

## Commentary

# What is the risk of rabies transmission from patients to health care staff?

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Admission of a human rabies case to hospital often creates great anxiety among staff that fear contamination. The care of a rabies patient requires only standard infectious precautions consisting of basic preventive measure applied in many other common diseases. This should be sufficient to prevent transmission to staff. Therefore, prevention of anxiety among health care workers should be an achievable goals.

**Keywords:** Health care workers, prevention, rabies transmission

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Rabies is an acute viral disease that causes encephalomyelitis in virtually all mammals including man. Rabies is primarily a disease of dogs and carnivores. Dog, cat, and wild carnivores like fox, jackal, wolf, mongoose, skunk, coyote, raccoon, and raccoon dog, plays an important role as vectors of rabies transmission to other animals. This also depends on epidemiological conditions and geographical location. Many domestic and some wild animals infected become “dead end hosts” and hence, usually do not play any role in further spread to new hosts.

Worldwide, more than 55,000 people die of rabies every year and rabies occurs in more than 150 countries and territories [1]. Dog bite is responsible for more than 95% of human rabies infection in endemic countries where stray dogs outnumber pet dogs and dog vaccination against rabies is not mandatory.

### ***Characteristics of rabies virus and mode of transmission***

Rabies virus is neurotropic and saliva of a rabid animal becomes infected during the course of rabies

illness. Salivary glands of experimentally infected dogs and cats with detectable virus have had geometric mean titers ranging from 3,400 to 386,000 mouse LD<sub>50</sub>/g [2, 3]. Thus, saliva of a rabid animal can be highly infectious. Animal bites are the primary mode of transmission. The virus is fragile and a rabid animal must inoculate it through the bite. Then, the wound is contaminated with saliva, which acts as the vehicle for rabies virus. However, rabies virus is not continuously present in canine and human saliva of infected hosts [4, 5].

There is no viremia in rabies and no risk of transmission through blood and blood products. Although rabies virus may be occasionally found in urine or tears of a human or rabid animal, it may not be at a sufficient titer to infect a new host [6]. Aerosol transmission between bats and other animals has been found to occur in caves and possibly in bats entering a bedroom of a sleeping person [7].

Rabies virus is inactivated rapidly in sunlight and does not survive for long periods outside the host unless protected in a cool, dark area. Rabies virus is highly sensitive to drying, ultraviolet rays, and various chemicals. It is inactivated by 1% sodium hypochlorite, 2% glutaraldehyde, 70% ethanol, formaldehyde, and quaternary ammonium compounds [8]. Rabies virus is inactivated at 56° Celsius over 30 minutes [9]. However, rabies virus can be freeze dried.

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### ***Human to human transmission***

There are anecdotal reports of human-to-human transmission. Usually a rabies patient does not bite others but it has been reported. Non-bite exposures rarely cause rabies. Although laboratory confirmed cases of human to human transmission have never been documented, it remains a theoretical possibility [4]. Two non-laboratory-confirmed cases of human-to-human rabies transmission in Ethiopia have been described [10]. The reported route of exposure in both cases was direct salivary contact from another human infected with rabies. A rare case of transplacental transmission of rabies in human was reported in Turkey [11]. There are anecdotal reports of rabies transmission during sexual intercourse [12]. Therefore, post-exposure prophylaxis is recommended in such cases.

Human rabies is near universally fatal and one of the most painful of all communicable diseases. There has never been a documented case of human-to-human transmission in hospital settings. Human rabies patients do not pose any greater infection risk to health-care personnel than do patients with more common bacterial and viral infections [13]. Casual contact, such as touching a person with rabies or contact with urine, blood, and stool does not constitute an exposure. Practically, there is no risk to other humans from a patient with rabies unless it is by mucous exposure to saliva or a bite.

Iatrogenic transmission has occurred among recipients from transplanted corneas [4, 14-19] and, recently, among seven recipients of solid organs and vascular tissues [20-23]. These cases occurred in Thailand, India, Germany, Iran, the United States, and France.

### **Discussion**

Despite the lack of evidence for human-to-human transmission in hospitals, health care workers who have been exposed to saliva of a patient with rabies should be offered post-exposure prophylaxis (PEP). Physicians often are forced to prescribe it because the fear of rabies creates the demand even though the risk may be minimal if present at all. This makes awareness of rabies that often presents in a non-classical manner and early laboratory diagnosis essential. It allows immediate reinforcement of rabies guideline for health care workers and, where really indicated, accelerated pre-exposure vaccination of staff possible. In many Asian countries, there is often a tendency not to admit hydrophobia patients to a

general hospital. Rabies patients must not be deprived of care. This is not acceptable on ethical grounds alone.

Health workers and support staff in emergency units and patient care settings must have continuous education and a clear understanding of clinical presentations of rabies. They must have the fact that it may appear with diverse clinical symptoms and signs. In rabies endemic countries, WHO, and national guidelines should be readily available to staff in primary care settings and emergency rooms.

Prompt recognition of a suspected rabies patient is a first step in prevention and protection of health care providers. Proper case history taking is essential at the emergency unit so that the suspected patient can be referred to the most appropriate facility for diagnosis and care. ICU admission is usually not indicated and efforts should concentrate on adequate sedation, analgesia, and comfort care that can usually be rendered in an ordinary private room by staff that have an adequate care plan for this dreaded condition [24].

The use of established/universal isolation precautions and personal protection measures as outlined in national hospital infection control guidelines can successfully protect health care providers. Healthcare providers should wear gowns, goggles, masks, and gloves, particularly during intubation and suctioning [13]. Persons exposed to the patient's infectious tissues or fluids should immediately wash the area with soap and water [26].

Finally, health care workers likely to be dealing with rabies patients should be given pre-exposure prophylaxis (PrEP) against rabies. The benefits of PrEP are that it protects healthcare providers against unapparent rabies exposures. Then, they only require short booster vaccination if truly exposed. No immunoglobulin is indicated.

### **Conclusion**

Rabies is one of the most dreaded zoonotic diseases known to man. Fortunately, there is no reported documented nosocomial transmission, as rabies is not transmitted through usual physical contact, aerosol like measles and influenza nor through contact with blood like hepatitis B or HIV/AIDS. Standard precautionary measures in dealing with an infectious disease patient in healthcare settings should be sufficient to prevent transmission to staff. Comfort care of the patient and prevention of anxiety among health care workers and of inappropriate post-exposure vaccination should be achievable goals.

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