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Rabies Day Special: Bridging the Gap between Science and Safety

Popular Article

## Rabies Awareness: Bridging the Global Health Gap

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### Introduction:

Rabies is a disease caused by a virus that affects the central nervous system in mammals, including humans. Once symptoms manifest, it is almost always fatal, making it one of the deadliest diseases known. Despite being preventable through vaccination, rabies continues to be a significant public health threat, especially in regions where vaccination coverage is low.

The World Health Organization (WHO) reports that rabies causes thousands of human deaths each year, with most cases occurring in rural areas of Africa and Asia. All warm-blooded animals are vulnerable to infection with rabies virus, but mammals are the only known vectors and reservoirs in nature. Factors such as the viral variant, the quantity of virus inoculated, and the bite site affects susceptibility. In addition, the degree of species susceptibility varies considerably. Foxes, coyotes, jackals, wolves, and certain rodents are among the most susceptible animal groups. Skunks, raccoons, bats, rabbits, cattle, and some members of the families Felidae and Viverridae have a high susceptibility. Groups with only moderate susceptibility include domestic dogs, sheep, goats, horses, and nonhuman primates. Birds and primitive mammals such as the opossum may have low susceptibility. Cats are actually more resistant than dogs are to experimental infection with some canine rabies virus isolates but are much more prone to develop infection with some field isolates from wildlife and with vaccine virus. Younger animals are usually more susceptible to rabies infection than are older ones.

This article explores rabies in detail—its causes, transmission, symptoms, and the critical measures for prevention. It also highlights the role of veterinary professionals in preventing and controlling rabies outbreaks, which is key to reducing both animal and human cases.

### Causes and Transmission:

Rabies is caused by the virus named rabies virus, which belongs to the Lyssavirus genus. The virus primarily spreads through the saliva of an infected animal, typically via a bite. In some instances, the virus can also be

transmitted through scratches or when saliva from a rabid animal comes into contact with open wounds or mucous membranes. The primary source of rabies infections in humans is domestic dogs, accounting for the vast majority of rabies cases globally. Wild animals such as bats, raccoons, and foxes also serve as important reservoirs for the virus. In areas where domestic dog vaccination rates are high, these wildlife species may become the main source of rabies infections.

Once the virus enters the body, it travels along the peripheral nerves toward the brain. The time between exposure and the onset of symptoms, known as the incubation period, varies. It can range from several days to a few months, depending on factors such as the location of the bite, the amount of virus introduced, and the immune status of the host.

### **Clinical Presentation:**

Rabies follows a predictable progression through several clinical stages, each with its own set of symptoms.

#### **❖ Prodromal Stage:**

During this early phase, both humans and animals may exhibit non-specific symptoms like fever, headache, and general discomfort. Behavioral changes may also occur in animals, with normally docile animals becoming unusually aggressive or shy.

#### **❖ Excitative Stage (Furious Rabies):**

In this stage, animals may become hyperactive and show signs of extreme aggression. Infected dogs and wild animals may appear fearless, often attacking without provocation. Classic signs such as difficulty swallowing and excessive drooling (which leads to "foaming at the mouth") are common. Humans in this stage may experience heightened agitation, hallucinations, and fear of water, a symptom known as hydrophobia, which occurs due to throat muscle spasms.

#### **❖ Paralytic Stage (Dumb Rabies):**

As the virus advances, paralysis sets in, starting at the bite site and spreading to other parts of the body. Animals may appear lethargic and lose coordination. In the final phase, paralysis affects the muscles used for breathing, leading to respiratory failure and death. In humans, once clinical signs develop, death is inevitable within a few days due to respiratory or cardiac arrest.

### **Diagnosis:**

Diagnosing rabies is difficult, especially during the early stages when symptoms are non-specific. In animals, the most reliable diagnostic method is the direct fluorescent antibody (DFA) test, which is performed post-mortem by examining brain tissue for viral antigens. While this test is highly accurate, it requires that the animal be euthanized. For humans, ante-mortem diagnosis involves testing multiple samples such as saliva, serum, cerebrospinal fluid, and skin biopsies for the presence of the virus. However, rabies diagnosis is often confirmed post-mortem.

Since no cure exists once symptoms have appeared, early diagnosis and immediate post-exposure treatment are crucial to prevent the disease from progressing.

### **Prevention and Control:**

The most effective way to control rabies is through prevention, primarily by vaccinating animals and providing post-exposure prophylaxis (PEP) to humans who are bitten by potentially rabid animals.

✓ **Vaccination of Domestic Animals:**

Mass vaccination of dogs is a cornerstone of rabies prevention programs, as dogs are the primary source of human infections in most parts of the world. Vaccination of at least 70-80% of the dog population in an area can prevent outbreaks and significantly reduce the number of human cases. In countries with effective rabies control programs, vaccinating other animals such as cats, ferrets, and livestock is also recommended, particularly in rabies-endemic regions.

✓ **Public Education and Awareness:**

Public education campaigns are essential for rabies prevention, especially in rural areas where rabies is more prevalent. People must be informed about the importance of vaccinating pets, recognizing rabies symptoms in animals, and seeking immediate medical attention after an animal bite.

✓ **Post-Exposure Prophylaxis (PEP):**

PEP is critical in preventing rabies in humans who have been exposed to the virus. It consists of wound cleaning, administration of a rabies vaccine, and in some cases, rabies immune globulin. PEP is highly effective if administered before the onset of symptoms, but access to these treatments can be limited in certain regions, making rabies control more difficult.

✓ **Wildlife Rabies Control:**

In areas where wildlife species act as major reservoirs for rabies, oral rabies vaccination (ORV) programs have been implemented. These programs involve distributing bait containing rabies vaccines in areas inhabited by wildlife such as raccoons, foxes, and coyotes.

**The Role of Veterinary Medicine in Rabies Control:**

Veterinarians play a pivotal role in rabies control and prevention efforts. Their responsibilities extend from vaccinating animals to educating the public about the dangers of rabies and how to prevent it.

• **Mass Vaccination Campaigns:**

Veterinary professionals are on the front lines of rabies control, particularly through their involvement in mass vaccination campaigns for domestic dogs and other animals. These campaigns have been instrumental in reducing the spread of rabies in regions with high transmission rates.

• **Public Health Education:**

Veterinarians often serve as educators in their communities, spreading awareness about rabies prevention. By working closely with public health authorities, veterinarians can also assist in developing and implementing rabies control strategies at both local and national levels.

• **Surveillance and Research:**

Veterinarians are involved in monitoring rabies cases and conducting research to improve diagnostic methods, develop better vaccines, and understand the epidemiology of the disease. Surveillance efforts are important for identifying rabies outbreaks before they cause severe damage and performing quick action to prevent them from spreading.

**Conclusion:**

Rabies remains a global health challenge, particularly in regions where access to vaccines and medical care is limited. However, it is a preventable disease, and significant progress has been made in reducing rabies cases

through vaccination and public health initiatives. Veterinary medicine plays a key role in controlling rabies, from mass vaccination programs to research and education.

Achieving global rabies control requires a collaborative effort from veterinarians, public health officials, governments, and communities. With continued commitment and resources, rabies can be eliminated, ensuring a future where humans and animals are free from the threat of this deadly disease.