Update on Rabies in Wild Animals

Wild animals accounted for nearly 93% of reported cases of rabies in 1998. Raccoons continued to be the most frequently reported rabid wildlife species (44.0% of all animal cases during 1998), followed by skunks (28.5%), bats (12.5%), foxes (5.5%), and other wild animals, including rodents and rabbits (1.6%). Reported cases in raccoons and foxes decreased 18.6% and 2.9%, respectively, from the totals reported in 1997, but cases in skunks and bats increased 11.4% and 3.5%, respectively, from 1997 totals.

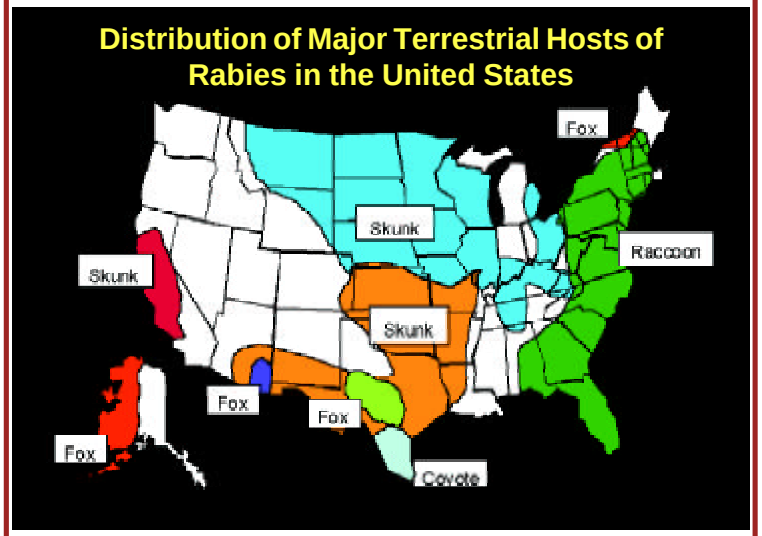


Figure. Outbreaks of rabies infections in terrestrial mammals such as raccoons, skunks, foxes, and coyotes are found in regions across the United States. The map shows where different rabies virus variants are found in similar animal species.

Infectious diseases can cause suffering and death to any person, regardless of age, gender, lifestyle, ethnic background, and socioeconomic status; moreover, they impose an enormous financial burden on society. Because we do not know what new diseases will arise, we must always be prepared for the unexpected. The Centers for Disease Control and Prevention (CDC) has recently released an updated plan, *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century*, which describes steps that we can take to move toward the realization of CDC's vision of a world in which all people join in a common effort to address today's emerging infectious diseases and prevent those of tomorrow.

The national emerging infectious disease plan encompasses nine specific categories of emerging infectious disease problems and groups of people who are most at risk: antimicrobial resistance; foodborne and waterborne diseases; vectorborne and zoonotic diseases; diseases transmitted through blood transfusions or blood products; chronic diseases caused by infectious agents; vaccine development and use; diseases of people with impaired immune systems; diseases of pregnant women and newborns; and diseases of travelers, immigrants, and refugees. This booklet focuses on vectorborne and zoonotic diseases.

Public health activities for the nine target areas are organized under four broad, intersecting goals: surveillance and response, applied research, infrastructure and training, and prevention and control.

The goal of surveillance and response is to detect, investigate, and monitor emerging pathogens, the diseases they cause and the factors influencing their emergence, and to respond to problems as they are identified. The goal of applied research is to integrate laboratory science and epidemiology to better understand and optimize public health practices related to emerging infectious diseases. The goal of infrastructure and training is to strengthen the underlying foundation of public health surveillance, research, and programs by supporting the planning, delivery, and evaluation of public health activities and practices. The fourth goal is to ensure prompt implementation of prevention and control strategies and enhance communication of public health information about emerging infections.

The Centers for Disease Control and Prevention Responds

The public health activities developed for the nine target areas by CDC's National Center for Infectious Diseases (NCID) build on existing efforts, are in the planning stages, or represent new efforts, all of which are described in individual booklets.

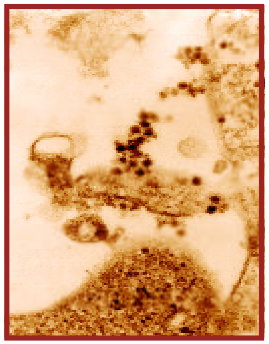
A number of infectious diseases are "vectorborne," which means that they are transmitted to animals and humans by blood-feeding arthropods, such as mosquitoes and ticks. Vectorborne diseases of public health importance include dengue fever, human ehrlichiosis, malaria, Lyme disease, and West Nile virus infection. As more people come in contact with previously undisturbed environments, their risk of infection with vectorborne diseases is increased. For example, residential building in the rural northeastern United States increased the risk for humans to come into contact with ticks that transmit Lyme disease.

Other infectious diseases are "zoonoses," which means that they are transmitted to humans by animals. Important zoonotic diseases include hantavirus pulmonary syndrome, influenza, leptospirosis, rabies, and salmonellosis, as well as most vectorborne diseases. The growing commercial pet trade is one way in which human risk of infection with zoonotic diseases is increased as these exotic animals may bring with them viruses, bacteria, and parasites new to North Americans.

The reemergence of certain vectorborne and zoonotic diseases may also be intensified by engineering projects such as land-clearing, dam-building, or creating irrigation systems, all of which bring humans into contact with animals and arthropods.

For example, when the Aswan Dam was built in Egypt during the 1950s, it created excellent breeding grounds for snails carrying parasites that cause schistosomiasis. While many vectorborne and zoonotic diseases are associated with the tropics or the developing world, some pathogens that cause diseases, such as Lyme disease, human ehrlichiosis, and hantavirus pulmonary syndrome, were first identified in North America. The emergence of Lyme disease in the United States was associated with the reversion of agricultural lands to secondary growth forest, the immigration of deer that carry infected ticks into these areas, and increasing urbanization.

West Nile virus encephalitis is another disease that has emerged in recent years in temperate regions of Europe and North America, presenting a threat to both people and animals. The public health implications of West Nile virus are serious. To prevent and control West Nile virus infection and other mosquitoborne diseases, the public health system must be fully equipped to conduct active surveillance, identify birds and animals that act as hosts, monitor human illness, and carry out mosquito control activities.



Electron micrograph of West Nile virus particles (cluster of dark spheres)

NCID Activities for Addressing Vectorborne and Zoonotic Diseases

In collaboration with many private and public partners, agricultural agencies, veterinarians, veterinary diagnostic laboratories, and others, NCID plans to take the following public health actions to address vectorborne and zoonotic diseases:

Goal I: Surveillance and Response

- Develop and enhance surveillance for vectorborne and zoonotic diseases.
- Monitor major changes in the incidence and geographic distribution of people infected with these diseases.
- Facilitate exchange of surveillance data between state health departments and agricultural agencies, particularly veterinary diagnostic laboratories.
- Monitor changes in the incidence and geographic distribution of mosquitoes and other disease vectors, including those that have resistance to pesticides.

- Conduct surveys to document morbidity, mortality, and economic burden due to vectorborne and zoonotic diseases.
- Establish disease and vector surveillance in areas where land development projects are planned or occurring (e.g., dam-building, deforestation, irrigation) or where other conditions exist that are conducive to the spread of vectorborne and zoonotic diseases.

Goal II: Applied Research

- Develop new diagnostic assays to facilitate surveillance for vectorborne and zoonotic diseases.
- Stimulate and support the development of prevention and control strategies for vectorborne and zoonotic diseases. This will include research on the biology and behavior of disease vectors and the development of vaccines, medicines, chemoprophylaxis, insect repellents, pesticides, and rodenticides.

Goal III: Infrastructure and Training

- Assess institutional capabilities for addressing vectorborne and zoonotic diseases within localities, regions, and countries.
- Promote the establishment of regional centers with expertise in surveillance, diagnosis, prevention, and epidemic preparedness for vectorborne and zoonotic diseases in areas of the world where these capabilities are limited.

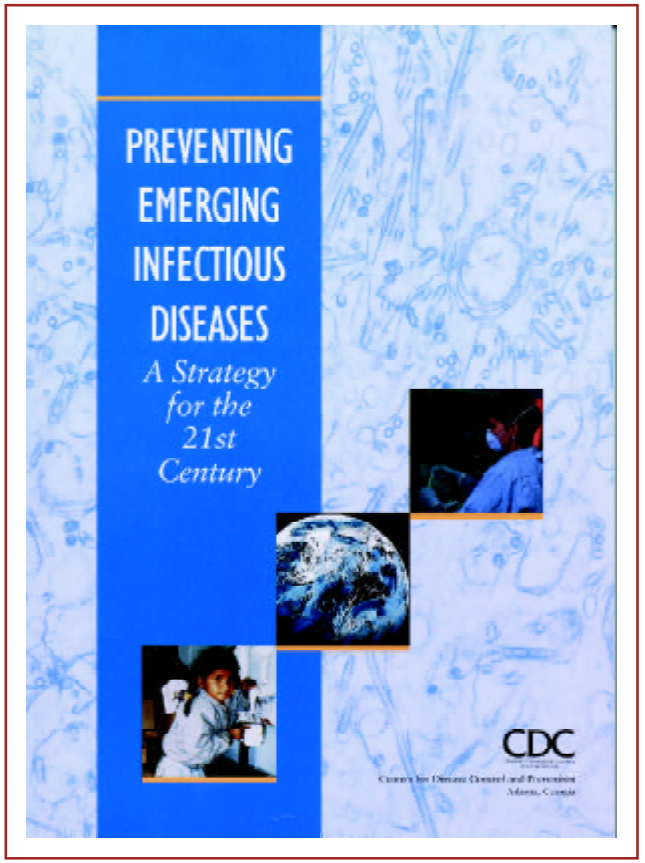
- Train personnel in the United States and other countries in surveillance, diagnosis, and prevention and control strategies for vectorborne and zoonotic diseases, as well as in the evaluation of drug and insecticide resistance in arthropod vectors and vertebrate hosts.
- Support capacity-building in the United States and abroad in order to produce diagnostic reagents, vaccines, and other biological products and chemicals for surveillance and control of vectorborne and zoonotic diseases.
- Promote regional cooperation to improve access to technical tools like global positioning systems and remote sensing data systems for epidemic forecasting.

Goal IV: Prevention and Control

- Develop and implement guidelines for the diagnosis, treatment, and prevention of vectorborne and zoonotic infections, including the development and adoption of vector control and drug use policies in disease-endemic areas.
- Conduct demonstration projects and other prevention activities, and assess their impact on vectorborne and zoonotic diseases.
- Encourage integration of vaccines for vectorborne and zoonotic diseases into the World Health Organization's regional Expanded Program on Immunization (EPI).

Where To Find Additional Information

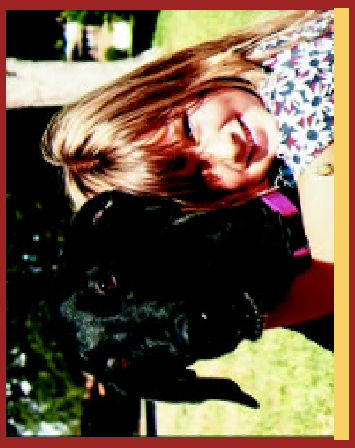
- Website for the complete plan, *Preventing Emerging Infectious Diseases: A Strategy for the 21st Century:* **www.cdc.gov/ncidod/emergplan**
- Website for information on infectious diseases: **www.cdc.gov/ncidod/diseases**
- Website for information on bacterial and mycotic diseases: **www.cdc.gov/ncidod/dbmd**
- Website for information on vectorborne diseases: **www.cdc.gov/ncidod/dvbid**
- Website for information for travelers: **www.cdc.gov/travel**
- Website of the American Veterinary Medical Association: **www.avma.org**
- CDC Voice Fax to receive information on various diseases by voice message or printed fact sheets: **1-888-CDC-FAXX (1-888-232-3299)**



Copies of the above plan are available from
National Center for Infectious Diseases
Centers for Disease Control and Prevention
Mailstop C-14
1600 Clifton Road, NE
Atlanta, GA 30333
www.cdc.gov/ncidod

PREVENTING EMERGING INFECTIOUS DISEASES

Addressing the Problem of Vectorborne and Zoonotic Diseases



A Strategy for the 21st Century

CDC

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