

to the cholera toxin. The cholera toxin is identical to the heat-labile toxin released by ETEC (Dukoral Product Monograph; Powderject Pharmaceuticals PLC). The vaccine confers at least 3 months protection but is an expensive option.

It is advised that the following items are included in the medical travel kit: oral rehydration mix, loperamide or diphenoxylate, a course of fluoroquinolones, pre-packed wipes, toilet paper and water purification tablets.

The cornerstone of restitution is rehydration, which can be achieved with an oral rehydration mix. Antimotility agents, such as loperamide, should be used if there is no rapid resolution of the symptoms. It should be discontinued if symptoms persist for more than 48 hours or fever, severe abdominal cramps or dysentery occur. Antimotility agents should not be used in the latter circumstances because the severity of the disease can be increased by delaying the clearance of pathogens. The preferred treatment regimens are ciprofloxacin 500 mg or norfloxacin 400 mg 12-hourly for 3 days. These regimens are believed to reduce the duration of the diarrhoea. Co-trimoxazole is a less effective alternative. Quinolone resistance occurs in south-east Asia and azithromycin is of benefit against quinolone-resistant *C. jejuni*. Probiotics (encapsulated lactic acid organisms) restore the balance of intestinal microflora and are considered to be an effective form of treatment.³

Whether it be on a luxury cruise or a budget backpacking adventure, travellers are vulnerable to enteritis. They must be vigilant in their choice of meals and activities.

References available on request.

RABIES AND THE TRAVELLER: A NEGLECTED AND LETHAL VIRUS

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Rabies, an encephalomyelitis caused by an RNA virus belonging to the genus *Lyssavirus*, family Rhabdoviridae, is almost 100% fatal. It attacks the central nervous system as an acute, progressive encephalomyelitis. Humans contract the disease by exposure to the saliva of an infected animal, most usually a dog.¹ The transmission can be through a bite, scratch or lick of damaged skin or mucous membranes. Rabies is an incurable disease if the patient does not receive appropriate medical attention before the onset of clinical symptoms. The incubation period is usually between 3 weeks and 3 months but may range from 4 days to many years. Using vaccines to immunise after exposure is the only means of preventing an inevitable death. The World Health Organization estimates that there are between 40 000 and 70 000 rabies deaths per year. Approximately 10 million people receive post-exposure immunisation annually.²

The primary care physician has an important role to play in ensuring that high-risk individuals are aware of their vulnerability, knowing what is avail-

able for their benefit, offering appropriate options and ensuring that they are prepared before being exposed to unsafe conditions.³

Awareness

Generally travellers are unaware of the risk of rabies and the availability of a pre-exposure programme that reduces detrimental sequelae.³ Missionaries seem vulnerable to contracting rabies because they often work in high-risk conditions for protracted periods of time. They often do not receive the pre-exposure vaccine course because of ignorance. A study of missionaries from the USA demonstrated that an enhanced education campaign would correlate with more use of pre-exposure vaccination.⁴

Travellers fulfilling certain criteria⁵ are considered to be at high risk and should receive the pre-exposure vaccine:

- Those visiting tropical countries in Africa, Asia and South America.
- Those visiting countries known to carry poor-quality, unreliable vaccine, such as nerve tissue-derived vaccine and equine immunoglobulin.
- Those exposed to rural environs or urban settings in developing countries for more than 30 days.
- Adventure travellers and children.

Pre-exposure vaccines

Highly purified, modern, cell-cultured rabies vaccine is normally used in South Africa. These products have a low risk of reaction with good tolerability and immunogenicity. A course of pre-exposure prophylaxis usually consists of an intramuscular injection into the deltoid muscle on day 0, then on day 7 and 21 or 28 (Table I). Further boosters are generally not recommended unless there is prolonged exposure;⁵ if required, a booster at 12

Table I. Pre-exposure prophylaxis

Product	Dose (ml)	Vaccine doses (N)	Schedule (days)	Route
Verorab vaccine	0.5	3	0, 7, 21 or 28	Intramuscular
Rabipor vaccine	1.0	3	0, 7, 21 or 28	Intramuscular

Adapted from Centers for Disease Control and Prevention.⁶

Table II. **Post-exposure prophylaxis**

Immunisation status	Product	Dose	Doses(N)	Schedule (days)	Route
Not previously immunised	Rabies immunoglobulin	20 IU/kg body weight	1	0	Infiltrated at bite site (if possible); remainder intramuscular
	Verorab vaccine	0.5 ml	5	0, 3, 7, 14, 28	Intramuscular
	Rabipor vaccine	1.0 ml	5	0, 3, 7, 14, 28	Intramuscular
Previously immunised	Verorab vaccine	0.5 ml	2	0, 3	Intramuscular
	Rabipor vaccine	1.0 ml	2	0, 3	Intramuscular

Adapted from Centers for Disease Control and Prevention.⁶

months should ensure adequate antibody titres for 3 - 5 years. The same dosage is given to children, with the anterolateral aspect of the thigh used in small children. It takes 7 - 10 days to establish protective titres of antibodies. However, in individuals taking chloroquine, severely immunocompromised patients on systemic corticosteroids or immunosuppressive agents and those living with HIV/AIDS, an immunological response may not develop.⁶ Last-minute travellers who have less than 3 - 4 weeks to prepare have two options — start the course before departure and complete the series at the destination, provided suitable facilities are available; otherwise be vigilant in avoiding stray dogs, cats and approachable wild animals, and be prepared to seek medical assistance without delay. Tetanus is given to animal-bite victims, so the primary care physician should advise that tetanus immunisation is up to date.

The advantages of ensuring that the pre-exposure course is completed include that after coming into contact with rabies:

- Only 2 further vaccines on day 0 and 3 are required as opposed to a course of 5 vaccines over a period of 1 month (Table II).
- There is no need for rabies immunoglobulin, which is expensive and not always available.
- Partial protection is ensured if there

is a delay in acquiring medical attention.

- Where there is inadvertent contact there is a degree of protection, which may be adequate.

Preparations

Before departure the traveller should make appropriate preparations to limit the consequences of exposure to the fatal disease by:

- understanding the risk of contracting rabies, the nature of the illness and the fact that it almost universally leads to an excruciating death.
- having the names of medical facilities that store rabies immunoglobulin and vaccine
- listing embassies that may store the products
- finalising travel insurance to expedite evacuation to a secure medical facility or home and cover the cost of any medical attention and materials
- arranging uninterrupted supervision for children to ensure minimum exposure, since 30 - 60% of human rabies occurs in under 15-year-olds
- being aware of rabid animal behaviour which can be aggressive or feeble/docile
- knowing that an animal bite must be washed with copious amounts of water (with soap if possible) for 5 - 10 minutes, encouraging bleeding and delaying suturing
- including in the travel bag iodine-based disinfectant or 70% alcohol

which may inactivate the rabies virus.

If pets are taken along (e.g. by expatriates who relocate for long periods) their rabies immunisations should be up to date. A large reservoir of rabies exists in wild animals (sylvatic rabies); nevertheless 95 - 98% of human deaths are due to canine rabies. By protecting the domestic dog, the virus is prevented from spilling over from its sylvatic reservoir to the vulnerable human population.

A wide range of South African mammals have been implicated in the transmission of rabies⁷ and it would be difficult to fault practitioners who, faced with a patient giving a history of a potential exposure, erred on the side of caution and administered post-exposure prophylaxis. In South Africa a number of rabies deaths have been recorded in cases where medical advice was sought in a timely fashion but the practitioner declined to administer post-exposure prophylaxis.

Rabies is an underestimated threat to travellers, posing a risk at many travel destinations. Correct management of pre- and post-exposure prophylaxis is not difficult, and will prevent unnecessary deaths.

References available on request.