



Rabies

Background

Rabies is a vaccine-preventable viral disease transmitted by exposure to the saliva of infected warm-blooded animals (e.g. dogs, cats, monkeys, bats, raccoons, wolves, dingoes, skunks, foxes, mongooses, livestock), through bites and scratches or licks on damaged skin (e.g. wounds, grazes, damaged nail beds, etc). The disease is fatal once symptoms are present, but it is entirely preventable if post-exposure vaccinations are administered promptly. Only a handful of people have survived the disease, making it an extremely rare occurrence.

Animals can have infected saliva for up to ten days before they appear sick and die, thus any incident with a warm blooded animal must be suspected as a potential exposure to rabies. Certain mammals are known as 'reservoirs' of infection. Examples include the dog in most countries around the world, the fox in Europe, vampire bats in South America and the Caribbean, and the silver haired bat in North America. However, any mammal may be infected, and can in turn pass on the infection.

Rabies is found in more than 150 countries and their territories. It is common in most countries in Africa and Asia and in parts of Latin America. Rabies is now very rare in Western Europe and Papua New Guinea and absent from Australia, New Zealand, Norway, Sweden, Japan, and most Pacific Islands. Dogs are the main source of human rabies deaths, contributing up to 99% of all rabies transmission to humans. The risk to most careful travellers is relatively low, but intrepid travellers, those working in rural areas, vets, zoologists, and children are at higher risk.

What is the risk to travellers and international workers?

When in a risk area, you face two primary risks, both of which need preventing: the small but important one of being infected with rabies, and the more common experience of anxiety following an encounter with a suspicious animal that you did nothing about. If you are well informed and fully vaccinated, you will be protected against both these risks. Your maximum danger times are usually when travelling to rural areas, trekking or jogging, or when you or your children touch an apparently friendly but unknown dog, monkey, squirrel, cat, or any other warm blooded creature. There is also a risk from the pets of friends, especially dogs, in areas where rabies is common, who have not had their pet's rabies immunisations kept up-to-date.

How do you become infected with rabies?

Infection of rabies can take place after being bitten, scratched, or licked on broken skin or the mouth (that is, in any way a mammal's saliva can get under your skin or into your mucous membranes) by a rabid animal. Remember, rabid animals may not look sick until just before they are about to die, so presume that any warm blooded animal you see in a risk area has rabies in its saliva.

What are the symptoms in animals and humans?

In animals, symptoms often include a change in behaviour, such as a dog becoming more aggressive or more docile than usual. There may be an aversion to water. Unprovoked attacks by dogs or by any mammal that behaves aggressively should ring alarm bells, especially if rabies is common in the area. However, many infected and infectious mammals behave quite normally.

Humans can develop symptoms any time from four days to 19 years after being bitten, but usually between 2-3 months. The symptoms progress rapidly from fever and headache to paralysis, bouts of terror and aggression, to coma and death. There is no cure once symptoms have started so it is vital to understand that you cannot wait until symptoms appear. Always seek medical attention immediately after a potential rabies incident.

How do I protect myself from rabies?

The most important way to protect yourself from rabies is to try to avoid being bitten, licked, or scratched by a dog, cat, monkey, bat, or any other mammal. Children are at particularly high risk and you need to keep a careful eye on them and explain why they should never touch an unknown animal. It is also important for parents to ensure that children can report an animal bite, scratch, or lick without getting into trouble, so that parents can get them to medical attention as soon as possible.

Pre-exposure vaccination is recommended for those travelling to risk areas frequently or for lengthy periods of time, generally for 2-4 weeks or more.

Rabies – The Vaccine

A pre-exposure vaccination course, which primes your immune system with your own source of antibodies, involves three injections. At least seven days is required between the first and second doses and 14 to 21 days between the second and third doses (0, 7, 21-28 day schedule). The vaccine gives protection as soon as the course of three is completed. There is an accelerated schedule of zero, three, and seven days with a booster at one year. Primary courses of the three injections never need to be repeated, and regular boosters are only occasionally recommended as there is evidence to show that your immunity to rabies remains in your body for a long time. Those working with animals should ideally have their antibody levels checked regularly.

After any encounter with a potentially rabid animal, a further two doses of rabies vaccination are needed to wake up the initial immune response and ensure the rabies virus is killed. Contrary to some people's fears, the modern rabies vaccine is both simple and safe.

There are several non-live rabies vaccines, which are largely interchangeable and are given by intramuscular injection (IM), or in some clinics and countries, by intradermal injection (ID). These injections are given before exposure (i.e. before you travel) but the same ones are also used after a potential exposure. However, when given post-exposure, it should ideally be administered by intramuscular injection only; for adults and most children in the upper arm (deltoid muscle) but for

very young children in the outer-upper thigh (anterolateral aspect of thigh). It should never be given in the buttock (gluteal muscle).

All those immunised will still need two post-exposure vaccines given as soon as possible after any potential exposure, with the second one given three to seven days later. Those previously not vaccinated will need a full course of four post-exposure vaccines (given on days 0, 3, 7, 21) and Rabies Immunoglobulin (RIG) in addition. If the day 21 vaccine is missed then a fifth vaccine is recommended two weeks after the 4th dose.

Rabies injections in children under the age of 12 months may not be advised. Rabies vaccine should be avoided in anyone who has had a significant reaction to a previous dose, and in anyone with a high fever or who is seriously ill. Pregnant women should receive it if their risk is very high, though after any possible exposure it is essential. Side-effects are few, and include local swelling and redness, and occasionally fever and headache, or (extremely rarely) more general allergic reactions.

How I decide if I should be vaccinated?

Deciding whether or not to get immunised is a tricky question because the risk is low but the worry and potential consequences are great. The expense of the pre-exposure vaccine course also puts some people off. There are no universally agreed guidelines on this, and risk and benefit need to be carefully weighed by an experienced travel health clinician. We believe the following travellers and international workers should consider getting the vaccine:

- Those staying longer than two weeks in sub-Saharan Africa or Southern or Southeast Asia;
- Those staying longer than one month in other areas of the world where rabies is known to occur, including Central and South America and Western Asia;
- Those visiting an affected area for any length of time who will be travelling to or working in remote areas which are more than 24 hours from the capital, or from a city known to have an equivalent level of health care and transport should a medical evacuation be necessary.

Advantages of having rabies pre-exposure vaccinations

- It reduces the number of post-exposure vaccines you need after a risk incident from five vaccinations over a month, down to two vaccines given a few days apart.
- It means you will not need to have Rabies Immunoglobulin (RIG) injected into the wound and other sites of your body. This blood product can be extremely difficult to obtain, as it is in short supply globally, and has with it a higher level of reaction risk, as it is a blood product that can be made from either human or horse antibodies.
- If you get a dog bite in a risk area and have not had the rabies pre-exposure vaccine course, there is a good chance you will need to be urgently evacuated to a well-resourced area to access the appropriate treatment.

- It limits the risk of delays in accessing post-exposure treatment when you just need the rabies vaccine which is much more widely available globally.

Rabies – Post-exposure treatment

What do I do if the worst happens?

If a warm-blooded animal in a risk area has somehow got their saliva under your skin through a bite or a scratch, or it has licked a cut/graze or mucous membrane (e.g. mouth or eyes), you need to:

- If possible, wash the area of the wound carefully with soap and water under a running tap to remove all saliva and dirt (avoid scrubbing).
- Apply some sort of antiseptic, iodine, or alcohol; ideally 70% ethanol, but gin, whisky, or other spirits will have some effect.
- Seek immediate medical attention.
- Do not have the wound stitched up, especially within the first 48 hours.
- You will then need post-exposure prophylaxis (PEP) rabies vaccines as soon as possible:
- Two post-exposure vaccinations if you have had the three rabies vaccines pre-travel.
- Or the full course of five rabies vaccines over a month plus Rabies Immunoglobulin (RIG) to provide passive immunity to the virus while your body responds to the post-exposure vaccination course.

Assume any animal which is unknown, behaving strangely, or disappears after the incident has rabies in its saliva. If you can (e.g. if it is a friend's pet or village dog) observe the animal for ten days. If it is still alive on the tenth day, you can relax and discontinue any treatment you have started. This is because animals are only infectious and able to transmit the rabies for ten days before they are killed by the disease.

Be aware of the World Health Organization's definitions of rabies exposure categories:

- **Category 1:** No physical contact with saliva. This includes touching, stroking, or feeding animals, or licks on intact skin. These need no treatment.
- **Category 2:** Minimal contact with saliva. This includes licks to broken skin (such as insect bites or scratches); nibbling of uncovered skin; minor scratches or abrasion without bleeding. These require immediate vaccination and local treatment of the wound.
- **Category 3:** Direct contact with saliva. This includes severe/deep laceration to skin (down to muscle); single or multiple transdermal bites or scratches; contamination of mucous

membrane with saliva from licks, contact with bats. These require immediate vaccination and administration of rabies immunoglobulin; local treatment of the wound.

Start post-exposure injections as follows for any Category 2 or 3 exposure:

- If you have definitely had a course of three primary injections over at least a three to four week period (i.e. your rabies vaccine is up-to-date), all you need is the short regime consisting of two post-exposure rabies vaccines. Have the first dose as soon as possible and the second three to seven days later. No rabies deaths have occurred in those following this regime.
- If you have not had a full course as described above (i.e. you have had some rabies vaccines, but not the full course), you will need the full regime of treatment. This includes four post-exposure doses of rabies vaccine starting as soon as possible and then on days 3, 7, and 21 after the first dose.
- If you have never previously had any rabies vaccine, you will need Rabies Immunoglobulin (RIG) at a dose of 20 units per kg of your body weight, injected into and around the bite site, and into standard vaccination sites in your thighs and upper arm. Then you will need the full regime of four vaccinations as described above.

What else should I do?

Make sure your tetanus is up-to-date. It should have been given within the last 10 years. Animal bites also carry a high risk of secondary bacterial or viral infection, meaning further preventative treatment may be needed. Seek medical advice.

Special situations

- **Rabies and Children**

Children and toddlers with their often fearless love of animals have a higher risk of being exposed to rabies. They are also at increased risk of being bitten on the head area owing to their size in relation to that of a dog. This means that the virus does not have far to travel to the brain. Once the brain is infected the virus goes on to cause the fatal symptoms. Actively discourage children from touching unknown animals. Pre-exposure vaccination is currently only given from one year upwards, in general because babies are usually carried and out of reach of animals. However, post-exposure treatment would be given regardless of age.

- **Rabies and Pregnancy**

In pregnancy, it is all about balancing risks. Although we would prefer not to give vaccines in pregnancy, if a pregnant woman were to be travelling to high-risk areas, especially where post-exposure treatment may be difficult to obtain, then the pre-exposure rabies vaccination course would be offered. Ideally, pregnant women could plan to have rabies vaccination before conception if they are likely to be in a risk setting. If they have a Category 2 or 3 risk as above, full immunisation as recommended is essential. No serious adverse reactions have been reported affecting pregnancy.

Wrong advice

If a local doctor suggests that a single injection or tablet alone is sufficient, do not accept such advice. Follow the instructions above.

If you are worried, contact a health professional you trust for advice or ring your travel insurance medical helpline.

Sources

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