Poxvirus & Rabies Branch (PRB)

The epidemiologists, laboratory scientists, and public health professionals in PRB are responsible for surveillance, control, and prevention of illness and death due to poxviruses and rabies.

Our Work

Laboratory Reference, Diagnostics, & Training

PRB's provides laboratory reference, diagnostic services, and trainings to state and local health departments, the Department of Defense (DOD), international organizations, and the Laboratory Response Network (over 150 labs across the U.S. prepared to respond to bioterrorism). PRB collaborates with the private sector to develop and evaluate novel diagnostic assays, therapeutics, and vaccines for rabies and pox-related viruses. The branch maintains high-containment laboratories (BSL3 &4) to safely conduct public health research.

Research & Surveillance

PRB conducts research studies on the microbiology, molecular biology, pathogenesis (disease process), ecology, and evolution of poxviruses and rabies. The branch monitors the incidence rates of these diseases in the U.S. and internationally.

Expert Consultation

PRB provides consultation regarding poxvirus and rabies-associated diseases and their diagnoses, prevention, control, and treatments. Assistance is offered to healthcare providers, academic institutions, state and local health departments, other government agencies, and the general public. PRB collaborates with non-governmental organizations to develop risk communication tools for disease prevention. The branch provides training on simple surveillance techniques and trains healthcare workers on monkeypox in the Democratic Republic of the Congo (DRC). PRB collaborates with the national government of Haiti on a rabies surveillance and control program which includes health education, enhanced diagnostics, surveillance, and an extensive dog vaccination campaign.

Outbreak Investigations

PRB staff travel in the U.S. and internationally in response to outbreaks or other occurrences of rabies or poxvirus-associated illness in people and animals. The teams conduct epidemiologic or ecologic investigations and supports prevention and control measures in affected areas. Specifically, PRB staff recently assisted ministries of health with outbreak responses in the Democratic Republic of Congo, Republic of Congo, Georgia (country), Taiwan, Vietnam, Peru, Mexico, Guatemala, and Colombia.

Our Pathogens

PRB's Poxvirus Team provides subject matter expertise on:

Orthopoxviruses, including
Smallpox
Monkeypox
Cowpox
Vaccinia Virus

Parapoxviruses, including
Orf Virus
Pseudocowpox

PRB's Rabies Team provides subject matter expertise on:

All **Rabies** variants as well as **Non-Rabies** Lyssaviruses, including:
European Bat Lyssavirus and West Caucasian Bat Virus

International Collaboration

PRB serves as the World Health Organization (WHO) Collaborating Center for both smallpox (and other poxvirus infections) and rabies. WHO's Advisory Committee on Variola Virus Research oversees activities including the evaluation of new antivirals (e.g., ST-246 and CMX001) and less-reactogenic (third and fourth generation) vaccines. Additionally, as new, more sensitive diagnostic techniques become available, their performance is tested against the detection of *Variola virus*. Developing these new medical counter measures and diagnostic tools can impact the treatment and detection of other Orthopoxviruses, such as monkeypox and vaccinia virus. PRB also serves as the WHO Collaborating Center for Reference and Research on Rabies and as a World Organization for Animal Health (OIE) reference laboratory. PRB trains multiple international partners in diagnosing rabies infection by direct rapid immunohistochemistry. This simple test, which requires only a standard light microscope, can allow local authorities to make life-saving decisions about when to treat people who have been bitten by dogs.

Recent Poxvirus and Rabies activities

- Retrieved a letter containing alleged smallpox scabs, which was on display in a "Bizarre Bits" exhibit in a museum in Virginia. The team decontaminated the exhibit and safely transported the 135- year old scab to CDC for testing. (The scab was not from the smallpox virus and posed no infectious threat).
- Coordinated the safe retrieval of multiple *variola* virus samples discovered in a historic collection of lyophilized samples at a National Institute of Health (NIH) facility. Samples were identified, grown and fully characterized in PRB's BSL-4 facility before being destroyed with oversight by WHO.
- Assisted in the investigation of a human rabies death transmitted through organ transplantation. Assessed over 500 persons for potential exposures to either the recipient or donor. Rabies prophylaxis was recommended for 41 individuals.
- Found poxviruses in the Republic of Georgia, Kenya, and North America and assisted in conducting outbreak investigations, developing new laboratory tests, engaging government and public health partners, and strengthening surveillance activities.
- Assisted the Taiwanese government with human and animal rabies vaccine recommendations, and the development of animal rabies surveillance after ferret badgers were diagnosed with rabies after Taiwan had been rabies-free for 50 years.

Recent PRB Publications

Rabies death attributed to exposure in Central America with symptom onset in a U.S. detention facility - Texas, 2013. Wallace RM, Bhavnani D, Russell J, et al; Centers for Disease Control and Prevention (CDC). MMWR Morb Mortal Wkly Rep. 2014 May 23;63(20):446-9.

Clinical management and humoral immune responses to rabies post-exposure prophylaxis among three patients who received solid organs from a donor with rabies. Vora NM, Orciari L, Niezgoda M, et al. Transpl Infect Dis. 2015 Apr 7. doi: 10.1111/tid.12393. [Epub ahead of print]

Enzootic and epizootic rabies associated with vampire bats, peru. Condori-Condori RE, Streicker DG, Cabezas-Sanchez C, Velasco-Villa A. Emerg Infect Dis. 2013;19(9). doi: 10.3201/eid1809.130083.

Human infection with a zoonotic orthopoxvirus in the country of Georgia.
Vora NM, Li Y, Geleishvili M, et al. N Engl J Med. 2015 Mar 26;372(13):1223-30. doi: 10.1056/NEJMoa1407647.

Clinical guidance for smallpox vaccine use in a postevent vaccination program.
Petersen BW, Damon IK, Pertowski CA, et al. MMWR Recomm Rep. 2015 Feb 20;64(RR-02):1-26.

Novel poxvirus infection in 2 patients from the United States.
Osadebe LU, Manthiram K, McCollum AM, et al. Clin Infect Dis. 2015 Jan 15;60(2):195-202. doi: 10.1093/cid/ciu790. Epub 2014 Oct 9.