patients and in the past year two 19 year old unmarried women have become pregnant after being told to stop the contraceptive pill before surgery. The first underwent a nephrectomy and the other shaving of an exostosis of the clavicle.

They both conceived despite being advised to use other contraceptives until they had restarted the pill.

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Personal computers in the Third World

SIR,—Our experience of using a personal computer in administration, teaching, and research in a university teaching department in the Third World is similar to that of Drs I H Wilson and D A K Watters (23 January, p 255). We too have used a BBC model B for three years, and it has broken down only once. This reliability may be due to the extra protection of a spike suppressor plug. A printer that allows single sheet printing saves us buying expensive fanfold computer paper, and a printer ribbon reinking machine (Computer Friends, USA) makes the cost of a ribbon negligible. Surprisingly, we find it cheaper, and sometimes quicker, to order equipment from British retailers.

We put our machine to many uses. A spreadsheet for examination marks has eliminated tedious calculation of totals and averages. Students use a self teaching program developed by the University of Leeds which we have modified slightly to help those with poor English. It is very popular as students prefer to make silly mistakes with an impersonal computer rather than in a tutorial. A program for marking multiple choice question papers is very useful. It used to be almost impossible to prepare a correctly typed multiple choice question paper, but now it is made "word perfect" on the word processor and the stencil is cut on the dot matrix printer. The script of transparencies for overhead projection is fed into the word processor, printed in enlarged type with a special chip (PMS Multifont), and then photocopied on to the transparency. The transparency can be wiped clean and reused while the scripts are stored on the disk. We use a large capacity database (System Delta) for our drug audits. The students themselves enter the data, a useful first step in becoming computer literate. Calculation of pharmacokinetic variables is done using specially written software.¹

We have had no formal training but have found a user group (BEEBUG) and its magazine very helpful. The biggest barriers to wider acceptance of computers in medicine in Sri Lanka appear to be "technophobia" and the misconception that using computers means learning computer programming.

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Carbon monoxide poisoning

SIR,—Drs T Meredith and A Vale (9 January, p 77) emphasise the importance of treatment with hyperbaric oxygen in the prevention of serious neuropsychiatric complications of carbon monoxide poisoning. This treatment is itself dangerous as reactive oxygen metabolites worsen the tissue damage of anoxia on subsequent reoxygenation. An increased rate of auto-oxidation, lipid peroxidation, and formation of superoxide and hydrogen peroxide mitochondria have been shown