Hinchingsbrooke Hospital opened at the end of 1983 as a new unit in a new health district. Our obstetric and gynaecological staff comprise four consultants and four general practice trainee senior house officers, and in 1987 we had 2008 deliveries. Like Mr Samra's unit, we have the lowest perinatal mortality rate in our region, 5.2 per 1000 (uncorrected) based on the 7015 deliveries in 1984-7. Neonatal intensive care is available on site, also "two tier"; we do not transfer high risk cases elsewhere. In these four years our caesarean section rate was 13.7%, 6% elective and 7.7% emergency; our vaginal instrumental delivery rate was 5.2%. Thus it appears that, neglecting possible population differences, we plan rather more elective caesarean sections than are planned in Mr Samra's unit but perform proportionately less than half the number of instrumental deliveries, probably because, without intermediate grade medical staff, our midwives enjoy greater freedom of practice.

No one would suggest that all three tier units should be dismantled immediately and replaced by two tier units, but even in its authors' wildest dreams "Achieving a Balance" cannot live up to its title. Under this plan over half the service posts in the intermediate grade in obstetrics and gynaecology will need to be filled by overseas graduates, brought over usually from developing countries simply to do this work. No other profession runs itself in this way; if a similar staffing structure were suggested for lawyers, teachers, or even general practitioners we as consumers would be horrified. If half Britain's obstetric units converted to two tier working we would be "in balance," with a sound career structure to offer to our aspiring juniors. Overseas visitors could then be treated correctly on a supernumerary basis, as pupils to be taught rather than cheap labour to be exploited.

Certainly, everything in the two tier garden is not fine; much bargaining is still to be done on matters such as staffing levels, free time, and easing of duties once the mid-50s are reached. But we have built a system that is liked by the doctors who work it, the nurses and midwives who support them, and the women who deliver under their care. What we need is for the BMA and the royal colleges to help us improve this system and refine it into an acceptable alternative to three tier working, rather than to pull it down and destroy it.

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Diagnosis of diabetes mellitus: pitfalls in the glucose tolerance test

SIR,—Dr K Wiener (28 November, p 1363) draws attention to the World Health Organisation's criteria for diagnosing diabetes mellitus and raises several important issues which appear to remain unresolved despite the latest recommendations of a study group.¹

The blood glucose response to a glucose load will be influenced by the timing, size, composition, and quantity of preceding food. These influences will be minimised by a suitable period of fasting. No study, however, has adequately examined the influence of the duration of fasting. It therefore seems reasonable to standardise to 10-16 hours, as recommended by the study group.¹ The test should be performed in the morning both for convenience and to avoid the effects of circadian variation in glucose tolerance.²

All laboratories should standardise the glucose load to 75 g (or 1.75 g/kg body weight to a maximum of 75 g for children) as recommended by the World Health Organisation¹ and other authoritative bodies^{3,5} and as emphasised by

Dr Wiener. With regard to anhydrous glucose, as opposed to the monohydrated form, most data have been obtained with 75 g of pure glucose or its equivalent, and this should be adhered to. Thus 82.5 g of the monohydrate would be required to deliver the 75 g glucose load.

We agree with Dr Wiener that the misdiagnosis of diabetes mellitus can have serious implications for the person concerned. In a clinical setting the diagnosis must be corroborated by supporting evidence. A lifetime diagnosis of diabetes mellitus should not be made on the basis of a single abnormal test result alone.¹ The introduction of the intermediate category of impaired glucose tolerance^{3,5} was, in part, designed to achieve this objective. Nevertheless, such individuals are at substantially higher risk for the subsequent development of diabetes.¹

In the epidemiological setting rather different considerations apply. The need for rigorous standardisation becomes paramount; even small, but systematic, differences in the test procedure may result in apparently significant, but spurious, differences between populations in glucose tolerance and in the prevalence of diabetes mellitus. Even taking the glucose load over five minutes, rather than 15 minutes, can make a 1 mmol/l difference in the mean two hour blood glucose concentration.⁶ Of course, if individuals qualifying for the diagnosis of diabetes come to light during epidemiological surveys it is as important to confirm the diagnosis by suitable repeat measurements as it is in a clinical setting.

The World Health Organisation is now preparing a survey manual for the study of diabetes mellitus, which will provide detailed guidance in these matters.

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- 1 World Health Organisation. *Diabetes mellitus*. Geneva: WHO, 1985. (WHO Technical Report Series No 727.)
- 2 Jarrett RJ. Rhythms in insulin and glucose. In: Kriger D, ed. *Endocrine rhythms*. New York: Raven Press, 1979:247-58.
- 3 National Diabetes Data Group. Classification and diagnosis of diabetes mellitus and other categories of glucose tolerance. *Diabetes* 1979;28:1039-57.
- 4 Keen H, Jarrett RJ, Alberti KGMM. Diabetes mellitus: a new look at diagnostic criteria. *Diabetologia* 1979;16:283-5.
- 5 World Health Organisation Expert Committee on Diabetes Mellitus. *Second report*. Geneva: WHO, 1980. (WHO Technical Report Series No 646.)
- 6 Heine RJ, Hanning I, Morgan L, Alberti KGMM. The oral glucose tolerance test (OGTT): effect of rate of ingestion of carbohydrate and different carbohydrate preparations. *Diabetes Care* 1983;6:441-5.

Secretor state of patients with insulin dependent or non-insulin dependent diabetes mellitus

SIR,—Dr P J Lamey and colleagues (12 December, p 1563) presented data contradicting ours (24 October, p 1024). The proportion of non-secretors in their control population (33%) was, however, unusually high for the United Kingdom. As their letter came from a department of oral medicine and

pathology I wonder whether the controls were taken from patients referred for investigation of recurrent oral infection. The authors' group works on oral candidiasis, and we have found a significant increase in the proportion of non-secretors among patients referred to the Edinburgh Dental School for investigation of this condition.¹

The number of patients with diabetes was roughly half the number examined in our study and the number of controls less than a third.

Nevertheless, the same pattern we observed was present in the results they reported: the proportion of non-secretors with type II diabetes was similar to that of the controls and the proportion of non-secretors with type I diabetes increased.

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1 Blackwell CC, Tom FF, Lawrie O, Weir DM, Wray D, Kinane DF. Non-secretion of blood group antigens and susceptibility to oral infections due to *C albicans*. *J Dent Res* 1980;65:502.

Logic in medicine: the role of leads

SIR,—There was a particularly important omission from the Logic in Medicine series (24 October, p 1033): the role of "leads"^{1,2} or "pivots"³ in medical problem solving. Leads are findings associated with a limited list of diagnostic possibilities, which are used to simplify the solution of a diagnostic problem. All diagnostic methods whether they are based on computers or human reasoning depend on this type of problem reduction.

Sometimes the presenting complaint is a good lead—for example, a lump in the neck. More often the initial possibilities are numerous and the diagnostician must proceed systematically in the hope that a better lead turns up: a systolic thrill would have been a good lead in Professor Fergus McCartney's example (21 November, p 1325). This lead can be discarded in favour of a better one in due course—for example, an ejection systolic murmur. Previous and subsequent evidence can then be used to eliminate^{1,2} or prune³ all but one of the possibilities raised by the best lead. The pruning may be done by using single items of powerful information⁴ or by using weak evidence and Bayes's theorem with the independence assumption (21 November, p 1329) or some other mathematical device (28 November, p 1392).

It must not be forgotten that hypothetico-deductive thought (31 October, p 1108) also occurs in clinical diagnosis. This begins by choosing one diagnostic possibility from the lead. The diagnostic term represents what the doctor imagines may be going on (the hypothetico part). The possibility is chased by looking for findings which are common in the postulated diagnosis but rare in at least one of the others. A number of such items may thus complement each other by eliminating or "refuting," but not usually completely, all but one of the initial possibilities (the deductive part). This chasing of a diagnostic possibility can be done as soon as a good lead is found by looking only for features which confirm and eliminate (they are simultaneous processes in clinical diagnosis). It is often more convenient, however, to keep going systematically and to leave most of the interpretation until the end, especially if it seems that there are going to be many leads leading to a number of coexisting diagnoses.

Formal logic (7 November, p 1195) can be regarded as a special case of reasoning logically with probabilities or frequencies when some of the latter are zero or 100%.⁴ It is something along these

lines which happens in medicine, the prevalence and incidence of the differential diagnoses having an important bearing on the reasoning process.⁵ The convention of substantiating the "knowledge" used by pointing to actual observations is linked closely to this type of reasoning.⁴ Perhaps "witch-doctors" (31 October, p 1108) are those who persistently scuttle away from such illuminating observations and open logical thought processes.

When we are actually talking to patients or examining them, we tend to interpret information quickly using subconscious thought processes. If we wish to explain our reasoning to patients or other doctors, however, we must use explicit, logical reasoning which often begins with "leads", and be prepared to substantiate the knowledge used. Perhaps this dual nature of the logic of medicine should have been emphasised.

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- 1 Llewelyn DEH. Mathematical analysis of the diagnostic relevance of clinical findings. *Clin Sci* 1979;57:477-9.
- 2 Llewelyn DEH. Accuracy and value of the haemoccult test. *Br Med J* 1983;285:1144-5.
- 3 Eddy DM, Clanton CH. The art of diagnosis. *N Engl J Med* 1981;36:1263-8.
- 4 Llewelyn DEH. Applying the principle of logical elimination to probabilistic diagnosis. *Med Inf (Lond)* 1981;6:25-32.
- 5 Llewelyn DEH. The mathematics of clinical diagnosis. In: Rodbard D, Forti G, eds. *Computers in endocrinology*. New York: Raven Press, 1984:299-331.

Recent theories on the cause of cot death

SIR,—In his review (28 November, p 1366) Professor A D Milner divides all the hypotheses on the cause of cot deaths introduced in the past 10 years into four categories but fails to mention one which clearly belongs to the group which he has labelled "maturation failure."¹

This theory—which assumes that a high proportion of childhood cancers are initiated during embryogenesis²—ascribes maturation failure to a latent period effect of one of these embryomas (juvenile myeloid leukaemia). It was originally introduced 12 years ago to explain (a) why there was overrepresentation of summer and autumn births among cot deaths and underrepresentation of these births among equally young patients with leukaemia, and (b) why there are so few myeloid cases among childhood leukaemias.³ But it was reintroduced a few months ago to explain why cot deaths as well as juvenile myeloid leukaemia have associations with exceptionally high levels of fetal haemoglobin.⁴

A high proportion of embryomas among juvenile leukaemias would allow these cases to have associations with faulty maturation of blood corpuscles and consequent difficulty in replacing either passive with active immunity (faulty leucopoiesis) or fetal with adult haemoglobin (faulty erythropoiesis). The first difficulty would affect lymphatic as well as myeloid embryomas, but the second would affect only the myeloid subgroup. Furthermore, infants who had survived the neonatal period in spite of one or both difficulties would be at high risk of dying either from a minor infection (myeloid and lymphatic embryomas) or from tissue anoxia (myeloid embryomas). Finally, this difference between otherwise similar neoplasms would be more noticeable today than it was before antibiotics had reduced the risk of death from infection without affecting sudden deaths of apparently healthy infants.

In short, besides providing a reason why cot deaths are concentrated between 1 and 6 months of age, this "maturation failure" hypothesis would account for the high incidence of lymphatic

leukaemia among 2 to 4 year olds and for the emergence of relatively high mortality from leukaemia after the discovery of drugs which compensate for defective immune responses. It is also a hypothesis which invites further testing of HbF and HbA concentrations in cases of unexplained stillbirths, cot deaths, and deaths from respiratory infection in young infants.

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- 1 Stewart AM. Competing causes of death in young cases of myeloid leukaemia. *Paediatr Perinat Epidemiol* 1987;1:197-8.
- 2 Knox EG, Marshall T, Barling RT. Leukaemia and childhood cancer in twins. *J Epidemiol Community Health* 1984;38:12-6.
- 3 Stewart AM. Infant leukaemias and cot deaths. *Br Med J* 1975;ii:605-7.
- 4 Giulian GG, Gilbert EF, Moss RL. Elevated fetal haemoglobin levels in sudden infant death syndrome. *N Engl J Med* 1987;316:1122-6.
- 5 Weatherall DJ, Edwards JA, Donahue WTA. Haemoglobin and red cell enzyme changes in juvenile myeloid leukaemia. *Br Med J* 1968;ii:679-81.

Computerised advice on malaria prevention and immunisation

SIR,—Drs Angela J Williams and David J M Lewis (5 December, p 1449) highlight the problem of disseminating accurate antimalarial and pretravel health advice. We share their concern,¹⁻³ especially as surveys undertaken in Glasgow between 1977 and 1985 indicated that 36% of the 13 816 overseas travellers who were interviewed on their return reported illness—much of which might have been prevented. Moreover, in the past 10 years 703 patients with malaria have been recorded in Scotland.

These findings all emphasise the need for a source of continually updated information on suitable antimalarial drugs for travellers and appropriate immunisations. Since January 1987 this has been available on a database compiled by the Communicable Diseases (Scotland) Unit (CD(S)U) and installed by the Scottish Poisons Bureau Information Service on its mainframe computer. General practitioners who have access to a terminal or computer with a modem (such as that which links with Prestel) can register to use the service by contacting the CD(S)U (telephone 041 946 7120 ext 247).

This service covers recommended immunisations and malaria prophylaxis and is updated directly from the unit on the basis of advice from various sources, including the World Health Organisation, the Department of Health and Social Security, the Malaria Reference Laboratory, embassies, and drug companies. Information about the administration and availability of both common and more unusual vaccines is also provided. Direct feedback is encouraged so that the information can be improved. A modified version of the database will be made available soon to other interested parties such as airlines, travel agencies, and businesses.

It is hoped that this use of modern technology will help the medical profession to minimise preventable illness in travellers and reduce the costs associated with travel related illnesses.

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- 1 Cossar JH, Reid D, Grist NR, et al. Illness associated with international travel: a ten year review. *Travel Medicine International* 1985;3:13-8.

- 2 Reid D, Cossar JH, Ako TI, Dewar RD. Do travel brochures give adequate advice on avoiding illness? *Br Med J* 1986;293:1472.
- 3 Walker E, Quayyum A. Malaria in Scotland and its presentation in a Glasgow hospital. *Health Bull (Edinb)* 1981;39:281-6.

Rare tumour system

SIR,—We are indebted to you for bringing to our attention the Leeds Oncology Information Centre (28 November, p 1421). This organisation receives and collates information on the management of rare cancers and facilitates exchange of information between oncologists. For some time in this oncology unit we have considered floating the idea of a national rare tumour register to gather as much data as possible about the diagnosis, management, and treatment of such uncommon neoplasms.

The situation that obtains at the moment is unsatisfactory. A clinician encountering a rare tumour must review the published reports, which is time consuming, and the desired information is often incomplete. Many of these reports are case reports, often published as curiosities to expand a curriculum vitae for professional advancement. Because of the nature of case reports details tend to be scanty and their value may be lost in the mountain of papers produced each year.

We would propose the establishment of a central rare tumour register which would receive fully detailed accounts of any rare tumour covering all aspects of the disease. These accounts would amount to a detailed discharge summary. On receipt and acceptance the doctor submitting the report would be credited with a rare tumour register citation number. This number would be acceptable for inclusion on a curriculum vitae as a publication. This system would encourage those in training to submit such reports and would avoid the tedium of revising and redrafting less complete case reports for publication in journals. Such a system would require the active support of bodies such as the BMA, the royal colleges, and the Department of Health and Social Security so that the rare tumour register citation attained some status. Once the central registry had accumulated sufficient cases we would expect that authoritative monographs could be produced and would furnish a very useful source of information for the clinician confronted with the management of unusual tumours.

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Intervention by general practitioners to reduce smoking

SIR,—Dr M A H Russell and colleagues (14 November, p 1240) addressed an important issue in their study of the effects of interventions by general practitioners to help people stop smoking. In summarising their findings they state that "brief intervention given without the support and back up of the local smokers' clinic had no detectable advantage over general practitioners' usual care." They also conclude that the supported brief intervention procedure "significantly increased the success rate." We believe, however, that methodological flaws in the study design cast doubt on these conclusions.

Though the authors report that there was no significant difference in either self reported or "adjusted" abstinence rates between the unsupported brief intervention and usual care groups, several design issues render this finding difficult to interpret. Firstly, the usual care that was provided was neither described nor monitored. It is quite