

Frequently asked questions about rabies for the General Public

World Health Organization

14 February 2018



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RABIES OVERVIEW

Q.1 WHAT IS RABIES?

Rabies is a viral disease transmitted from mammals to humans that causes an acute encephalitis. There are two clinical manifestations of rabies: furious and paralytic. Furious rabies is the most common form of human rabies. Once symptoms of the disease develop, either form is almost always fatal. Rabies is transmitted through mucosal exposure to infected animals, such as rabid dogs, bats and sometimes other species. As dog bites cause almost all human cases, we can prevent rabies deaths by increasing awareness, vaccinating dogs to prevent the disease at its source and administering life-saving post-exposure prophylaxis to people after they have been bitten.

Q.2 WHERE DOES RABIES OCCUR?

Rabies occurs worldwide and on all continents except for Antarctica. However, the vast majority of human deaths (up to 99%) are caused by the classical rabies virus transmitted by dogs (Fig. 1). Anyone bitten by a rabid animal or exposed to the saliva of a rabid animal is at risk from developing rabies and should seek immediate medical advice to initiate life-saving post-exposure prophylaxis.

Rabies kills about 60 000 people each year, mostly in Asia and Africa. Children are at higher risk of rabies because they often play with animals; are more likely to receive a bite to the face or neck; and may not report bites or scratches received during play.

Bites from rabid dogs cause up to 99% of human rabies cases. Rabies is almost always fatal once clinical signs occur. There is currently no effective treatment for rabies after clinical signs appear. However, the disease is preventable through vaccination either before or immediately after an exposure.

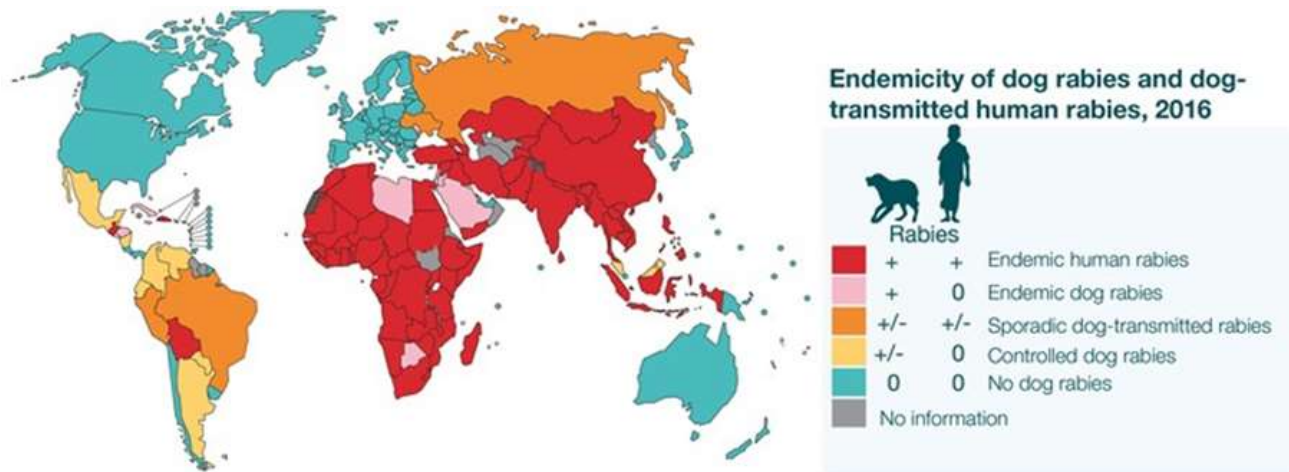


Figure 1. Distribution of dog-mediated rabies worldwide, based on 2016 data

RABIES TRANSMISSION FROM ANIMALS

Q.3 HOW IS RABIES TRANSMITTED?

The rabies virus is mainly transmitted from the saliva of a rabid animal when it bites or scratches a person. Licks to wounds, grazes, broken skin, or to the lining of the mouth and nose, can also transmit the virus.

Dogs are responsible for up to 99% of human rabies cases, however the virus can be transmitted from the bite of any rabid animal. Human rabies cases have occurred because of bites from cats, bats, mongooses, jackals, foxes, wolves and other carnivorous animals. Worldwide, rabies due to monkey and rat bites is rare. Many animals will become aggressive and bite when they have rabies, including horses and donkeys. In animals where biting is not common, such as cattle and buffalo, transmission can still occur through exposure to saliva. Care should be taken while examining sick animals that are salivating.

Q.4 THROUGH WHAT BODILY PRODUCTS CAN RABIES BE TRANSMITTED?

The most common route of transmission is through the saliva of a rabid animal. However, the rabies virus has also been found, and could possibly be transmitted, through other bodily fluids such as tears, and nervous tissue. Rabies virus is not found in blood or faeces.

There are no evidence-based reports of human rabies arising from consumption of milk, including breastmilk, or cooked meat. However, consuming the meat or milk of a rabid animal is strongly discouraged.

Individuals or professionals who slaughter rabies-infected mammals and handle tissues of rabid animals may be at risk of contracting the virus through breaks in their skin. These individuals should use specialized personal protective equipment and consult infectious disease specialists if they suspect they have been exposed to rabies-infected carcasses.

Human-to-human transmission of rabies is extremely rare. However, caregivers should be vigilant when looking after patients with rabies and avoid contact with their saliva and other excretions. Hand washing and good personal hygiene are of upmost importance when caring for patients with rabies.

Q.5 CAN THE CONSUMPTION OF RAW MEAT FROM A RABIES-INFECTED ANIMAL TRANSMIT RABIES?

Consuming the meat from a rabid animal is strongly discouraged. Although no human cases have been documented following the consumption of uncooked meat from a rabid animal, butchering or eating a rabid animal may potentially transmit rabies. If an exposure occurs, PEP should be initiated.

Cooked meat does not transmit rabies; however, it is not advisable to butcher or consume meat of any kind from an infected animal. The carcass should be buried or burned if possible, with advice from a veterinary professional.

Q.6 IS PEP NECESSARY IF MILK OR MILK PRODUCTS FROM A RABIES-INFECTED ANIMAL ARE CONSUMED?

There is no laboratory or epidemiological evidence to show that rabies is transmitted via the consumption of milk or milk products. Therefore, PEP is not required for consuming any milk or milk products. However, as for any animal suffering from infectious diseases, it is not advisable to consume milk from rabid animals.

Q.7 WHAT SHOULD I DO IF MYSELF OR MY PET HAS HAD CONTACT WITH A BAT?

If you or your pet has had contact with a bat, it is recommended that you thoroughly wash the site of contact and immediately consult a physician at a health facility. You should also contact your health department for assistance to have the bat tested for rabies. Do not touch **any bats**.

If you think your pet or domestic animal has been bitten by a bat, immediately contact a veterinarian.

Remember to keep vaccinations current for dogs, cats and ferrets.

In addition to rabies, bats can carry a variety of dangerous diseases. Advice should be sought from physicians as to whether other treatments may be required.

Bats can sometimes bite without causing obvious wounds and marks. Attention must be paid to the possibility of exposures or bites in situations where people are in close contact with bats.

In the Americas, because of progress in the elimination of canine rabies, rabies fatalities in humans are more frequently caused by bat-associated rabies virus.

Bats are usually shy and gentle animals, and are hugely important to our ecosystems. You cannot get rabies just from seeing or being in the same area as a bat.

A bat being handled can bite in self-defence.

If you are able to approach a bat – it cannot fly, is on the floor or clinging to the wall – it is more likely to be sick, injured or infected with rabies.

Do not touch the bat.

If the bat needs to be moved for safety reasons or you are sure there has been contact with the bat, follow these steps to safely capture the bat:

1. When the bat lands, approach it slowly, while wearing leather work gloves.
2. Place a box or tin gently over the bat.
3. Slide a piece of cardboard under the container to trap the bat inside.
4. Tape the cardboard to the container securely, and punch small holes in the cardboard, allowing the bat to breathe.
5. Contact animal control or the health department to make arrangements for testing.

Q.8 DO YOU REQUIRE PEP IF BITTEN BY A RAT?

Under normal circumstances, rabies is not transmitted by rodents. As a general rule it is therefore not necessary to receive PEP if bitten by a rat.

However, if bitten by a rodent, you should still wash and clean the wound as you would with any other animal bite wound. Ask your physician if other care, e.g. anti-tetanus prophylaxis, is required.

RABIES TRANSMISSION FROM HUMANS

Q.9 THROUGH WHAT BODILY PRODUCTS CAN RABIES BE TRANSMITTED?

The most common route of transmission is through the saliva of a rabid animal. However, the rabies virus has also been found, and could possibly be transmitted, through other bodily fluids such as tears, and nervous tissue. Rabies virus is not found in blood or faeces.

There are no evidence-based reports of human rabies arising from consumption of milk, including breastmilk, or cooked meat. However, consuming the meat or milk of a rabid animal is strongly discouraged.

Individuals or professionals who slaughter rabies-infected mammals and handle tissues of rabid animals may be at risk of contracting the virus through breaks in their skin. These individuals should use specialized personal protective equipment and consult infectious disease specialists if they suspect they have been exposed to rabies-infected carcasses.

Human-to-human transmission of rabies is extremely rare. However, caregivers should be vigilant when looking after patients with rabies and avoid contact with their saliva and other excretions. Hand washing and good personal hygiene are of utmost importance when caring for patients with rabies.

Q.10 CAN RABIES BE TRANSMITTED THROUGH ORGAN TRANSPLANTATION?

Yes. Organs transplanted from rabid organ donors can transmit rabies to the organ recipient. Individuals with symptoms of encephalitis (inflammation of the brain) before death should therefore be excluded as organ donors. Human-to-human transmission has never been confirmed outside the organ transplantation situation.

RABIES SYMPTOMS

Q.11 WHAT ARE THE SYMPTOMS OF RABIES IN A DOG?

Dog rabies is characterized by changes to its normal behaviour, such as:

- unprovoked abnormal aggression (e.g. biting two or more people or animals and/or inanimate objects without provocation);
- abnormal behaviour;
- restlessness;
- incoordination and paralysis;
- lethargy;

- abnormal vocalization or a change in vocalization (e.g. hoarse barking and growling or inability to make a sound); and
- hyper salivation, excessive salivation or foaming at the edges of the mouth.

The incubation period ranges from a few days to several months, however death usually occurs within 10 days after the onset of symptoms. Any bite from a dog in an area endemic for rabies should be considered a potential risk.

Q.12 HOW DOES RABIES DEVELOP IN HUMANS?

After entering the human body e.g. through an animal bite, the rabies virus enters the peripheral nervous system and migrates to the central nervous system (spinal cord and brain). The infected person exhibits behavioural changes and clinical signs when the virus reaches the brain. Clinical signs typically appear 2-3 months after a person has been infected. In exceptional cases, clinical signs can develop after a few days, or after more than six months, following an exposure.

Q.13 WHAT ARE THE SYMPTOMS OF RABIES IN HUMANS?

People with rabies have the following signs and symptoms:

- discomfort, pain, prickling or itching sensation at the site of bite wound;
- neurological dysfunction, progressing within days, including but not limited to anxiety, confusion and agitation. As the disease progresses, the person may experience delirium, hallucinations, insomnia and other abnormal behaviour;
- aerophobia (fear of air)
- hydrophobia (fear of water); at a later stage the mere sight of water may provoke spasms in the neck and throat
- intolerance to noise, bright light or drafts;
- hyperactivity (typically in furious rabies)
- difficulty swallowing, nausea, vomiting;
- localized weakness, paralytic syndromes;
- coma and death

Death is caused by cardiac or respiratory failure, typically within 7–10 days after the first signs, if no intensive care is instituted. There is currently no effective treatment for rabies after clinical signs appear.

Q.14 WHAT FACTORS INFLUENCE THE DEVELOPMENT OF HUMAN RABIES?

Anyone bitten by a rabid animal or exposed to the saliva of a rabid animal is at risk from developing rabies, and should seek immediate medical advice to initiate life-saving post-exposure prophylaxis.

Several factors influence the likelihood of rabies developing, including:

- the severity of the bite – scratch, superficial bite, deep bite, multiple bites, etc.;
- the amount of the rabies virus introduced to the wound site;
- the animal responsible for the bite (e.g. bat, virus strain carried, clinically rabid animal);
- the immune status of the victim; and

- the site of the bite – head and neck wounds, as well as wounds in highly innervated areas such as fingers, generally have shorter incubation periods (i.e. time from infection to clinical signs/death) due to the proximity of the viral inoculation to the nerves.

Q.15 IS RABIES ALWAYS FATAL?

Human rabies is almost invariably fatal once clinical symptoms occur. There is currently no effective treatment available anywhere in the world for rabies patients who already show clinical signs of the disease.

Rabies is almost always fatal once clinical signs appear. No specific treatment is available for clinical rabies. However, clinical rabies can be prevented through vaccination given before or immediately after an exposure.

Although rabies is a fatal disease, survival has been documented in at least 15 cases around the world. Almost all survivors had received at least a partial course of preventative, pre-exposure prophylaxis (PrEP) that might have modified the course of illness. All survivors experienced severe, debilitating sequelae on recovery.

People exposed to rabies should receive prompt post-exposure prophylaxis (PEP) to prevent clinical rabies. PEP consists of wound washing, a series of rabies vaccinations, and in some cases rabies immunoglobulin.

As dog bites cause almost all human cases, we can prevent rabies deaths by vaccinating dogs to prevent the disease at its source.

RABIES PREVENTION

Q.16 WHAT CAN BE DONE TO PREVENT AND CONTROL RABIES?

Dog vaccination and [bite prevention](#) are key to stopping rabies transmission between dogs and from dogs to humans. Preventing rabies at its source is a cost-effective and sustainable way to save lives.

International organizations such as the World Health Organization (WHO) and its partners support countries to conduct **effective dog vaccination campaigns** by (i) making dog rabies vaccine banks available to ensure consistent, affordable, high-quality vaccines; (ii) strengthening health and veterinary services to deliver effective dog vaccination campaigns; and (iii) promoting innovative mechanisms to reach free-roaming dogs increase dog vaccination coverage.

To achieve control and eventual elimination of rabies, programmes should conduct recurrent (usually annual) mass dog vaccination campaigns. Achieving vaccination coverage of at least should be sufficient to maintain the required level of herd immunity in the susceptible dog population.



and

Vaccinating 70% of dogs breaks the rabies transmission cycle in areas at risk

70%

It is vital to have your dog vaccinated against rabies to protect you, your family and your community.

More information can be found at [WHO Dog rabies control webpage](#) or [OIE Rabies Portal](#)

Q.17 HOW CAN WE PREVENT DOGS FROM BITING

PREVENTION IS BETTER THAN CURE. STOP BITES BEFORE THEY HAPPEN.

How should we treat dogs we are familiar with?

When dogs are young, we should interact with them frequently and gently to make sure they are not scared of people. Puppies should enjoy playing with people to ensure they grow up used to humans handling them, and learn not to bite. This is how we bond with our pets.

All owners should learn how to communicate with their dogs so they can avoid dangerous situations and train their dogs to be well behaved around people.

Dogs may not understand that biting is wrong. Often dogs bite if they are scared or trying to protect themselves. To avoid being bitten by dogs, we need to understand:

- how dogs are feeling;
- how to approach dogs safely; and
- when it is safe to interact with dogs

[Friend's don't bite! Illustrated guide to pet care and bite prevention](#)

[Want a friend? Be a friend! The guide to pet care and bite prevention.](#)

How should we treat dogs we are not familiar with?

If a dog runs towards you, stand still and keep quiet. Let the dog sniff you. When it walks away you should walk away slowly and quietly in the opposite direction.

Stay away from any dogs you do not know. This includes dogs that are chained or behind fences.

Never tease, chase or throw anything at dogs. Do not disturb dogs that are eating, sleeping or feeding puppies. Do not hit, kick or shout at a dog. Keep away from dogs that are behaving strangely.

A guide to preventing dog bites is available here:

http://www.who.int/rabies/resources/Five_tips_to_prevent_dog_bites_poster.pdf?ua=1

Q.18 HOW SHOULD AN ANIMAL BITE BE TREATED?

If a person is bitten by an animal, the following measures should be taken:

- Wash wounds and scratches immediately with soap or detergent and flush them thoroughly for about 15 minutes with copious amounts of water. If soap is not available, flush with water alone. Wound washing is the *most effective first-aid treatment against rabies*.
- Apply an iodine-containing or anti-viral medication preparation on top of the wound 15 minutes after it has been washed and flushed.

- Take the person to a health care facility for further assessment and treatment by a healthcare professional as soon as possible.
- Safely confine the biting animal, where possible, and collect information on it and the bite circumstance to provide information to the health care professional and public health officer.
- Keep the biting animal confined and under observation for 10 days.

Check with local authorities regarding how to appropriately report dog bites and biting dogs.

AVOID applying irritants to the wounds such as chili powder, plant juices, acids and alkalis.

DO NOT cover the wound with dressings or bandages.

Q.19 DO YOU HAVE TO GET A VACCINATION AGAINST RABIES IF A VACCINATED DOG BITES YOU?

Not all animal bites require preventive rabies interventions, but medical advice should be sought immediately if the bite arises from an animal showing signs of rabies or from an animal in a rabies-endemic country. Where the biting animal appears healthy and normal, the bite was provoked, and the animal has received up-to-date high-quality vaccine (with appropriate documentation), post-exposure prophylaxis is not necessary.

Check with local authorities regarding how to appropriately report dog bites or biting animals.

Q.20 DO YOU HAVE TO RECEIVE VACCINATION AGAINST RABIES IF A DOG OF UNKNOWN VACCINE STATUS BITES YOU?

Yes. Post-exposure rabies prophylaxis (PEP) is necessary if you are bitten by a dog, cat or other animal that is rabid or is suspected to be infected with the rabies virus. The assessment about whether you need PEP should be performed by trained healthcare personnel. PEP is always required if laboratory tests of brain material are positive for rabies.

Further information is available in the WHO guidelines <http://www.who.int/rabies/human/postexp/en/>

Q.21 WHAT IS POST-EXPOSURE PROPHYLAXIS (PEP)?

PEP, or post-exposure prophylaxis, is the administration of rabies vaccine, with or without rabies immunoglobulin, **AFTER** an exposure and includes:

1. Wound washing and wound care (see [How should an animal bite be treated?](#))
2. Administration of a series of rabies vaccine injections **immediately** after an exposure.

PEP sometimes includes:

3. Administration of rabies immunoglobulins (RIG), depending on the severity of the exposure.

Further information is available in the WHO guidelines: <http://www.who.int/rabies/human/postexp/en/>

Q.22 IS SIMPLY OBSERVING THE BITING ANIMAL FOR 10 DAYS WITHOUT STARTING POST-EXPOSURE PROPHYLAXIS JUSTIFIED?

No. In countries where rabies is prevalent, it is necessary to start post-exposure prophylaxis for the exposed person promptly, and keep the biting animal under observation for 10 days where possible. An animal infected with rabies will usually show clinical signs, or die, within 1-7 days, providing the basis of the 10-day observation period.

If the animal remains healthy during the observation period then post-exposure prophylaxis can be converted into a pre-exposure regimen.

Q.23 WHAT IS PRE-EXPOSURE PROPHYLAXIS (PREP)?

PrEP, or pre-exposure prophylaxis, is the administration of rabies vaccine **BEFORE** an exposure to the rabies virus occurs and makes treatment after an exposure to the rabies virus easier.

PrEP is recommended for individuals at higher risk of rabies due to their occupation (e.g. veterinarians and animal health workers), and travellers to areas endemic for rabies. It can also be administered in populations living in remote, rabies-endemic areas that may not have access to timely and adequate post-exposure prophylaxis.

Q.24 IS THERE A SINGLE-DOSE HUMAN RABIES VACCINE THAT WILL PROVIDE LIFE-LONG IMMUNITY?

At present, there is no single-dose rabies vaccine available anywhere in the world that can provide life-long immunity.

Rabies vaccines are given as a series. Regardless of previous vaccination, if exposed to the virus you will require another series of vaccines.

RABIES VACCINE SAFETY

Q.25 IS IT POSSIBLE TO DEVELOP RABIES FROM THE VACCINATION?

No. All rabies vaccines for human use are inactivated. Human rabies vaccines undergo a series of quality control tests such as potency, toxicity, safety and sterility. It is not possible for the rabies vaccination to cause the disease. Human rabies vaccines are safe highly effective at preventing rabies.

Q.26 IS RABIES VACCINATION DURING PREGNANCY AND LACTATION SAFE?

Pregnant and lactating women can safely receive the rabies vaccine.

Life-saving rabies vaccinations should never be withheld. There is no scientific evidence that suggests the baby is harmed by the vaccine or will acquire the rabies virus from the womb or breast milk. To date there have been no documented cases of rabies transmission from pregnancy or breastfeeding.

RABIES TREATMENT

Q.27 IS THERE ANY SPECIFIC TREATMENT FOR A RABIES PATIENT?

Rabies is fatal; there is no reliable treatment once rabies develops. Palliative treatment of rabies patients should focus on reducing pain and anxiety, and keeping the patient as comfortable as possible.

Precautions should be taken by the caregiver to avoid contamination of mucous membranes and wounds with saliva e.g. by washing hands, exercising good hygiene, and using personal protective equipment such as gloves.

- The patient should be kept in a quiet room with subdued light and be protected from stimuli (e.g. loud noises, cold air) that are likely to increase spasms and convulsions.
- Sedation with benzodiazepines or intravenous morphine will help control muscular spasms and excitability. Tranquilizers can be given for cases of severe restlessness, agitation, hallucination, or aggression.
- Feeding orally is usually impossible. Fluids should be given intravenously.
- Current “aggressive” protocols such as the Milwaukee protocol do not reliably produce survival, and may cause severe consequences.

The privacy, dignity and cultural needs of patients should be respected. Preserving the capacity of the family to communicate with their loved ones in their dying moments must be a priority. This should be discussed with the family as early as possible once the diagnosis has been made.

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Sources

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