Zoonotic Disease Newsletter

Washington State Department of Health's bulletin on zoonoses and vector-borne diseases

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Washington State Department of Health

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Few West Nile virus detections this season

Washington State Department of Health, News Release, November 28, 2007

2007 was a surprisingly slow season for West Nile virus in Washington. After the first human cases in 2006, it seemed the state was primed for a big year that just never came.

"We're fortunate that West Nile virus was not a significant problem in our state this year, especially after the activity we saw last year in our state and region," said Gregg Grunenfelder, Assistant Secretary for the Department of Health's Environmental Health Division.

In 2007, monitoring detected eight horses and one dead bird that were positive for West Nile virus. This year Washington also saw its first case confirmed in a dog. All 2007 cases were in Yakima County. Environmental monitoring has ended for the year; mosquito and dead bird testing will resume around the state next spring.

In 2006, three people, six horses and 13 dead birds tested positive for West Nile virus in our state. Idaho had more than 1,000 human cases; Oregon had around 70 human cases last year. As 2007 winds down, Idaho has reported 108 human infections and Oregon has reported 27.

A dog from the White Swan area in Yakima County tested positive for West Nile virus. The 9-year-old male German Shorthaired Pointer began showing symptoms of illness and was taken to a local clinic on October 5th. After three unsuccessful days of treatment the ill dog was euthanized. The initial West Nile test was conducted by a local commercial lab and then confirmed positive by Cornell's Animal Health Diagnostic Center.

Symptomatic infection among dogs is very rare. Oregon reported one confirmed West Nile dog case and one presumptive case in 2007. Idaho also reported one dog case this year.

CDC offers a Q&A on West Nile Virus and Dogs and Cats. The University of Illinois Extension has FAQs on Preventing West Nile Virus in Pets and Livestock.

"The lack of much West Nile virus activity in the Northwest this year demonstrates how difficult it is to predict the occurrence of this disease," said Nancy Napolilli of the agency's Office of Environmental Health and Safety. "Other states that have had West Nile activity for several years are finding that it can be a minor problem one year and become a significant problem the following year."

Multiple factors may affect whether West Nile virus is bad one year and not the next. Weather and environmental conditions, animal host and mosquito populations, mosquito control activities and the public's awareness of preventing the disease all play a role in the intensity of virus activity in any year. The presence of the virus may also be limited to one area, affecting one county or city greatly while sparing a neighboring community.

"Although the severity of West Nile virus activity is difficult to predict, we know that the virus is establishing itself in our state and an outbreak is possible in the coming years," Grunenfelder said. "Working with our partners, we'll continue to provide local communities advanced warning of West Nile virus by doing environmental monitoring and helping with local plans to minimize potential outbreaks."

West Nile virus is bird disease that is spread to people, birds, horses and other animals by infected mosquitoes. The best way to reduce the chances of infection is to avoid mosquito bites.

Study indicates widespread roundworm infection

Companion Animal Parasite Council, Parasites in the News, November 5, 2007

Children's play habits and their attraction to pets put them at higher risk of *Toxocara* infection than adults.

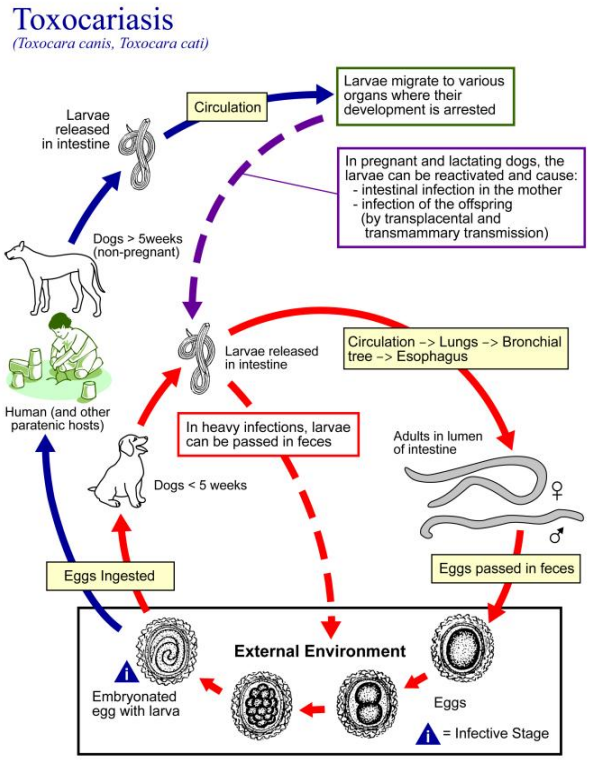
Prevention measures include:

- Keep the dog or cat - especially puppies and kittens - under a veterinarian's care for early and regular deworming
- Clean up after the pet and dispose of stool
- Keep animals' play area clean
- Wash hands after playing with dogs or cats
- Keep children from playing in areas where animals have soiled
- Cover sandboxes to keep out animals
- Don't let children eat dirt

More on *toxocariasis* is at www.cdc.gov/ncidod/dpd/parasites/toxocara/.

About 14 percent of the U.S. population is infected with *Toxocara*, or internal roundworms, contracted from dogs and cats. That's according to the results of a Centers for Disease Control and Prevention (CDC) study announced today at the American Society of Tropical Medicine and Hygiene in Philadelphia.

The CDC study shows the transmission of *Toxocara* from dogs and cats to people is most common in young children and youth under age 20, and more common in non-Hispanic Blacks than in Mexican Americans and non-Hispanic Whites of all age groups. It is highest in lower socioeconomic and less-educated populations. All children, however, are more susceptible to infection given their propensity to play in and sometimes eat contaminated soil.



Infections are acquired by accidental ingestion of *Toxocara* eggs found in environments contaminated with feces of infected dogs and cats. This includes play areas and sandboxes.

"The results of this study demonstrate that *Toxocara* infection in the United States is more widespread and common than previously understood," said Peter Schantz, VMD, PhD, an epidemiologist in the Division of Parasitic Diseases at the CDC and a founding board member of the Companion Animal Parasite Council. "Although most persons infected with *Toxocara* have no apparent symptoms, this infectious agent is capable of causing blindness and other serious systemic illness, which makes it a public health issue."

While rare, the visual impairment most often affects children. Since toxocariasis is not a reportable infection, true numbers of cases of visual impairment and other syndromes are not known, according to Schantz.

Canine leptospirosis is a reportable zoonotic disease in Washington. Since August 2007, 18 cases have been reported to the state Department of Health's Zoonotic Disease Program. Suspect or confirmed cases of dogs diagnosed with leptospirosis need to be reported to the associated local health jurisdiction and to the state's Zoonotic Disease Program. Report forms are available by phone at (360) 236-3388 or email elizabeth.dykstra@doh.wa.gov.

The number of reported canine leptospirosis cases typically increases during the colder months. For more information on canine leptospirosis in Washington, see the February 2007 issue of the Zoonotic Disease Newsletter.

West Nile virus knowledge improves with new research

Environmental indicators preceded almost two-thirds of the Denver area human West Nile virus infections in 2003.

Environmental predictors of human West Nile virus infections, Colorado
Patnaik JL, et al. Emerging Infectious Diseases. 2007, 13(11): 1788-1790.

Abstract: To determine whether environmental surveillance of West Nile virus–positive dead birds, mosquito pools, equines, and sentinel chickens helped predict human cases in metropolitan Denver, Colorado, during 2003, we analyzed human surveillance data and environmental data. Birds successfully predicted the highest proportion of human cases, followed by mosquito pools, and equines.

Evidence suggests human WNV outbreaks in the western United States are preceded by below-average rainfall in the prior year.

Inter-annual associations between precipitation and human incidence of West Nile virus in the United States
Landesman WJ, et al. Vector-Borne and Zoonotic Diseases. 2007, 7(3): 337-343.

Abstract: Higher-than-average precipitation levels may cause mosquito outbreaks if mosquitoes are limited by larval habitat availability. Alternatively, recent ecological research suggests that drought events can lead to mosquito outbreaks the following year due to changes in food web structure. By either mechanism, these mosquito outbreaks may contribute to human cases of West Nile Virus (WNV) in the recent United States outbreak. Using county level precipitation and human WNV incidence data (2002–2004), we tested the impacts of above and below-average rainfall on the prevalence of WNV in human populations both within and between years. We found evidence that human WNV incidence is most strongly associated with annual precipitation from the preceding year. Human outbreaks of WNV are preceded by above-average rainfall in the eastern United States and below-average rainfall in the western United States in the prior year. While no direct mechanism may be determined from this study, we hypothesize that differences in the ecology of mosquito vectors may be responsible for the opposite relationships between precipitation and WNV outbreaks between the eastern and western United States.

The odds of finding WNV-positive mosquitoes were almost 20 times greater at sites reporting a WNV-infected dead corvid than at sites without an infected dead corvid.

West Nile virus-infected dead corvids increase the risk of infection in *Culex* mosquitoes in domestic landscapes
Nielsen CF, et al. Journal of Medical Entomology. 2007, 44(6): 1067-1073.

Abstract: A comparative study of West Nile virus infection rates in *Culex* mosquitoes collected at 13 sites, seven reporting WNV-positive dead corvids (case sites) and six without reported dead birds (control sites) was conducted in Davis, CA, from 14 to 21 July at the beginning of the 2006 WNV outbreak. In total, 3,051 *Culex* mosquitoes were collected using gravid traps and CO_2-baited traps; WNV-infected mosquitoes were only collected with CO_2-baited traps. WNV-infected *Culex pipiens* were collected at one of the seven case sites. Six of seven case sites yielded WNV-infected *Culex tarsalis*, whereas only one of six control sites had WNV-infected *Cx. tarsalis*. Overall, the odds of finding WNV-positive mosquitoes were 19.75 times greater at sites reporting a WNV-infected dead corvid than sites without a WNV-infected dead corvid. Maximum likelihood estimates of the overall infection rates at the case sites were 3.48/1,000 for *Cx. tarsalis* and 8.69/1,000 for *Cx. pipiens* compared with 1.02/1,000 in *Cx. tarsalis* collected at the control sites. Results indicate that *Cx. tarsalis* was important in early season enzootic transmission within Davis and that sites reporting WNV-infected dead corvids are areas to focus control and surveillance efforts.

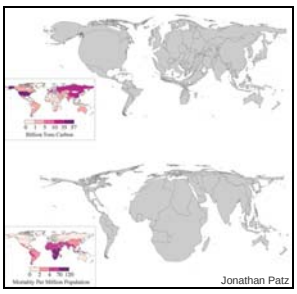
Mice previously fed upon by mosquitoes are far more likely to die once they are infected with West Nile virus.

Prior Exposure to Uninfected Mosquitoes Enhances Mortality in Naturally-Transmitted West Nile Virus Infection
Schneider BS, et al. PLoS ONE. 2007, 2(11).

Abstract: Arthropod-borne (arbo)viruses such as WNV are transmitted to vertebrates as an infectious mosquito probes the skin for blood, depositing the virus and saliva into the skin and circulation. Growing evidence has demonstrated that arthropod, and recently mosquito, saliva can have a profound effect on pathogen transmission efficiency, pathogenesis, and disease course. A potentially important aspect of natural infections that has been ignored is that in nature vertebrates are typically exposed to the feeding of uninfected mosquitoes prior to the mosquito that transmits WNV. The possibility that pre-exposure to mosquito saliva might modulate WNV infection was explored. Here we report that sensitization to mosquito saliva exacerbates viral infection. Prior exposure of mice to mosquito feeding resulted in increased mortality following WNV infection. This aggravated disease course was associated with enhanced early viral replication, increased interleukin-10 expression, and elevated influx of WNV-susceptible cell types to the inoculation site. This exacerbated disease course was mimicked by passive transfer of mosquito-sensitized serum. This is the first report that sensitization to arthropod saliva can exacerbate arthropod-borne infection, contrary to previous studies with parasite and bacteria infections. This research suggests that in addition to the seroreactivity of the host to virus, it is important to take into account the immune response to vector feeding.

Health toll of climate change seen as ethical crisis

By Terry Devitt, University of Wisconsin-Madison, News, November 6, 2007



View a larger version of these two world maps which schematically represent the contribution of different nations to global warming as measured in atmospheric carbon output (top), and the health effects of global warming as measured in mortality for diseases and other effects of a warming world climate (bottom).

The public health costs of global climate change are likely to be the greatest in those parts of the world that have contributed least to the problem, posing a significant ethical dilemma for the developed world, according to a new study.

In a paper to be published the week of Nov. 12, 2007, in the journal EcoHealth, a team of researchers led by environmental public health authority Jonathan Patz of the University of Wisconsin-Madison reports that the health burden of climate change will rest disproportionately on the world's poor.

"Our high consumption of energy is putting a huge disease burden on places that are quite remote from us," explains Patz, a professor in the UW-Madison School of Medicine and Public Health and the Nelson Institute for Environmental Studies. "There are many serious diseases that are sensitive to climate, and as earth's climate changes, so too can the range and transmission of such diseases."

The new study, says Patz, begins to hitch the scientifically quantifiable aspects of climate change to the ethical dimensions of the problem. Some, including Nobel Peace Prize laureate Al Gore, have long argued that the "global warming crisis is not a political issue but a moral one."

According to Patz, who for over a decade has been a lead author for the United Nations Intergovernmental Panel on Climate Change (IPCC), which shared the 2007 Peace Prize with Gore, the scientific debate on global warming is over. The scientific community, he argues, must now turn its attention to dissecting the problem and devising rational solutions.

The authors quantify the ethical dimension of global climate change by measuring per capita carbon emissions and comparing that data with climate-related disease burden for the most affected regions of the world. The results show a stark contrast between those populations causing global warming from those suffering the brunt of the impacts.

Americans, for example, have carbon outputs six times the global average, but a significantly lower relative risk for the health effects of climate change.

Changes in patterns of diseases and other negative outcomes of a warming world, argues Patz, suggests the developed world must begin "to pursue equitable solutions that first protect the most vulnerable population groups."

"Many of these climate-sensitive diseases, such as malaria, malnutrition, and diarrhea, affect children," he explains. "We in the developed world need to recognize how our way of life imposes negative impacts upon poorer nations of the world — especially their children."

The new EcoHealth study also cautions that potential solutions to the world's energy problems may exacerbate the negative health impacts of global warming. In particular, the report cited the rush to biofuels as a phenomenon that could trigger other problems by accelerating deforestation and affecting world food supplies and prices.

"If energy demand drives up the price of corn, for example, this can inflict undue burden on poor or malnourished populations or shift agricultural areas away from other traditional food crops," Patz and his co-authors write.

"Rapid expansion of biofuel crops in the tropics further threatens much of the world's remaining rainforests," says co-author Holly Gibbs of the Center for Sustainability and the Global Environment (SAGE) at UW-Madison, who has studied the effects of land use on deforestation around the world.

Read related media articles entitled Climate change is public health issue – US experts by *Reuters* and The (warming) world is not flat from *The New York Times*.

WHO Director-General to talk on "Climate Change and Health"

Dr. Margaret Chan, Director-General of the World Health Organization will speak on "Climate Change and Health" on December 10, 2007.

The videocast is free and open to the public.

More information is at www.nih.gov/news/pr/nov2007/nidcr-26.htm.

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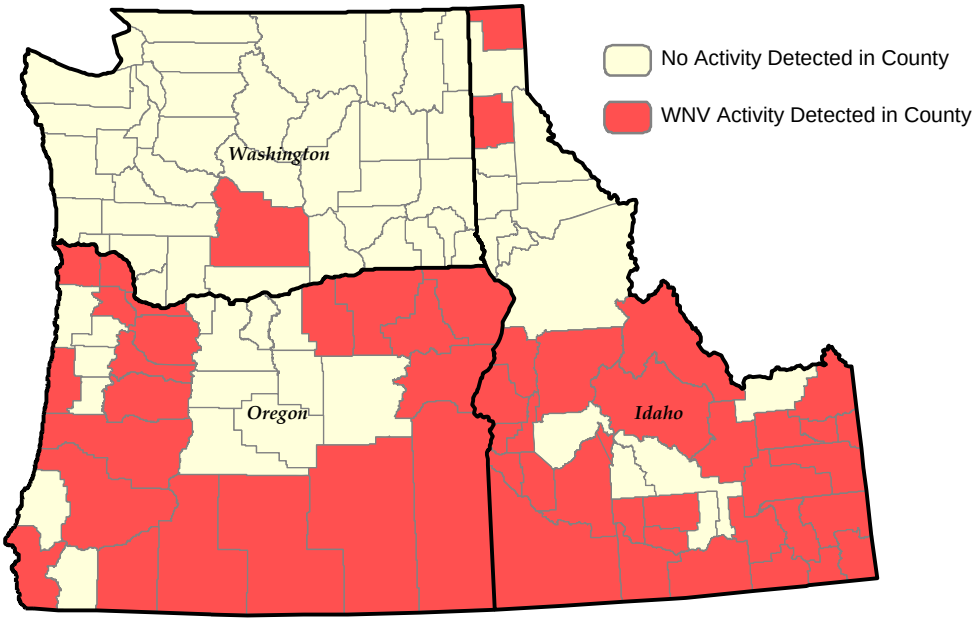
West Nile virus activity in the northwest, 2007



State	Human	Horse/other mammal	Bird	Mosquito sample
Washington	0	9	1	0
Idaho	108*	16	14	(17 counties)
Oregon	27*	20	63	32

*Includes out-of-state acquired infections
Source: WA (Nov. 28, 2007), ID (Oct. 12, 2007), OR (Nov. 9, 2007) State Health Department Web Sites

Plague causes death of national park employee

Adapted from Grand Canyon National Park, News Release, November 16, 2007

Tests from the Centers for Disease Control and Prevention (CDC) have confirmed plague as the cause of death of 37-year-old wildlife biologist Eric York.

York, who worked at Grand Canyon National Park, was found deceased in his residence on the South Rim on November 2, 2007.

Additional CDC tests have also determined that the strain of plague that infected Eric is the same strain of plague that infected a mountain lion that Eric had direct and recent contact with. These tests support other evidence that the mountain lion was the source for Eric's infection.

Plague is a rare, but sometimes fatal, disease caused by the bacterium *Yersinia pestis*. It is primarily a disease of animals, but it can be transmitted to humans through the bites of rodent fleas or by direct contact with infected animals.

Plague is considered endemic in northern Arizona at elevations above 4,500 feet. While an average of one or two human cases of plague are reported each year in Arizona, there were no human cases reported from 2001 through 2006 in the state.

Read about the increased 2007 plague activity in Arizona from the news release at www.nps.gov/grca/parknews/upload/11.16.07%20Plague%20confirmed%20as%20cause%20in%20employee%20death.pdf.