



INTERNATIONAL SOCIETY
FOR INFECTIOUS DISEASES



Navigation

- [Home](#)
- [Search Archives](#)
- [Announcements](#)
- [Recalls/Alerts](#)
- [Calendar of Events](#)
- [Maps of Outbreaks](#)
- [Submit Info](#)
- [Subscribe/Unsubscribe](#)
- [FAQs](#)
- [About ProMED-mail](#)
- [Who's Who](#)
- [Awards](#)
- [Citing ProMED-mail](#)
- [Links](#)

Archive Number 20030103.0016

Published Date 03-JAN-2003

Subject PRO/AH> West Nile virus update 2003 - USA (01)

WEST NILE VIRUS UPDATE 2003 - USA (01)

A ProMED-mail post

<<http://www.promedmail.org>>

ProMED-mail is a program of the
International Society for Infectious Diseases
<<http://www.isid.org>>

Date: 3 Jan 2003

From: ProMED-mail <promed@promedmail.org>

Source: Washington Post, Sat 28 Dec 2002 [edited]

<<http://www.washingtonpost.com/wp-dyn/articles/A45800-2002Dec27.html>>

Ecological Impact of West Nile Virus

First there was the silence of the crows. Then the horses fell ill -- more than 14 000 this past summer [2002] alone -- along with squirrels, chipmunks, and mountain goats. Even mighty raptors -- eagles, hawks, and great horned owls -- dropped from the sky. Now scientists are beginning to taking stock of West Nile virus's North American invasion, and they are taken aback by the scale and sweep of its ecological impact. While the human toll dominated the nation's attention this year [2002] -- the virus killed at least 241 people and infected thousands more -- the effects on wildlife were far worse.

The virus swept westward with alarming rapidity, appearing in almost every state in the nation -- an astonishing expansion for a [virus] that had never been seen in the Western Hemisphere until 3 years ago. Equally unexpected, nearly 200 species of birds, reptiles and mammals fell ill as a result of West Nile virus infection this year [2002], including rabbits and reindeer, pelicans and bats, even a few dogs and cats. The virus also slammed dozens of exotic species in about 100 U.S. zoos, killing cockatiels, emus, seals, flamingos, and penguins. Florida alligator farms lost more than 200 of the reptiles.

The epidemic has so resembled a bioterrorism attack that the nation's zoos -- which spearheaded an effort to track [the spread of West Nile virus] and mount emergency vaccinations -- could end up with potentially important roles in the emerging arena of homeland security. Just last month, in a hastily organized effort reminiscent of President Bush's smallpox plan, officials at 2 California zoos inoculated their endangered California condors with an experimental vaccine that may be the animals' only hope for survival.

West Nile virus infection is not fatal in all animals, and over time some species are expected to adapt. But even partial [declines] in key populations could have serious consequences. Rodent populations could blossom in areas where raptors are dying, and pest birds such as house sparrows may be increasing where crows are absent. The worst is still ahead,

scientists say. Come spring, West Nile virus is expected to complete its push to the West Coast, home to endangered whooping cranes and economically important flocks of domestic geese. The virus is also poised to leap to the subtropics, where rare birds and other vulnerable creatures already face formidable threats to their survival. "Once it gets to the tropics, where you've got species already stressed by habitat destruction and you have the potential for year-round mosquito transmission, some of those populations are not going to make it," said Peter Marra, an animal ecologist and West Nile specialist at the Smithsonian Environmental Research Center in Edgewater, Maryland. "I'm concerned about parrots and hummingbird populations. There's not that many of them left."

West Nile made its North American debut in the fall of 1999, discovered in a dead New York crow. Scientists don't know how the virus reached U.S. shores -- perhaps it hid inside a single infected bird imported from the Middle East. But one thing is certain, said Stephen Ostroff of the Centers for Disease Control and Prevention (CDC) in Atlanta: "There's no way that West Nile virus is going to go away." The virus does not appear to be any more virulent in Americans than in other people around the world, and scientists suspect that the US population will gradually gain immunity through low-level exposures. That is the situation today in countries where the virus has been active for many years. Most people in those countries have antibodies to the virus from early childhood, and serious complications or death from West Nile virus infection are rare.

But in North American wildlife, the virus has proven to be unusually aggressive and capable of infecting a surprisingly diverse array of animals. "Most viruses tend to be rather host-specific, but that's not the case with what we were seeing," said Tracey McNamara, chief of pathology for the Wildlife Conservation Society, which has its headquarters at the Bronx Zoo [NY], where the first infected crow was found. It is still unclear how many of the 200 or so species struck by West Nile virus infection have suffered significant population declines. But a consensus is emerging that among birds, in particular, far more species are being hurt than scientists had predicted -- not just the crows, ravens, and jays that were known to be especially vulnerable. "There's been a huge die-off of raptors," said Robert G. McLean of the Agriculture Department's National Wildlife Research Center in Fort Collins, Colorado.

The experience of the University of Minnesota's Raptor Center, which rehabilitates sick and injured raptors, was typical. "In mid-August [2002], we had our first case: a great horned owl," said spokeswoman Sue Kirchoff. "In September and October, we were just inundated." The center took in 70 ailing birds of prey, including great horned owls, eagles, and red-tailed hawks. Officials there presume that if that many were found and brought to the center, countless others died in the wild, with potentially far-ranging repercussions. "From a biological standpoint, raptors take longer to mature and have fewer offspring" than smaller birds, said Patti Bright of the American Bird Conservancy. "Whether they'll be able to rebound, well, we just don't know." It will take a while longer, Bright and others said, before it is known whether rodent populations are taking advantage of West Nile virus's impact on birds of prey.

The evidence for declines in songbirds and other small avian species is less direct, in part because they are so much less visible. "We're simply not going to know for a while [about] the smaller birds, because we're not going to find the bodies," said David S. Wilcove, a professor of ecology at Princeton University who has been studying West Nile virus disease. Still, researchers this year found more than 140 bird species sickened or dead [as a result of West Nile virus infection], including chickadees, doves, grackles, gulls, herons, kingfishers, pelicans, sparrows, swans, turkeys, warblers, woodpeckers, and wrens. And while most of those species will probably pull through as resistant individuals mate and pass their antiviral vigor to their offspring, ornithologists expect that others will not be so

lucky.

They point to the experience of Hawaii, where the arrival of an avian poxvirus in the 1890s and avian malaria in the 1930s drove dozens of species to extinction or close to it. "Those [microbes] just hammered Hawaiian forest birds," Wilcove said. "That illustrates the potential for harm when a disease organism encounters a naive population."

Several unexpected aspects of the epidemic have fed Wilcove's and others' pessimism. One surprise is that the virus can be transmitted directly from bird to bird, not only via mosquitoes. Raptors can acquire the virus by eating infected prey, and some birds can apparently spread the virus in their droppings. There's also evidence that some birds can pass the virus directly to their chicks while they're still inside the egg.

Another surprise is that West Nile virus can be transmitted directly from adult mosquitoes to their eggs, so that newly hatched aquatic larvae are born infected. That could make insecticides, which typically kill only adults, less effective.

Scientists have also been surprised to learn that the virus can persevere through the winter, even in many Northern states. Researchers are not sure which animals are serving as the virus's winter host, but the phenomenon is allowing the disease to spread year round and is giving the summer viral eruption an earlier start each year.

Yet another surprise is the number of mosquito species -- 36 at last count -- that carry the virus. "This is a virus that's never seen a mosquito it doesn't like," said Ostroff of the CDC. "That's not typical for most pathogenic viruses."

If that weren't enough, some researchers suspect that West Nile virus might be capable of mixing its genetic material with that of a closely related virus, such as the one that causes St. Louis encephalitis, if both viruses were to infect a single animal. Other viruses have periodically produced such hybrids, creating in the process an entirely new and dangerous virus.

"This virus is going to spread to the West Coast big time by next year, no question," USDA's McLean said. "Each habitat is different, but California seems to be an area that has all the factors you need for a major spread. I think they're going to be facing major problems in humans, horses, birds, and other animals. I just don't see any barriers."

Such predictions have a particularly ominous ring for researchers on the California Condor Recovery Team, who have been struggling to bring the ungainly bird back from the brink of extinction. They knew that this summer's experimental inoculations of zoo birds with the horse vaccine -- the only West Nile vaccine approved for marketing in this country -- had been disappointing, with many birds failing to develop protective antibodies. So in November 2002, veterinarians at the Los Angeles and San Diego zoos injected into the thighs of their condors an experimental vaccine to try to confer immunity before the spring egg-laying season. "We had absolutely zero negative effects," said Cynthia Stringfield, veterinarian of the Los Angeles Zoo, and preliminary blood tests suggested that the birds "had a fantastic immune response." If further tests show that the vaccine works, the team will try to vaccinate all 128 captive California condors and the approximately 70 birds now living in the wild.

Zoos may take the lead in the fight against West Nile virus in more ways than that. More than 100 U.S. zoos and wildlife parks have joined a newly created information-sharing network, which has its headquarters at Chicago's Lincoln Park Zoo, to track West Nile virus infection and other emerging infections in exotic animals. Some scientists suspect the network may even prove useful in the cause of homeland security, by providing a sensitive

nationwide "sentinel system" for detecting the first hints of a bioterrorism attack. After all, zoo officials noted, New York crows were dying in droves in the fall of 1999, but no one figured out that West Nile virus was the culprit, or that the deaths were related to a spate of unusual human illnesses, until a crow died on the grounds of the Bronx Zoo. Zoos, it turns out, take every death seriously -- even those of non-zoo animals on zoo grounds -- because any death can mark the start of a devastating epidemic. "Every dead animal is picked up and immediately necropsied," said McNamara, the Bronx Zoo pathologist. "That's not true in Central Park." When the Bronx crow was found to be teeming with West Nile virus, it was the first evidence that the Old World virus had leaped the Atlantic -- and the beginning of the recognition that an epidemic was already under way in humans. McNamara said a zoo vet could be the first to know whether terrorists have released a human or animal pathogen. The consortium is seeking federal funding.

Still, some scientists fear that the nation may soon become less able to prevent outbreaks such as that of West Nile virus -- whether accidental or intentional. They said the U.S. system for screening incoming animal, plant and microbial life -- a patchwork of more than 20 agencies -- has long been undervalued and underfunded. Now the largest component, the Agriculture Department's Animal and Plant Health Inspection Service, is to become part of the new Homeland Security Department. That's leading many ecologists to fear that it will narrow its focus to classical bioterrorism pathogens such as anthrax, leaving the nation more vulnerable to [agents] such as West Nile virus. "I have a feeling that beetles in imported wood packaging are not going to be at the top of the list," said Faith T. Campbell, director of the invasive species program at the American Lands Alliance in Washington. Yet the recent U.S. invasion by Asian longhorned beetles, which arrived in wood packaging from China, is expected to cost the nation as much as \$669 billion in insect-destroyed trees in urban areas alone in coming decades, Campbell said.

Whether West Nile virus ends up decimating many animal populations or settling in as a mere high-grade ecological disturbance, the epidemic should be a wake-up call to beef up the nation's surveillance and quarantine network, said Princeton's Wilcove.

[Byline: Rick Weiss]

--
PromED-mail
<promed@promedmail.org>

[see also:

2002

West Nile virus - USA 2001: final report [20020613.4491](#)
West Nile virus, predicted spread in 2002 - USA [20020109.3206](#)
West Nile virus update 2002 - USA (01) [20020506.4109](#)
West Nile virus update 2002 - USA (17) [20020823.5124](#)
West Nile virus update 2002 - USA (18): human [20020901.5212](#)
West Nile virus update 2002 - USA (19): non-human [20020901.5213](#)
West Nile virus update 2002 - USA (20) [20020907.5252](#)
West Nile virus update 2002 - USA (35) [20021226.6129](#)
West Nile virus, raptors - USA [20020912.5289](#)
West Nile virus, raptors - USA (04) [20021001.5432](#)

2001

West Nile virus surveillance - USA 2000 final report [20010423.0792](#)
West Nile virus surveillance - USA [20010129.0207](#)
West Nile virus surveillance 2001 - USA (34) [20011130.2914](#)

.....mpp/cp/pg/jw

#####
PROMED-mail makes every effort to verify the reports that are posted, but the accuracy and completeness of the information, and of any statements or opinions based thereon, are not guaranteed. The reader assumes all risks in using information posted or archived by PROMED-mail. ISID and its associated service providers shall not be held responsible for errors or omissions or held liable for any damages incurred as a result of use or reliance upon posted or archived material.

Visit PROMED-mail's web site at <<http://www.promedmail.org>>.
Send all items for posting to: promed@promedmail.org (NOT to an individual moderator). If you do not give your full name and affiliation, it may not be posted. Send commands to subscribe/unsubscribe, get archives, help, etc. to: majordomo@promedmail.org. For assistance from a human being send mail to: owner-majordomo@promedmail.org.

#####

[about ISID](#) | [membership](#) | [programs](#) | [publications](#) | [resources](#)
[11th ICID](#) | [site map](#) | [ISID home](#)

©2001 International Society for Infectious Diseases
All Rights Reserved.
Read our [privacy guidelines](#).

Use of this web site and related services is governed by the [Terms of Service](#).