Weekly measles notifications in 1987-8 (when last measles epidemic occurred) and 1994, England and Wales

their stage of development, to break chains of transmission. When the campaign was planned different methods of delivering services were tested. The cost of preventing an epidemic was estimated at around £20m for the vaccine, publicity, and immunisation services. The cost of an epidemic was estimated to be around £60m. These calculations took account of the burden of illness and death, the primary care and hospital costs for illness in children, and the burden to the children's parents (a third of a million working days lost). Pilot studies before the campaign showed that high coverage could be achieved through public health teams and that this approach was more cost effective than other options. Experience showed that this was correct. In one month the teams reached 90% coverage of 12 annual birth cohorts of children, a tremendous achievement. The participation of general practitioners undoubtedly contributed greatly to the success.

It is sad that the Primary Care Virology Group did not involve the Department of Health in its discussions. Had it done so, Higson might have been better informed about the countries where these campaigns have been undertaken and might have better understood our campaign strategy.

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Immunising infants at risk of hepatitis B

Parent held vaccination card may improve uptake

EDITOR,—Claire P Smith and colleagues report a protocol for giving hepatitis B vaccine to the babies of mothers who are carriers of hepatitis B.¹ For the past 10 years I have been trying to ensure immunisation of all the babies at risk of infection within the West Midlands region as part of clinical trials of hepatitis B vaccine²⁻⁴ and, more recently, in line with the Department of Health's recommendations.⁵ Since 1974, when universal antenatal screening started in the West Midlands, we have regularly communicated with hospital obstetricians regarding the risk of infection during delivery and with paediatricians regarding the protection of the babies. I communicate with over 20 maternity units across the West Midlands region. More recently, in response to failures to complete courses of vaccine initiated in maternity units, we have also contacted patients' general practitioners direct and provided additional information packages to local community paediatricians.

The key person in ensuring continuing care of the baby at risk is the mother, and at the suggestion of one of our busiest maternity units we produced a hepatitis B vaccination card. Its design is compatible with the parent held child health record

(the red book) used in most health districts in Britain, and it can be inserted as a page or slotted into the transparent wallet at the front of the book. Once this is in the mother's possession she can see that the appropriate boxes are ticked when vaccine is given. The card is being piloted at the moment for comment from users and to work out the best strategy for its use.

I am interested to know if there is support for the wider use of such a card and would be grateful for any comments readers may have.

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Community programme boasts initial success

EDITOR,—Claire P Smith and colleagues report the difficulties they experienced in Manchester in ensuring a high uptake of second and subsequent immunisations offered to infants at high risk of acquiring hepatitis B infection neonatally.¹ Early last year the then South East London Health Authority (health commissioners for the boroughs of Lambeth, Southwark, and Lewisham) commissioned a community based programme in an attempt to improve rates of completion of immunisation against hepatitis B among high risk infants. Previous follow up arrangements for infants at risk had been hospital based, had followed varying immunisation schedules, and had had a poor completion rate.

The new service is provided by a single community team covering an area of complex ethnic mix (including west African, Vietnamese, Turkish, Caribbean, and South American families) with roughly 9000 births a year. The key workers in the new programme are the antenatal and paediatric liaison health visitors, who are established in their roles. Their job descriptions now include responsibility for promoting links among the antenatal teams, the virology service, the neonatal paediatric team, and the primary care team. The health visitors are working towards streamlining procedures in each hospital and also have the responsibility for ensuring that the infants receive their second immunisation at home at the age of 1 month. The home visit is used as an opportunity to explain in greater detail the immunisation programme and to discuss with the family the wider implications of the mother's hepatitis B status. The health worker is accompanied on this visit by a trained interpreter from the family health services authority's interpreting service if this is necessary.

Since the service was established last April 61 infants have been enrolled on the programme. Of the 50 infants eligible for their second immunisation, 45 have now received it. None has been lost to follow up.

The responsibility for giving the third and fourth immunisations rests with the family health visitor, and the immunisations are carried out at

the family's general practice surgery, the local infant welfare clinic, or the child's home at the age of 6 months and 1 year. The programme is administered by one of the child health clerical officers, who uses a locally written computer software program that generates letters and appointments and orders vaccine.

We hope that this community programme will sustain its initial success and prove an effective method of delivery of both vaccine and health education.

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- 1 Smith CP, Parle M, Morris DJ. Implementation of government recommendations for immunising infants at risk of hepatitis B. *BMJ* 1994;309:1339. (19 November.)

BCG vaccination programmes may provide useful guidance

EDITOR,—We agree that "selective vaccination policies create enormous practical difficulties, especially where most of the affected babies are from ethnic minority groups."¹ We have had similar problems with a selective neonatal BCG vaccination programme in Milton Keynes. In one respect BCG vaccination is easier than vaccination against hepatitis B because only one injection is given, but in another respect it is more difficult because the group at risk is hard to define. Coverage is also difficult to monitor because the denominator (those at risk) is often unknown and the numerator (vaccinations performed) may be poorly recorded.

As in Manchester,¹ the question of need for vaccination is discussed in the antenatal clinic with the help of written material. The midwives enter into the antenatal records (both written and computerised) whether the neonate is likely to be in a group at risk. This serves two purposes. Firstly, when the details of delivery are entered into the computer a form requesting BCG vaccination is automatically printed out. This reminds staff to give the vaccine and to return the form to the community child health department, where details are entered into the department's computer. Secondly, a list of those at risk is stored in the obstetric computer and can be compared with data from the child health computer to estimate vaccine coverage.

This system was introduced in 1991, and vaccination coverage increased from 19.3% (95% confidence interval 13.4% to 25.2%) in 1990 to 77.5% (73.6% to 81.3%) in 1993. This method could be adapted to similar diseases such as hepatitis B and sickle cell disease.

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- 1 Smith CP, Parle M, Morris DJ. Implementation of government recommendations for immunising infants at risk of hepatitis B. *BMJ* 1994;309:1339. (19 November.)

Drug resistant tuberculosis

EDITOR,—Concern is growing over the spread of drug resistant *Mycobacterium tuberculosis*. New evidence suggests that this spread may be increasing in certain sections of the British population. The recent advances in molecular techniques have equipped us with the means to make substantial

inroads into the possible impact of drug resistant tuberculosis.¹ A central laboratory to which samples could be sent would provide us with an important means of combating the problem.

It would be helpful if specimens from any patient believed to be at risk of drug resistant tuberculosis could be sent to the central laboratory for fast tracking. The polymerase chain reaction could identify the organism quickly once a smear had been found to be positive for acid-alcohol fast bacilli at the local laboratory. Use of restrictive fragment link polymorphism would enable a national register of drug resistant organisms to be established by DNA fingerprinting so that, should subsequent samples arrive with the same print pattern, the clinician could be rapidly alerted to the possibility of drug resistance.

There are currently some 7000 notifications of tuberculosis a year in Britain; in addition, in about 1000 cases in which smears yield a positive result, culture yields mycobacteria that do not result in tuberculosis. It would probably not be feasible to send all 8000 specimens for which smear testing yields a positive result to a central laboratory. It would therefore be appropriate to identify the risk factors in patients who may have drug resistant tuberculosis and fast track these patients alone. I suggest the following categories: patients who have had previous treatment, particularly if they are from abroad; those known to have had drug resistant disease previously; HIV positive patients; patients who may have been infected in the African continent or middle east; contacts of patients known to have drug resistant tuberculosis; and substance misusers and homeless people. I estimate that these six categories of patients make up 10-20% of the patients notified as having tuberculosis in Britain—that is, 700-1400 patients. The total cost of this service would not be excessive and would represent money well spent in the control of a potentially disastrous problem.

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Transmission of tuberculosis in patients with HIV infection

EDITOR,—We agree with the final conclusions drawn by G M Scott and J Holton that even more strict controls should be adopted to control the transmission of tuberculosis in centres caring for patients with HIV infection.¹ Transmission of tuberculosis at their hospital is, however, supported by both our molecular biology data and the epidemiology.

Editorial constraints prevented us from including detailed epidemiology of transmission in our paper.² In Scott and Holton's investigation, apart from the patient in case 1 walking through Ward B, there were other potential exposures. Previous sputum smear tests in the patient had yielded positive results and he did not begin to receive antituberculosis treatment for several hours after bronchoscopy. Bronchoscopy induces coughing and formation of droplet nuclei. At the time of the potential outbreak of tuberculosis the room had an extractor fan venting separately from the ward but no negative pressure ventilation. The bronchoscopy room opens directly on to Ward B. Wards A and B are connected by an atrium, and patients from each ward use facilities on the other.

The probability of a person becoming infected during a one hour exposure to infectious droplet nuclei is estimated to range between one in four and one in 600. Extensive transmission has been observed during exposures as brief as two hours. The American Thoracic Society recommends that if tuberculosis is a diagnostic possibility and bronchoscopy is required then the procedure

should be performed in a room designed to meet acid fast bacilli design specifications; these are stringent.³

We find the epidemiological data adequate to support our view that transmission of tuberculosis occurred in the three patients Scott and Holton described, who originated from different continents. The fact that a research project performed on specimens stored for one year has brought this episode of transmission to light supports the view that fingerprinting of all strains of *Mycobacterium tuberculosis* complex should become routine.

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Length of hip axis and rate of hip fracture

EDITOR,—Ian R Reid and colleagues conclude that increases in the age adjusted rate of hip fracture can be accounted for by changes in the geometry of the proximal femur and that the "epidemic" of hip fractures "cannot be reversed by any single intervention."¹ The assertion that no intervention can reverse the trend is flawed. The epidemic is, after all, one of fractures, not of limb lengthening. Central to the argument that an increase of 5.5 mm in the hip axis, or length of the femoral neck, is associated with an increased rate of fracture is the physics of trauma: the longer the axis the less force is needed to produce a fracture in a bone of given strength. This itself suggests prevention based on (a) the prevention of falls^{2,3} (that is, by identifying those at risk, removing hazards, improving mobility, providing aids, or modifying medical management) or (b) a reduction in the impact of trauma associated with falls (by designing environments to reduce the impact of falls for those at high risk⁴ or improving neuromuscular protective responses and gait⁵ or padding the hip⁶).

In attempts to prevent hip fracture, focusing on the characteristics of bone to the exclusion of other factors (as Reid and colleagues do) is probably mistaken. To reduce the incidence of hip fracture over coming years preventive strategies need to be developed that modify the environment and behaviour of cohorts at risk to prevent falls. Such prevention should reduce both mortality and personal suffering and may also prove cost effective.

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Prophylaxis against malaria

EDITOR,—J H Miller and D A Warrell's observation on British troops' non-compliance with simple preventive measures against malaria is of concern.¹ One of the key issues in prophylaxis against malaria is that the strategies for improving compliance should include both educating the prescribers and counselling the patients.² As a doctor providing medical help to travellers in India, I find the standard advice on prophylaxis against malaria often inadequate, especially among young people travelling for long periods on low budgets. Also, many health advisers overseas have a limited idea about the vastness of the sub-continent and consequent regional variability in advice concerning travel.

Visitors to India are at risk of malaria, which is a problem in many cities.³ The current outbreak in Rajasthan, which is predominantly an outbreak of *Plasmodium falciparum* infection, is causing concern. I did a survey among 452 foreign travellers in Calcutta and found that 21 were taking an inadequate dose of antimalarial drugs and that 111 were not taking any (S Chatterjee, third conference on international travel medicine, Paris, 26-29 April 1993). Inquiry about the reasons for not taking the drugs showed that 45 had been given inadequate information before travelling since they had either not been informed about prophylaxis or had been told that it was not required. A further 33 had decided to stop taking medicines, contrary to medical advice, mainly because of concern about side effects, the complexity of a daily regimen of two drugs, and perceived uselessness. This was based on past travel experience, "friendly" advice to stop the drugs, and confusion because fellow travellers were taking alternative regimens. Twenty five had stopped because of side effects, and the remaining eight comprised a miscellaneous group.

These findings point to areas of conflict concerning compliance with prophylaxis against malaria among travellers. We need to address these facts if we believe that the key to healthy travel lies with improving the behaviour of travellers.

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Travel prophylaxis

Figures in study were incorrect

EDITOR,—Debate about the role of immunoprophylaxis for travellers is to be encouraged, but health care planners should not be lulled into complacency by R H Behrens and J A Roberts's conclusion that vaccination against typhoid and