

# POXVIRUS AND RABIES BRANCH

Division of High Consequence Pathogens and Pathology



## Defending Against Poxviruses and Rabies

Smallpox killed millions of people before it was eradicated, and other poxviruses, like monkeypox, still cause serious diseases globally. Even though smallpox has been eradicated, ongoing research is vital to ensure we are prepared if it is ever used as a bioterrorism agent.

Rabies remains one of the most fatal of all known infectious diseases and causes more deaths than any other disease spread by animals.

Scientists in CDC's Poxvirus and Rabies Branch (PRB) defend against illness and death from poxviruses and rabies in people and animals at home and around the world. PRB scientists:

- ▶ Conduct research to learn more about poxviruses and rabies and how to detect, prevent, and treat the diseases they cause.
- ▶ Advise partners on programs to prevent and control rabies and poxviruses.
- ▶ Perform tests to quickly identify poxviruses and rabies and train public health partners around the world how to use lab techniques to test for these deadly diseases in their own laboratories.
- ▶ Develop and evaluate diagnostic tests and lifesaving treatments and vaccines.

PRB also is designated as a World Health Organization (WHO) Collaborating Center for Poxviruses and Rabies and as a World Organization for Animal Health (OIE) rabies reference laboratory.

## Stopping Poxviruses and Rabies Before They Attack Testing a Third-Generation Smallpox Vaccine

Monkeypox is a disease closely related to smallpox that has recently increased or re-emerged in parts of Africa and infected a number of people, including travelers who then carried the disease to the United Kingdom, Israel, and Singapore. PRB works with partners in the Democratic Republic of Congo, the country with the greatest burden of monkeypox disease, to field test a newly approved smallpox and monkeypox vaccine in healthcare workers. Information from the field test will help us understand how effective the vaccine is in preventing monkeypox in people. Study results will inform whether the vaccine could be used more widely to prevent monkeypox and how best to protect people if there were an emergency involving smallpox.

## PRB by the Numbers

- ▶ PRB studies nearly 50 species of poxviruses, rabies, and related viruses and works in over 22 countries to improve our ability to prevent and control health risks among people
- ▶ Every year, PRB scientists test **5,000** animal and human samples for poxviruses and rabies. They have deployed a new rapid rabies test to nearly 50 labs in the United States and abroad.
- ▶ PRB scientists analyze data on more than **95,000** suspected rabid animals to quickly detect which animals pose the biggest risk to people, pets, and wildlife.





## Identifying Disease Sources

PRB staff work all over the world with public health partners to identify which animals host diseases that can spread to people. PRB trains scientists in Africa, Asia, Europe, and South America to safely test domesticated and wild mammals to see if they have been infected with poxviruses, rabies, or rabies-related lyssaviruses. Health officials can use information about these animal hosts to provide recommendations for how people can protect themselves, their livestock, and their pets from getting sick with these viruses. PRB scientists also use cutting-edge genetic sequencing methods to understand how viruses spread and evolve so they can rapidly identify emerging risks.

## Guiding Rabies Prevention Efforts Worldwide

PRB helps partners around the world to improve monitoring and laboratory testing for rabies in dogs, which is still common in many countries and causes more than 99% of human rabies deaths worldwide. In 2019, PRB assisted Haiti and the Dominican Republic when rabid dogs infected three people along the border of the two countries, the highest number of human rabies cases that had been reported in decades in the Dominican Republic. PRB trained 30 dog vaccinators to use a new mobile app to track and manage vaccination activities along the border, resulting in 32,000 dog vaccinations in two weeks. The team successfully brought an end to the outbreak, and no additional rabies cases in people have been reported. The methods and tools used to control rabies in Haiti have now been used to vaccinate more than 3 million dogs in nine countries.

## Using Innovative Approaches to Diagnose and Report Rabies

Quick and reliable diagnosis and reporting are key to disease prevention and control. PRB recently developed a novel rapid test for rabies in people and animals, the LN34, that is already being used in 46 labs in the United States and globally. The LN34 uses PCR, a testing method that identifies a virus's genetic material. PCR is already used and widely available worldwide, making it easy for labs anywhere to accurately diagnose rabies without specialized microscopes or extensive training, which helps labs quickly identify cases so potential outbreaks can be contained at their source.

PRB also manages the National Rabies Surveillance System — a powerful tool to rapidly detect the location and types (or variants) of rabies virus infecting animals in the United States. The system allows state health labs to electronically share test results in near real-time and ensure rapid coordination and response when rabies cases are detected. The system helps monitor for reintroduction of the dog rabies variant, which was eliminated in the United States.