Imported Infections

Immunization and Other Prophylactic Measures

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Though the International Sanitary Regulations of the World Health Organization now apply vaccination requirements to only two diseases—smallpox and yellow fever—there are several potentially dangerous diseases such as typhoid, cholera, malaria, hepatitis, poliomyelitis, and tetanus from which the foreign traveller would be well advised to obtain protection.

Travellers tend to fall into three groups: the short-term tourist, the "overlander", and members of an organized expedition.

Short-term Holiday

In a prosperous year about two and a half million people go on a package-tour holiday. In most cases this consists of a one or two weeks' visit to a Mediterranean or North African resort. If the holiday maker consults his family doctor at all before his departure it would probably be to seek advice on the best sun lotion, insect repellent, or remedy for the almost inevitable attack of diarrhoea.

Some conditions may deprive him of two or three precious days of his holiday, but in relation to the many people involved the incidence of major illness is quite low. Nevertheless, the holiday maker is not free from all risks—even though the brief paragraph at the end of his travel brochure in health matters does not adequately warn him of them. In the United Kingdom 200 cases of typhoid fever are still notified annually and about 75% of these are contracted in the Mediterranean area. The epidemic of cholera due to the El Tor biotype also leaves no room for complacency. In the first six months of 1974 the World Health Organization was notified by 28 countries of some 36,000 cases with about 3,000 deaths.¹ The Mediterranean and North African resorts have been involved and there have even been deaths among holiday makers to those areas.

TRAVELLERS' DIARRHOEA

Travellers' diarrhoea is familiar to most tourists and was discussed in an earlier article in this series (*B.M.J.*, 30 November, 1974). The family doctor is frequently asked to prescribe a drug for treating this condition, should it arise. As no fewer than 31 out of the 42 antidiarrhoeals listed in *M.I.M.S.* contain one or two antibiotics there is a strong likelihood that the patient will be given an antibiotic either of sulphonamide or aminoglycoside (streptomycin, neomycin) groups.

Nevertheless, *Salmonella* surveillance studies now indicate that

there are very strong reasons for restricting the use of antibiotics for this essentially self-limiting condition—particularly transferable antibiotic resistance. Hence clearly antibiotics should be avoided and the traveller could be provided with codeine 15-30 mg thrice daily after meals, or diphenoxylate 2.5 mg with 0.05 mg atropine sulphate (Lomotil). The initial dosage of the latter is 5 mg, thrice daily after meals, but the effect of the atropine limits any considerable increase in this.

TYPHOID FEVER

Several controlled trials in countries where typhoid fever is endemic have confirmed the value of both the acetone-killed and heat-killed phenol preserved vaccines.² The tendency nowadays is to use the monovalent typhoid vaccine containing 1,000 million *Salmonella typhi* per ml as this contains a lower content of killed bacteria with consequent reduction of the adverse reaction to the vaccine. Two doses of typhoid vaccine gives a 70-90% protection for at least three years (table I).

TABLE I—Schedule for Typhoid Vaccination

Deep Subcutaneous Injection (ml)	Interval (weeks)	Intradermal injection (ml)
1. 0.5 2. 0.5	Four to six	0.1 0.1
Children 1-10 years 1. 0.25 2. 0.25	Four to six	0.1 0.1

Reinforcing doses

These are recommended every three years. Even when more than three years have elapsed, a single dose is all that is required. The intradermal dose of 0.1 ml of the vaccine containing 1,000 million *S. typhi* per ml may not be sufficient for a primary immunizing course but may be employed as a reinforcing dose and in those with a history of severe reactions to typhoid vaccine.

CHOLERA

The classical *Vibrio cholerae* has been replaced by the El Tor biotype, which may be of the Ogawa or Inaba serotypes. The holiday maker to the Mediterranean or North Africa is at risk, and there have been at least 25 imported cases of El Tor cholera into Europe. Nevertheless, the fact that in no case has a secondary spread resulted indicates the great importance of a safe drinking water supply and efficient sewage disposal in the prevention of the disease. Cholera vaccination plays little part in controlling the disease in an infected area but may afford the traveller a limited protection (table II).

In the absence of an effective vaccine the traveller should be advised: never to drink tap water but only boiled or bottled from a reputable source; to avoid shrimps or prawn dishes, mussels, oysters, and lobsters; and to be wary of salads and fresh fruit which are a possible, but less likely, source of infection.

TABLE II—*Dosage Schedule for Cholera Vaccination*

Age (years)	First Subcutaneous Dose (ml)	All Subsequent Subcutaneous dose (ml)
1-5	0.1	0.3
5-10	0.3	0.5
Over 10	0.5	1.0

Reinforcing Doses

These are recommended at six month intervals.

'Overlanders'

Many family practitioners will have encountered the young boy or girl who renounces work and studies for the "hippy trail" to Katmandu. The overlanders appear regularly at the vaccination clinic before their departure but some return many months later as pitiable wrecks. They are undernourished, dependent on drugs, and suffering from such conditions as the effects of hepatitis, giardiasis, and the malabsorption syndrome. Compared with the short-term Mediterranean tourist, overlanders are a far more vulnerable group. At least they should have the benefit of a full vaccination programme. In addition to typhoid and cholera vaccinations, the following diseases should be considered: smallpox, hepatitis, poliomyelitis, tetanus, and malaria.

SMALLPOX

In 1967 the World Health Organization began its smallpox eradication programme. In that year there were no fewer than 30 countries in which case to case spread of smallpox was occurring and today there are only four countries—namely India, Pakistan, Bangladesh, and Ethiopia. In fact 90% of the world's cases of smallpox arise in the Sind province of Pakistan, the states of Bihar, West Bengal, and Bangladesh. Smallpox vaccination is essential for travel to the above countries unless one of the following contraindications exist.

Eczema

The patient with active eczema should not receive a smallpox vaccination and contact with a recently vaccinated individual should be avoided. The vaccinia virus not only activates the eczema but multiple vaccinia lesions attack the eczematous areas. In the case of a traveller to the smallpox endemic zone in whom eczema has been inactive for at least one year a dose of vaccinia globulin may be given intramuscularly into the other arm at the same time as the smallpox vaccination. Should eczema vaccination still occur, the drug methisazone (Marboran) may be used.

Steroid Therapy

Smallpox vaccination in a patient under steroid therapy is a risky procedure because of surrounding inflammation and the risk of septicaemia.

Pregnancy

Possibly smallpox vaccination in pregnancy carries a significantly increased risk of fetal morbidity. Even a smallpox vaccination late in pregnancy may give rise to the transplacental passage of the vaccinia virus with the danger of the birth of a macerated fetus covered with multiple vaccinia lesions.

Immunological Disorder

Vaccination should be avoided in the leukaemias and other tumours of the reticulo-endothelial system.

HEPATITIS

Hepatitis is one of the commonest illnesses acquired by the long-term traveller to India and the Far East. A co-operative study by the Walter Reed Army Institute³ on over 100,000 United States soldiers in Korea indicated that 5 ml normal immune globulin given intramuscularly reduces the incidence of this disease. This trial seemed to indicate that protection occurred in patients with both positive and negative Australian antigen hepatitis, but there is still much controversy whether the hepatitis associated with the parenteral use of drugs is prevented by normal immune globulin.

In Britain the Public Health Laboratory Service is responsible for the distribution of the material and will normally post it without delay to family doctors who may require it for long-term travellers. As it is a passive form of immunity with only a four to six months period of protection, it is best given intramuscularly a few days before departure. It gives rise to no local or systemic reaction.

POLIOMYELITIS

Before the introduction of polio vaccination there had always been an increased incidence of poliomyelitis among recently-arrived Europeans to the poorer countries of the world. It is still prudent to give a reinforcing dose of the oral poliomyelitis vaccine to a child before departure.

TETANUS

The "overlander" should be protected against tetanus but few will have given themselves sufficient time for the following schedule:

1st dose Tetanus toxoid	(0.5 ml six to 12 weeks later)
2nd dose 0.5 ml toxoid	(0.5 ml six to 12 months later)
3rd dose 0.5 ml toxoid	(0.5 ml 12 months later)
Reinforcing dose of 0.5 ml required after five years.	

MALARIA

As Professor B. Macgrath has pointed out "a warning against malaria is more important than a demonstration of what to do if the plane drops into the sea. . . ." Passengers about to land

TABLE III—*Malaria: Time-Interval Between Return to the United Kingdom and Onset, 1973**

	P. falciparum	P. vivax	P. ovale	P. malariae	Mixed infections			Not stated	All types Total
					Pv/Pm	Pf/Pv	Pm/Pf		
One month, or less	118	117	3	10	8	2	2	6	266
One to five months	12	86	7	5	2	1	0	3	116
Six to 12 months	1	57	1	1	1	2	0	2	65
One year or more	0	6	1	2	0	0	0	0	9
Not stated	14	43	1	3	0	1	0	23	85
Total	145	309	13	21	6	2	32	34	541

*Weekly Epidemiological Record, W.H.O., 1974, 49, 317.

in airports in West, Central, and East Africa or in South East Asian countries (even if only for refuelling) should be warned, through the public address system, that they may be exposed to falciparum malaria, which is a killer if not treated. When one considers that in 1972 5,590 cases of malaria were imported into various European countries it is clear that this message still goes largely unheeded.

Table III shows the interval between the return to this country and the onset of the malarial attack in 456 cases. In the case of *Plasmodium falciparum* (the most dangerous form of malaria) antimalarial therapy for one month after leaving the malarial zone would have prevented 118 of the 145 cases reported.

One of the following drugs should be given to all travellers to Africa, India, Pakistan, New Guinea, and South America. The tablets should be taken one week before departure and then continuously throughout the period of exposure and for one month after leaving the malarial zone: proguanil hydrochloride (Paludrine), one 100 mg tablet daily; pyrimethamine (Draprin), one 25 mg tablet on the same day each week; or chloroquine, 300 mg (base) once a week.

In local areas of Africa strains of *P. falciparum* have become resistant to these drugs and some authorities consider that the dosage should be doubled for travellers to Africa.

Organized Expeditions

The third group of travellers consists of organized groups, transcontinental expeditions, or perhaps relief workers or missionaries to a drought area of Africa or South America. In this connexion the distribution of the yellow fever endemic zone must be considered and the recent appearance of a "meningitis belt" of similar distribution in Africa.

YELLOW FEVER ENDEMIC ZONE

Nowadays yellow fever seems to be confined to the jungle areas of Africa and South America and few cases are reported. Family doctors will have to refer their patients to designated yellow fever centres as the attenuated 17D yellow fever vaccine is only stable for short periods at room temperature when reconstituted.

MENINGOCOCCAL MENINGITIS

The "meningitis belt" of Africa stretches from the Sudan to Senegal running through parts of the Sahara now affected by severe drought. The World Health Organization has co-ordinated trials into a vaccine prepared from the polysaccharide of a group A.N. meningitidis. The vaccine is prepared freeze dried and administered with a jet injector. At present it is not available in the United Kingdom but it would clearly be indicated in members of a trans-African expedition or relief workers in the Sahara drought area. Possibly a combined Group A and Group C polysaccharide vaccine will also be made available.

Medical Advice on Expeditions

Family doctors may sometimes be asked to advise on a drug-kit and medical precautions for overseas expeditions to Africa, the Middle East, and the Far East. It is advisable, particularly at night, to avoid undue exposure of the arms and legs. Long-sleeved shirts or blouses, trousers rather than shorts or skirts and socks or stockings should be worn. The exposed areas of the face and hands should be rubbed with an insect repellent such as Mylol (Boots), or Sketofax (Burroughs Wellcome). The vehicle or camp should be regularly sprayed with a suitable "knock-down" insecticide containing 0.1 - 0.4% pyrethrum. Finally, a mosquito-net should be used at night unless the vehicle is used for sleeping, in which case it should be made mosquito-proof with gauze.

WATER, FOOD, AND MILK

All water for drinking should be boiled before it is placed in bags or storage containers as this is more reliable than chlorination. Bilharzia, which occurs in Africa and the Middle East, may be acquired by bathing or washing in water from rivers and lakes. Therefore all water for washing should be heated first to the temperature of a hot bath but boiling is not necessary. An alternative protection against bilharzia would be to chlorinate the water, but the concentration of free chlorine of more than 1 p.p.m. is required to render it safe in 10 minutes.

Fruit and vegetables bought at local markets should be thoroughly washed in boiled or chlorinated water. Milk from cows or goats should be brought to the boil before being drunk.

MEDICAL SUPPLIES

The following table includes a suggested list of essential supplies and drugs (table IV).

TABLE V—Medical Supplies and Drugs

Dressings	Melolin dressings 5 cm × 5 cm and 10 cm × 10 cm sized Netelast support bandages Crepe bandages Butterfly closures for first aid closure of wounds
Antibiotics	Gentamicin cream for skin sepsis Cap. Ampicillin 500 mg or tetracyclin 250 mg as a general purpose antibiotic
Antidiarrhoeal drugs	Lomotil tablets for short-term diarrhoea Phthalylsulphathiazole 500 mg tablets for bacillary dysentery The dosage is 5 ml daily
Antimalarial drugs	Proguanil hydrochloride 100 mg tablets for prevention Chloroquine sulphate 200 mg for the treatment of malaria Dosage is two tablets of chloroquine three times a day for the first day, then one tablet twice daily for two days
Analgesics and hypnotics	Paracetamol 500 mg for mild pain Pentazocine hydrochloride 50 mg for more severe pain

References

- ¹ *Weekly Epidemiological Record*, World Health Organization, 1974, 49, 309.
- ² Cretanovic, B., and Vemura, K., *Bulletin of W.H.O.*, 1965, 32, 29.
- ³ Conrad, M. E., *Archives of Internal Medicine*, 1971, 128, 723.