Software for screening to assess risk of Down's syndrome

SIR,—The brief reference to screening for Down's syndrome in the ABC of antenatal care[1] is perhaps indicative of the few centres currently offering screening to assess the risk of Down's syndrome despite the considerable benefits that the screen offers. The delays in introducing the screen are possibly due to uncertainty about the analytes required to perform an effective screen. α Fetoprotein and human chorionic gonadotrophin are well established, but there is still dispute over whether unconjugated oestriol should be included.[2,3] Furthermore, other potential screening variables have been suggested, including pregnancy specific β_1 glycoprotein (SP-1),[4] ratio of biparietal diameter to length of femur,[5] and maternal urea resistant neutrophil alkaline phosphatase activity.[6]

A further cause of delay in introducing the screen is the poor availability of commercial software to calculate the risk. In Gwent and South Glamorgan screening using α fetoprotein and human chorionic gonadotrophin has been offered with considerable success for the past 16 months. Introduction of this service was possible only after in house software had been developed.[7] Therefore, to encourage the spread of screening throughout the United Kingdom an MS-DOS compatible software package written in Turbo-PASCAL for one off calculation of risks of Down's syndrome is available from us free of charge to the NHS, and the complete database software used to run the Gwent screening program is also available subject to a small Foxbase licensing charge (details from me). A simple program will also be accessible by modem on the Association of Clinical Biochemists' bulletin board in the next few weeks (details from Dr J Kay, clinical biochemistry department, John Radcliffe Hospital, Oxford).

T M REYNOLDS

Medical Biochemistry Department,
University Hospital of Wales,
Cardiff CF4 4XW

1 Chamberlain G. ABC of antenatal care: normal antenatal management. *BMJ* 1991;**302**:774-9. (30 March.)
2 Wald N, Cuckle H, Densem J, *et al.* Maternal serum screening for Down's syndrome in early pregnancy. *BMJ* 1988;**297**: 883-7.
3 Macri J, Kasturi R, Krantz D, Cook E, Sunderji S, Larsen J. Maternal serum Down syndrome screening: unconjugated estriol is not useful. *Am J Obstet Gynecol* 1990;**162**:672-3.
4 Bartels I, Lindemann A. Maternal levels of pregnancy-specific β_1 glycoprotein (SP-1) are elevated in pregnancies affected by Down's syndrome. *Hum Genet* 1988;**80**:46-8.
5 O'Brien W, Knuppel R, Torres C, Sternlicht D. Potential prenatal predictors of Down syndrome: a statistical analysis. *Am J Obstet Gynecol* 1990;**163**:1796-8.
6 Cuckle H, Wald N, Goodburn S, Sneddon J, Amess J, Dunn S. Measurement of activity of urea resistant neutrophil alkaline phosphatase as an antenatal screening test for Down's syndrome. *BMJ* 1990;**301**:1024-6.
7 Reynolds T, Penney M. The mathematical basis of multivariate risk screening: with special reference to screening for Down's syndrome associated pregnancy. *Ann Clin Biochem* 1990;**29**: 452-8.

Estimations of gestational age and screening for Down's syndrome

SIR,—Professor Roger Robinson notes that increased use of the "triple" screening test for Down's syndrome may result in a reduction in the number of children born with the syndrome.[1] Despite considerable interest in the triple test, our experience is that obstetricians are not generally aware of the importance of accurate estimation of gestational age.

Using an equation derived from the results of Wald *et al*[2] we calculated the risk of Down's syndrome at term for 3532 patients in our data base. We calculated the likelihood ratio assuming the gestation to be 15·0, 16·0, 17·0, and 18·0 weeks.

Effect on risk of Down's syndrome at term of underestimation of gestation. All results are expressed as ratio of likelihood ratio at 16·0, 17·0 or 18·0 weeks to the likelihood ratio at 15·0 weeks

	Assumed gestation (weeks)		
	16·0	17·0	18·0
Arithmetic mean	2·96	7·98	17·32
Geometric mean	2·64	6·26	12·52
Median	2·64	6·43	12·99
Standard deviation	1·56	6·42	15·62
5th centile	1·43	1·98	2·90
95th centile	5·72	15·06	35·64

The likelihood ratio was then expressed as a ratio to that at 15·0 weeks. The table shows the results.

Many centres use ultrasonography to screen for neural tube defects at 18 weeks and do not have the resources to scan at 15 weeks as well. Screening for Down's syndrome is best performed at 15·0 weeks as this is the earliest gestation for which the screen has been validated.[2] This results in requests for calculation of risk of Down's syndrome based on gestation by last normal menstrual period at about 15 weeks.

Commercial software packages currently available calculate a single risk based on one estimated gestation. Estimation of gestation by last normal menstrual period in women who are sure of their dates results in an error of more than two weeks in 17% of women.[3] The 95% confidence limit for estimation of gestation by measurement of biparietal diameter by ultrasonography up to 20 weeks is about one week.[4]

Recalculation of risk may be necessary in about 15% of patients. We would be unable to recalculate the risk for 15% of the 5000 patients to whom we offer this screen each year.

We therefore report a risk for five different gestations: that quoted on the request form and also assuming a gestation of 15·0, 16·0, 17·0, and 18·0 weeks. In a woman of uncertain gestation, reporting a range of risks within which the pregnancy falls may provide useful information when amniocentesis is being considered. Disadvantages are the complicated nature of the report produced and providing technical back up for our inhouse software. Our system also requires specialist knowledge about screening for Down's syndrome, which is not essential when commercial software packages are used. This format of reporting highlights the need to use the best available assessment of length of gestation.

S HOLDING

Pathology Department,
Kingston General Hospital,
Hull HU3 1UR

1 Robinson R. Fewer neural tube defects: more Down's. *BMJ* 1991;**302**:612. (16 March.)
2 Wald NJ, Cuckle HS, Demsem JW, *et al.* Maternal serum screening for Down's syndrome in early pregnancy. *BMJ* 1988;**297**:883-7.
3 Bennett MJ, Little G, Dewhurst J, Chamberlain G. Predictive value of ultrasound measurements in early pregnancy: a randomised controlled trial. *Br J Obstet Gynaecol* 1982;**89**: 338-41.
4 Bowie JD, Andreotti RF. Estimating gestational age in utero. In: Callen PW, ed. *Ultrasonography in obstetrics and gynecology.* Philadelphia: Saunders, 1983:21-40.

Work can damage your health

SIR,—David McIntosh has suggested that ethical guidelines for occupational physicians should be revised to reduce the risk that doctors' duty to the employer will prevent them speaking out when a warning could help prevent accidents and illnesses.[1]

The Faculty of Occupational Medicine's guidance on ethics for occupational physicians,[2] which has established itself as a reliable reference document, covers a wide range of problems that may be encountered by a doctor working in industry. It deals specifically with the relationship between the doctor and the employer and emphasises doctors' duty to individual patients and the independence of their position in clinical matters. Doctors may be employed by a particular organisation but they have an ethical duty to put their patients' interests first. The faculty has formulated a clause for inclusion in the contract of employment of an occupational physician spelling out the distinction between responsibility to an employer and ethical obligations. Where problems still remain the guidelines suggest discussion and consultation with appropriate senior colleagues.

Our experience suggests that the faculty's guidance on ethics deals adequately with problems of this kind should they arise. Furthermore, under the Health and Safety at Work Act 1974 (section 2(2)c and section 6) the duties of an employer in these circumstances are also clear.

R I McCALLUM

Faculty of Occupational Medicine,
Royal College of Physicians,
London NW1 4LE

1 Dyer C. Work can damage your health. *BMJ* 1991;**302**:433-4. (23 February.)
2 Faculty of Occupational Medicine, Royal College of Physicians of London. *Guidance on ethics for occupational physicians.* 3rd ed. London: RCP, 1986.

The new culture

SIR,—A big variable in service provision is the referral rates from general practitioners to outpatient departments. The auditors from the National Audit Office seemed unsure whether a high rate of referral or a low rate represented the best practice. Some comfort is taken about this because for the first time general practitioners have to submit information in annual reports, which will include their referral practices, which Mr John Warden says "can be challenged."[1]

However, I would challenge the whole matter of the referral rates reported in practice reports. Schedule 1E, referring to Regulation 3(2) of Terms of Service for Doctors in General Practice, refers to "the referral of patients to other services under the National Health Service Act 1977." In the leafy lanes of most cities many—if not most—referrals are now to private units outside the NHS which do not have to be included in general practitioners' annual reports. The danger is that the referral rates in well off practices will seem to be much lower than in the inner city practices where patients are entirely reliant on the provision of the NHS. If the National Audit Office wants a valid comparison of referral rates between practices then it has to compare like with like. Hence a valid comparison means the total referrals whether in the NHS or outside it. Under general practitioners' present terms of service, referrals outside the NHS will not be included and it will not, therefore, be possible to compare like with like for referral rates.

JOHN D SINSON

Leeds LS17 6HF

1 Warden J. The new culture. *BMJ* 1991;**302**:554. (9 March.)

Global warming and health

SIR,—Professor Andrew Haines's editorial conveys the impression that adverse effects of global warming would dominate.[1] All countries except equatorial countries show higher mortality in winter than summer. The table shows large increases in mortality in winter in Mediterranean countries, where protection against cold is often less good than in Britain. Heat related mortality is real, but comparatively minor; so are possible effects of the spread of tropical diseases, which are in any case largely controllable. The data on seasonal mortality clearly suggest that the direct effect of moderate global warming on mortality, at

least when temperature has stabilised and temporary disruptions have passed, would be beneficial.

Scientific assessments of emotive topics of this kind have in the past been notoriously subject to distortion by public misconceptions. The belief that 100 000 British people died of hypothermia in cold houses every winter persisted for many years, and it still does in some quarters. In fact, recorded deaths from hypothermia never exceeded 500 per year, and such deaths indoors virtually all result from collapse due to other illness.[2] These misapprehensions seriously delayed scientific work on the subject despite longstanding evidence that many deaths in winter are caused by arterial thrombosis.[3] This arterial mortality has been little affected by home heating and is apparently due mainly to haematological changes produced by excursions outdoors in cold weather.[4,5] Deaths in winter from respiratory causes, which are less numerous, have by contrast fallen with the increase in central heating in Britain in recent years.

Seasonal mortality and age structure of population in England and Wales and Mediterranean countries

	England and Wales	Portugal	Greece
Increase in mortality January-March *v* July-September (%)	32·6	37·6	34·2
% Of population over 60	20·0	14·3	17·5

Values for 1976-83 from United Nations demographic year-books.

It is right for us to be concerned about possible consequences of global warming, which go much wider than direct effects of temperature on human mortality. It also seems sensible to seek ways to moderate the warming until its size and consequences are better assessed. However, that assessment should not assume an adverse effect of moderate global warming on human health.

W R KEATINGE

Queen Mary and Westfield College,
London E1 4NS

1 Haines A. Global warming and health. *BMJ* 1991;**302**:669-70. (23 March.)
2 Woodhouse P, Coleshaw SRK, Keatinge WR. Factors associated with hypothermia in patients admitted to a group of inner city hospitals. *Lancet* 1989;ii:1201-3.
3 Rose G. Cold weather and ischaemic heart disease. *Br J Prev Soc Med* 1966;**20**:97-100.
4 Keatinge WR, Coleshaw SRK, Cotter F, Mattock M, Murphy M, Chelliah R. Increases in platelet and red cell counts, blood viscosity, and arterial pressure during mild surface cooling: factors in mortality from coronary and cerebral thrombosis in winter. *BMJ* 1984;**289**:1405-8.
5 Keatinge WR, Coleshaw SRK, Holmes J, Evans S. Changes in seasonal mortality with improvement in home heating in England and Wales 1964-1984. *Int J Biometeorol* 1989;**33**:71-6.

Abuse of student electives

SIR,—Dr Martin F Wilks reveals remarkable ignorance of what British medical students do on their electives.[1] At Oxford our clinical students mainly go abroad, most to Third World countries, although some go to centres of excellence in Canada, Australia, or the United States. They have been to most African countries, from the Sudan and Ethiopia to Nigeria and Cameroon. They have been to Greenland, China and Japan, Papua New Guinea, India and Pakistan, Brazil and Peru, Thailand, and Iran, to mention but a few destinations.

Dr Wilks may unwittingly be right when he says "British is the best." So many continental medical schools suffer from the curse of misplaced egalitarianism: everybody who wants to read medicine is (or used to be) let in, regardless of ability to benefit from the course. Result: large numbers of students and lack of real contact between teacher and the taught. I have gone through the whole of the medical course and qualified in Copenhagen, and because just after Hitler's war there was no reciprocity between Scandinavia and the United Kingdom I started again from scratch and went through the medical course and qualified at Oxford. There is no doubt in my mind about which was the better medical school.

Medicine should be fun. Who would want to go to Germany when you can see *real* medicine in Farfarawayistan?

BENT JUEL-JENSEN

St Cross College,
Oxford OX1 3LZ

1 Wilks MF. Abuse of student electives. *BMJ* 1991;**302**:663. (16 March.)

Problems of new overseas doctors in the United Kingdom

SIR,—Following Dr R S Bhopal's letter on racial discrimination in British medicine,[1] I wish to draw attention to the problems encountered by doctors newly arrived in the United Kingdom. Overseas doctors are an important part of the NHS and they will probably continue to be required for the service to run effectively.

Most graduates from abroad join the NHS by sitting the General Medical Council's Professional and Linguistic Assessment Board examination. This two part examination assesses medical knowledge as well as written and spoken English. Others join through the Overseas Doctors Training Scheme, sponsored jointly by academic bodies in their home countries and the royal college. This exempts them from the GMC's examination.

Most overseas doctors working in the NHS come from Africa and Asia, where English is the language of medical education and practice. Reading medical texts is not difficult for these doctors, but the active language is quite another matter. They face problems understanding their colleagues, nurses, and patients because of regional accents and the speed of spoken English.

Other problems include differences in hospital practices and culture. Requesting investigations and getting results over the phone, and communicating with nurses, relatives, and general practitioners are all part of a new experience that takes time to get used to. Such problems affect the efficiency of new doctors during the first months of their job and create a poor impression on colleagues and consultants. This can lead to diminished professional rapport, lack of confidence, and a sense of inadequacy. It may also affect job references and examination performance. A practical solution would be for overseas doctors to have a run in period of clinical attachment for two to four weeks before starting their job in the same hospital. This would help them get used to the system and the language. They should then be able to perform their duties more efficiently and avoid unnecessary and largely unjustified discrimination.

M Z SHAHEEN

East Birmingham Hospital,
Birmingham B9 5ST

1 Bhopal RS. Effects of discrimination on careers of British medical graduates. *BMJ* 1991;**302**:235. (26 January.)

Attendance allowance

SIR,—In his discussion of the attendance allowance Mr Simon Ennals remarks that doctors are ideally placed to spot potential claimants and to help with making a claim.[1] As doctors in a cystic fibrosis clinic we look after children with a condition in which the outcome may depend largely on the amount of parental input. We aim to inform all parents of the attendance allowance and other appropriate allowances available through the Department of Social Security, and we strongly support their claims.

We asked families in our clinic about their experiences in applying for the attendance allowance. All families with a child receiving full care from us and within the age group eligible for the allowance at the time of survey took part (33 families, 38 children). Of those receiving attendance allowance, 23 had succeeded on the first application and two after appeal. Of those not receiving the allowance, five had applied once, six had appealed, and two had not applied.

We found that younger (and therefore fitter) children were more likely to be receiving the allowance: eight of nine aged 2-5 years, 10 of 17 aged 5-10, and 7 of 12 aged 10-15. This was not necessarily a reflection of recent change in assessment policy as five families of children who had initially been refused the allowance had recently unsuccessfully reapplied. Nor was there an overall correlation between clinical score[2,3] and success in application.

Good health and improving life expectancy in cystic fibrosis are directly linked to diligent daily treatment. All our patients have the same disease, requiring virtually the same treatment, which is usually delivered by their parents. The attendance allowance is granted on the basis of need, and this survey arose from our realisation that, despite this uniformity of need, not all our patients were receiving the allowance.

We noted that when claiming the attendance allowance parents are often distressed by the lack of understanding displayed by the medical assessor. In several cases the assessor was reported to have "taken one look at the child, and said that he was too well to need the allowance" (the parent's words). Mr Ennals may be right in saying that doctors are in a good position to advise patients about the allowance, but we have come to the conclusion that many of the assessing doctors (possibly retired adult specialists) may simply not understand the special needs of children with cystic fibrosis. Especially relevant is the simple concept that the child appears well as a result of the "attendance" for which the allowance is being claimed.

As medical advances in cystic fibrosis reach the headlines and the prospects for definitive treatment and cure brighten we should not forget the hard work being done every day by the families of affected children. We believe that the attendance allowance should be granted to all these children.

S A PETERS
C J ROLLES

Department of Child Health,
Southampton General Hospital,
Southampton SO9 4XY

1 Ennals S. Attendance allowance. *BMJ* 1991;**302**:228-30. (26 January.)
2 Schwachman H, Kulczyki LL. Longterm study of one hundred five patients with cystic fibrosis. *Am J Dis Child* 1958;**96**:6-15.
3 Taussig LM, Kattwinkel J, Friedewald WT, di Sant'Agnese PA. A new prognostic score and clinical evaluation system for cystic fibrosis. *J Pediatr* 1973;**82**:380-90.

Childhood immunisation in the new decade

SIR,—The subtitle of Dr Peter D Rudd's editorial asserts that "Earlier schedules should produce better protection," but the evidence lacks conviction.[1] Dr Rudd mentions outbreaks of measles in vaccinated American children but not the report from 30 schools in Wisconsin showing that 83% of the 170 vaccinated patients had received their measles vaccine before 15 months of age, compared with only 39% of the 144 vaccinated healthy controls.[2] Likewise, the efficacy of measles vaccine in India increased from 50% in children vaccinated