



Media centre

Rabies

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Key facts

- Rabies occurs in more than 150 countries and territories.
- More than 55 000 people die of rabies every year mostly in Asia and Africa.
- 40% of people who are bitten by suspect rabid animals are children under 15 years of age.
- Dogs are the source of the vast majority of human rabies deaths.
- Wound cleansing and immunization within a few hours after contact with a suspect rabid animal can prevent the onset of rabies and death.
- Every year, more than 15 million people worldwide receive a post-exposure vaccination to prevent the disease– this is estimated to prevent hundreds of thousands of rabies deaths annually.

Rabies is a zoonotic disease (a disease that is transmitted to humans from animals) that is caused by a virus. The disease affects domestic and wild animals, and is spread to people through close contact with infectious material, usually saliva, via bites or scratches.

Rabies is present on all continents with the exception of Antarctica, but more than 95% of human deaths occur in Asia and Africa. Once symptoms of the disease develop, rabies is nearly always fatal.

Rabies is a neglected disease of poor and vulnerable populations whose deaths are rarely reported. It occurs mainly in remote rural communities where measures to prevent dog to human transmission have not been implemented. Under-reporting of rabies also prevents mobilization of resources from the international community for the elimination of human dog-mediated rabies.

Symptoms

The incubation period for rabies is typically 1–3 months, but may vary from <1 week to >1 year. The initial symptoms of rabies are fever and often pain or an unusual or unexplained tingling, pricking or burning sensation (paraesthesia) at the wound site.

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Related links

[WHO's work on rabies](#)

[WHO Expert Consultation on Rabies: first report, 2005 \[pdf 514kb\]](#)

[More about rabies](#)

As the virus spreads through the central nervous system, progressive, fatal inflammation of the brain and spinal cord develops.

Two forms of the disease can follow. People with furious rabies exhibit signs of hyperactivity, excited behaviour, hydrophobia and sometimes aerophobia. After a few days, death occurs by cardio-respiratory arrest.

Paralytic rabies accounts for about 30% of the total number of human cases. This form of rabies runs a less dramatic and usually longer course than the furious form. The muscles gradually become paralyzed, starting at the site of the bite or scratch. A coma slowly develops, and eventually death occurs. The paralytic form of rabies is often misdiagnosed, contributing to the under-reporting of the disease.

Diagnosis

No tests are available to diagnose rabies infection in humans before the onset of clinical disease, and unless the rabies-specific signs of hydrophobia or aerophobia are present, the clinical diagnosis may be difficult. Human rabies can be confirmed intra-vitam and post mortem by various diagnostic techniques aimed at detecting whole virus, viral antigens or nucleic acids in infected tissues (brain, skin, urine or saliva).

Transmission

People are usually infected following a deep bite or scratch by an infected animal. Dogs are the main host and transmitter of rabies. They are the source of infection in all of the estimated 50 000 human rabies deaths annually in Asia and Africa.

Bats are the source of most human rabies deaths in the Americas. Bat rabies has also recently emerged as a public health threat in Australia and western Europe. Human deaths following exposure to foxes, raccoons, skunks, jackals, mongooses and other wild carnivore host species are very rare.

Transmission can also occur when infectious material – usually saliva – comes into direct contact with human mucosa or fresh skin wounds. Human-to-human transmission by bite is theoretically possible but has never been confirmed.

Rarely, rabies may be contracted by inhalation of virus-containing aerosol or via transplantation of an infected organ. Ingestion of raw meat or other tissues from animals infected with rabies is not a source of human infection.

Post-exposure prophylaxis (PEP)

Post-exposure prophylaxis (PEP) consists of:

- local treatment of the wound, initiated as soon as possible after exposure;
- a course of potent and effective rabies vaccine that meets WHO recommendations; and

- the administration of rabies immunoglobulin, if indicated.

Effective treatment soon after exposure to rabies can prevent the onset of symptoms and death.

Local treatment of the wound

Removing the rabies virus at the site of the infection by chemical or physical means is an effective means of protection. Therefore, prompt local treatment of all bite wounds and scratches that may be contaminated with rabies virus is important. Recommended first-aid procedures include immediate and thorough flushing and washing of the wound for a minimum of 15 minutes with soap and water, detergent, povidone iodine or other substances that kill the rabies virus.

Recommended PEP

PEP depends on the type of contact with the suspected rabid animal (see table).

Table: Categories of contact and recommended post-exposure prophylaxis (PEP)

Categories of contact with suspect rabid animal	Post-exposure prophylaxis measures
Category I – touching or feeding animals, licks on intact skin	None
Category II – nibbling of uncovered skin, minor scratches or abrasions without bleeding	Immediate vaccination and local treatment of the wound
Category III – single or multiple transdermal bites or scratches, licks on broken skin; contamination of mucous membrane with saliva from licks, contacts with bats.	Immediate vaccination and administration of rabies immunoglobulin; local treatment of the wound

All category II and III exposures assessed as carrying a risk of developing rabies require PEP. This risk is increased if:

- the biting mammal is a known rabies reservoir or vector species;
- the animal looks sick or has an abnormal behaviour;
- a wound or mucous membrane was contaminated by the animal's saliva;
- the bite was unprovoked; and
- the animal has not been vaccinated.

In developing countries, the vaccination status of the suspected animal alone should not be considered when deciding whether to initiate prophylaxis or not.

Who is most at risk?

Dog rabies potentially threatens over 3 billion people in Asia and Africa. People most at risk live in rural areas where human vaccines and

immunoglobulin are not readily available or accessible.

Poor people are at a higher risk, as the average cost of rabies post-exposure prophylaxis after contact with a suspected rabid animal is US\$ 40 in Africa and US\$ 49 in Asia, where the average daily income is about US\$ 1–2 per person.

Although all age groups are susceptible, rabies is most common in children aged under 15. On average 40 % of post-exposure prophylaxis regimens are given to children aged 5–14 years, and the majority are male.

Anyone in continual, frequent or increased danger of exposure to rabies virus – either by nature of their residence or occupation – is also at risk. Travellers with extensive outdoor exposure in rural, high-risk areas where immediate access to appropriate medical care may be limited should be considered at risk regardless of the duration of their stay. Children living in or visiting rabies-affected areas are at particular risk.

Prevention

Eliminating rabies in dogs

Rabies is a vaccine-preventable disease. The most cost-effective strategy for preventing rabies in people is by eliminating rabies in dogs through vaccination. Vaccination of animals (mostly dogs) has reduced the number of human (and animal) rabies cases in several countries, particularly in Latin America. However, recent increases in human rabies deaths in parts of Africa, Asia and Latin America suggest that rabies is re-emerging as a serious public health issue.

Preventing human rabies through control of domestic dog rabies is a realistic goal for large parts of Africa and Asia, and is justified financially by the future savings of discontinuing post-exposure prophylaxis for people.

Preventive immunization in people

Safe, effective vaccines can be used for pre-exposure immunization. This is recommended for travellers spending a lot of time outdoors, especially in rural areas, involved in activities such as bicycling, camping, or hiking as well as for long-term travellers and expatriates living in areas with a significant risk of exposure.

Pre-exposure immunization is also recommended for people in certain high-risk occupations such as laboratory workers dealing with live rabies virus and other rabies-related viruses (lyssaviruses), and people involved in any activities that might bring them professionally or otherwise into direct contact with bats, carnivores, and other mammals in rabies-affected areas. As children are considered at higher risk because they tend to play with animals, may receive more severe bites, or may not report bites, their immunization could be considered if living in or visiting high risk areas.

WHO response

For at least three decades WHO has fought to break the "cycle of neglect"

affecting rabies prevention and control particularly in low- and middle-income countries through advocacy, surveys and studies and research on the use of new tools .

The Organization continues to promote human rabies prevention through the elimination of rabies in dogs as well as a wider use of the intradermal route for PEP which reduces volume and thereby cost of cell-cultured vaccine by 60 to 80%.

WHO supports targets for elimination of human and dog rabies in all Latin American countries by 2015 and of human rabies transmitted by dogs in South-East Asia by 2020. In this latter region a five-year plan (2012–2016) aims to halve the currently estimated number of human rabies deaths in endemic countries.