and one's own experience; but in my own four years in Eastern Africa, with constant contact with patients suffering from malaria (mainly *Plasmodium falciparum* and *P. vivax*), I saw a number of patients with malaria, proved on blood slide, who, I had no doubt, had taken recommended antimalarial drugs as directed. My colleagues with similar experience and I felt there was no doubt that, at the very least, pockets of relative or absolute resistance to both the above drugs existed, and tended to recommend either one of the pyrimethamine combination drugs, such as Maloprim (pyrimethamine plus dapsone) or Fansidar (pyrimethamine plus sulphur). We used chloroquine, despite its dangers when taken over a prolonged period and the theoretical danger of developing chloroquine resistance. It is entirely reasonable to assume that a number of cases were due to poor patient compliance, but entirely unreasonable to suppose that, when one is dealing with a large number of expatriates with average or above-average intelligence, all such cases are due to this. The potential danger of inadequate prophylaxis was underlined by two cases in which relatives of my patients, after a "safari holiday" on inadequate prophylactics, died after return to Europe; in both cases, as they had been taking what was thought to be an appropriate prophylactic drug, the diagnosis of malaria had not been seriously considered, even on hospital admission. One of my patients, while on leave in England, developed cerebral malaria while being investigated for "influenza" in an English district general hospital.

Perhaps, when consideration is given to ways in which the taking of prophylactic drugs may be emphasised to the public, more thought should be given to communication with doctors in those areas of the world where malaria is endemic, and which attract large numbers of tourists. Theoretically, pyrimethamine and proguanil are the correct drugs to use in many areas of the world; theoretically, persons contracting malaria in these areas cannot have taken the drug correctly; in practice, this is just not so, and there is a real danger to visitors who rely on the advice given to them by their practitioners, who, reasonably enough, rely on expert advice given to them.

J R COPPER

Geriatric Department,
Plymouth General Hospital,
Plymouth, Devon PL4 7JJ

Polio immunisation and travel

SIR,—Many recent articles, including the document produced in September by the Office of Health Economics, have brought attention to the problem of low levels of immunisation against poliomyelitis. Although the DHSS claims an overall immunisation coverage against polio approaching 80%, a number of surveys have confirmed the existence of areas where no more than 50% of children have received a full course of polio vaccine. In spite of the probability of autoimmunisation between children in a community, there clearly must be a risk that considerable numbers of children and adults are currently susceptible to infection with polio. There must be a risk of epidemic spread should the "wild" virus be reintroduced from infected areas.

The purpose of this letter is to draw your attention to the magnitude of this risk. Several

surveys in countries popular in the tourist circuit, such as Thailand and Egypt, have shown that the prevalence of residual paralysis after polio is much higher than has been officially reported to the World Health Organisation. Our own surveys in several tropical countries have shown an annual incidence of 37 cases per 100 000 children, approximately 15 times the reported incidence.

Clearly, our priority must be to eliminate the disease in those countries still harbouring endemic transmission, but almost as important should be the inclusion of polio immunisation as a prerequisite for all travellers to the tropics and the maintenance of high levels of immunisation in the developed world. The minor risk of vaccine-associated cases is outweighed by the potential tragedy of polio among travellers and the risk of further epidemics in polio-free countries.

N A WARD

Stop Polio Campaign,
Save the Children Fund,
London SW9 0PT

Measles and vaccine protection

SIR,—I believe Dr G A Jackson may have misinterpreted his data on measles and measles complications among vaccinated and unvaccinated individuals (4 August, p 332).

Most epidemiologists would apply a statistical test to the measles complication rate observed in those vaccinated ($18/147 = 12.2\%$) and those unvaccinated ($34/348 = 9.8\%$). The chi-squared test using the Yate's correction factor indicates that these two rates are not significantly different ($\chi^2 = 0.43$, $P > 0.05$). There is also no significant difference in the proportion of vaccinated and unvaccinated cases classified as being severe.

More importantly, the complication rates in the two groups—even if different—cannot be used to assess correctly the protection afforded by measles vaccine (that is, the vaccine efficacy). Rather, one needs to know, as Dr Jackson points out, the measles attack rate of vaccinated (AR_{vac}) and unvaccinated (AR_{un}) individuals. Dr Jackson's table provides only the proportion of measles cases which were either vaccinated or unvaccinated. The vaccine efficacy (VE) is the percentage reduction in the measles attack rate attributable to measles vaccine—that is, $VE = [(AR_{un} - AR_{vac})/AR_{un}] \times 100$. Reported measles vaccine efficacy has been at least 90% in most studies.¹²

When the data necessary to calculate vaccine efficacy are available, it is essential to realise that as the proportion of vaccinated individuals in a community increases, the proportion of measles patients with a history of previous vaccination will increase.¹³ These cases are a result of primary vaccine failure, which can be expected in 5-10% of vaccine recipients who fail to seroconvert and are thus unprotected.⁴ Dr Jackson should not therefore be surprised that almost one-third of his patients had been vaccinated. Ideally, when 100% of the population has been vaccinated, 100% of the few measles cases which may occur will be in persons who have been vaccinated. Causes of primary vaccine failure, in addition to the inherent 5-10% non-seroconversion rate, are, as Dr Jackson notes, improper vaccine shipping, storage, and handling.¹ Waning vaccine-induced immunity (that is, secondary measles vaccine failure) has not been observed.¹⁴

As measles vaccine coverage increases, a

full understanding of the concept of vaccine efficacy becomes increasingly important. Along with surveillance data, it is one of the best tools to illustrate to the public that vaccines are safe, useful, and effective.

STEPHEN R PREBLUD

Surveillance and Assessment Branch,
Immunisation Division,
Center for Disease Control,
Atlanta, Georgia 30333, USA

¹ Hayden, G F, *Clinical Pediatrics*, 1979, 18, 155, 167.

² Marks, J S, Halpin, T J, and Orenstein, W A, *Pediatrics*, 1978, 62, 955.

³ Center for Disease Control, *Measles Surveillance 1973-1976*. Atlanta, Georgia, CDC July 1977.

⁴ Krugman, S, *Journal of Pediatrics*, 1977, 90, 1.

Smallpox vaccination

SIR,—The article on smallpox vaccination (8 September, p 617) coincided with a further case of accidental vaccinia which I saw at our eye hospital. A 5-year-old boy had sustained an accidental vaccinia of his left eyelids through contact with a family who had recently been vaccinated before going abroad.

Over the years I have seen a number of such cases. They are always worrying in case corneal involvement should take place with permanent scarring. It seems to me that such cases may become more common now that routine vaccination has been stopped and we have a totally susceptible childhood population. When vaccination is carried out would it not be wise to cover the vaccinated area to limit the possible spread to others?

In this recent case, as in previous ones, the Public Health Laboratory Service Laboratory at Colindale kindly provided hyperimmune gammaglobulin both for intramuscular injection and to be made up as a topical application in the form of eye drops.

J N ORMROD

Kent County Ophthalmic and
Aural Hospital,
Maidstone, Kent ME14 1DT

Smallpox vaccination in the Forces

SIR,—I have recently been approached by one of my patients who is a member of one of the Royal Naval reserves and who is about to go to Germany on his annual camp. He came to see me requesting smallpox vaccination since it was three years since he had had his last one, and produced for me a letter instructing him that he must obtain such vaccination before he joined his unit. I explained to him the situation with regard to the prevalence of smallpox in the world today and the requirement for vaccination, but while he appreciated my arguments he pressed for vaccination since he did not wish to be turned away from his camp.

It seems to me most strange that the Forces are still requiring smallpox vaccination in such circumstances and I should like to question this as a general policy.

D P B POUND

Daventry, Northants NN11 4EJ

Are breast-fed babies still getting a raw deal in hospital?

SIR,—I was greatly encouraged to read the paper by Dr Phyllis Culley and others (13 October, p 891). At last the medical profession is coming to recognise what many nursing