

Laboratory Confirmed WNV Infections in the United States

	1999	2000	2001	2002
Humans (Deaths)	62 (7)	21 (2)	65 (9)	4,071 (274)
Mosquito Pools	17	522	863	6,543
Birds	296	4,305	6,669	17,258
Horses	25	70	752	14,848

- ### WNV Issues
- What is the “value” of sentinel species?
 - Do all animals receive the same level of diagnostic attention?
 - Species bias – human/domestic/wild
 - Cultural divide between human health and veterinary health
 - Ignoring the virus in wildlife could hinder public health

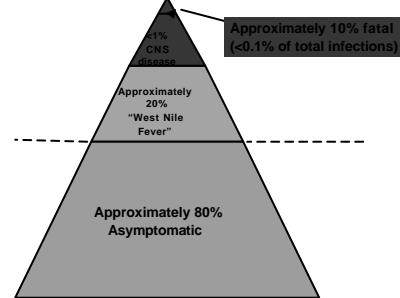
- ### “Classical” Clinical Description
- Incubation period of 2-15 days
 - Most illness: “West Nile fever”
 - Fever, headache
 - Rash, lymphadenopathy
 - Nausea, vomiting
 - Rarely pancreatitis, hepatitis, myocarditis

- ### “Classical” Clinical Description
- Severe neurologic illness categories
 - Meningitis
 - Fever, stiff neck, CSF pleocytosis
 - Encephalitis
 - Altered mental status
 - “Meningoencephalitis”
 - Acute flaccid paralysis

Newly Described Transmission Routes

- **Organ transplantation**
Infection in organ donor and 4 organ recipients, August 2002
- **Blood transfusion**
23 confirmed, 18 still under investigation
Aug. 2002 - Jan. 2003
- **Breast milk**
2 cases, of which 1 asymptomatic. Sept. 2002
- **Transplacental**
First reported human case. Nov. 2002
- **Occupational**
1 case 2001, 2 cases 2002, all in laboratory workers

WNV Human Infection "Iceberg"



Major WNV Positive Mammals/Reptiles

- **Pets:** Cat, Dog
- **Wildlife:** Deer, Wolf, Squirrel, Skunk, Rabbit, Bat, Bear
- **Domestic Animals/Livestock:** Horse, Cattle, Sheep, Goat, Llama, Alpaca
- **Marine Mammals/Reptiles:** Seal, Alligator, Crocodile monitor

Major WNV Positive Bird Species

- **Songbirds:** Crow, Blue Jay, Mockingbird, Ovenbird
- **Shorebirds:** Herring Gull, Virginia Rail
- **Raptors/Owls:** Hawks, Great Horned Owl
- **Doves:** Pigeon, Mourning Dove
- **Fowl:** Wild Turkey, Domestic Chicken
- **Captive/Exotic:** Parakeet, Penguin, Flamingo
- **Waterfowl:** Canada Goose

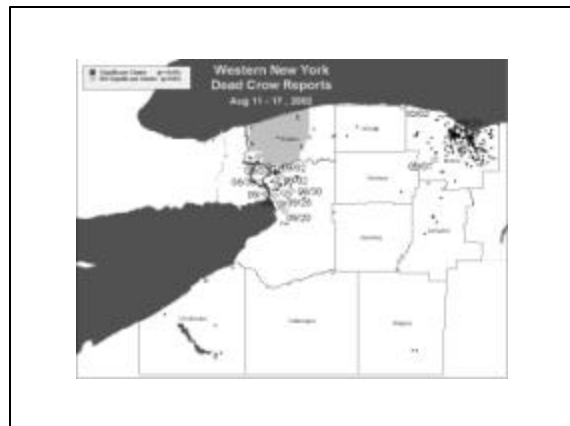
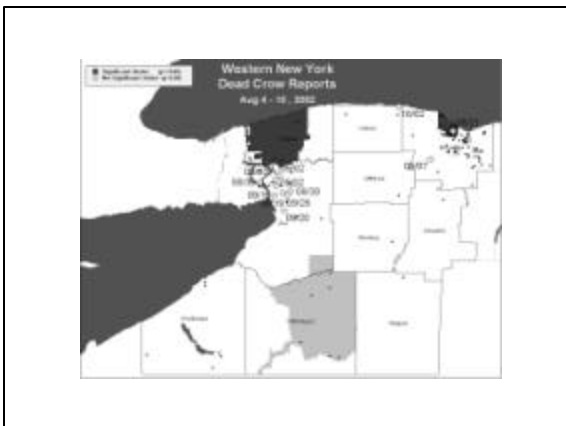
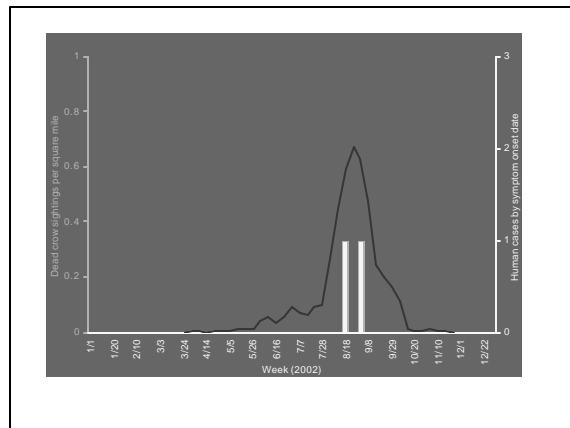
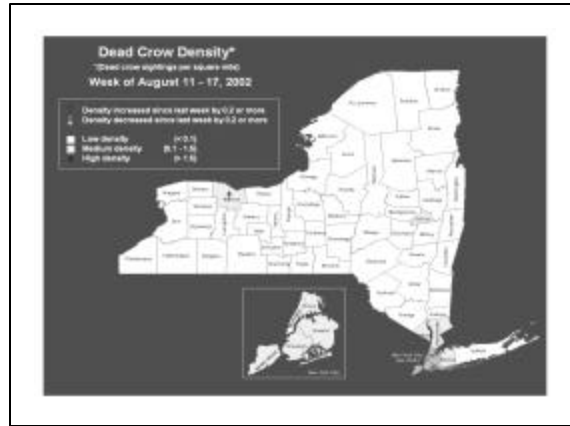
Long Term Outcomes

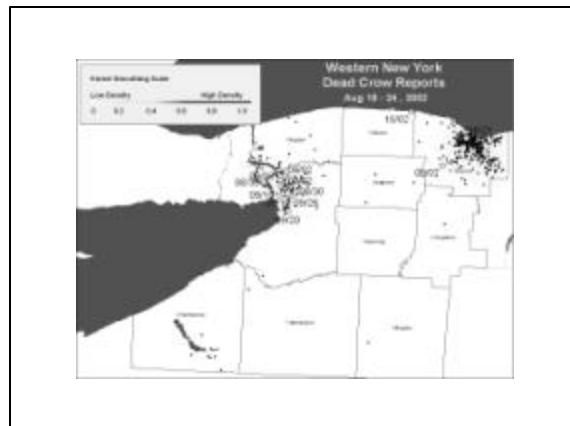
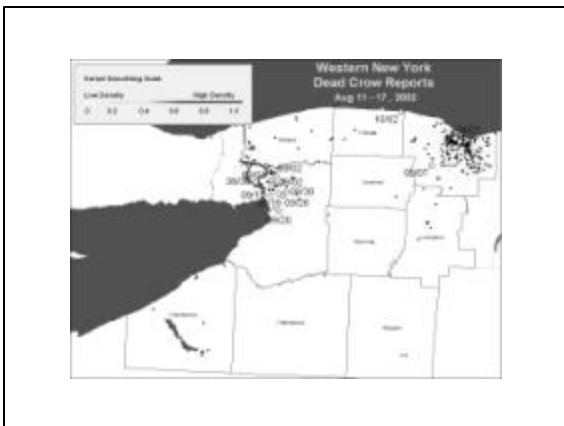
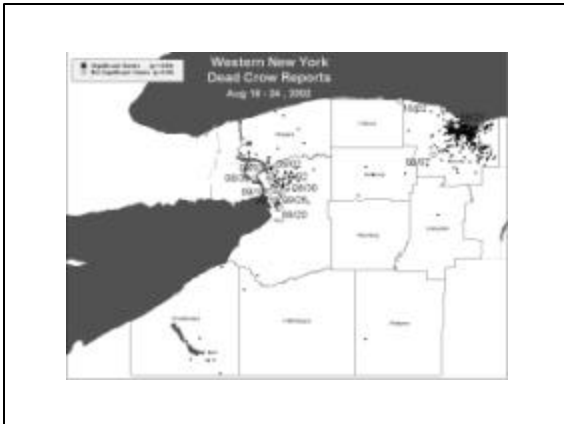
- Study on monkeys inoculated with variety of strains of WNV from different locales (India, Egypt, Uganda, U.S.S.R.)
- All strains induced viral persistence
- Monkeys with encephalitis, fever, or asymptomatic infections had subacute neurodegenerative disease
- Results - WNV may be implicated in the etiology of subacute diseases of CNS

Study on West Nile Virus Persistence in Monkeys, V. Pogodina et al. Archives of Virology 1983; 75: 71-86

Surveillance for West Nile Virus in Zoological Institutions

- Zoo animals present a *unique data set* in our ability to pursue long term follow up studies.
- Every known WNV positive individual will be followed clinically and any neurologic deficits will be documented.
- All known WNV positive individuals will be necropsied at time of demise.





To Report A Dead Bird In NYS

- Contact county health dept. or call the dead bird hotline, 1-866-537-BIRD (2473)
- Report all dead crows.
- Not all birds will be picked up/tested.
- If testing is not required, dispose of bird, wear gloves to bury or double-bag for trash.
- County test results on DOH web site:
www.health.state.ny.us

Biosafety Issues

- Investigations that involve handling of live WNV should be conducted under BSL-3 containment... BSL-2 facilities, with modifications, can achieve an acceptable level of safety for routine diagnostic procedures, including necropsies
- Laboratory workers should use every precaution to minimize their risk for exposure to fluids or tissues during handling

Laboratory-Acquired WNV Infections – United States, 2002
MMWR 51 (50): 1133-1335, 2002

Biosafety Issues

- Study investigated amounts of virus recoverable from oral and cloacal swabs as compared to brain tissue
- All three specimen types had comparable amounts of virus
- Veterinary practitioners? Wildlife rehabilitators? Ornithologists?

Biosafety should be practiced by all

Detection of West Nile Virus in Oral and Cloacal Swabs Collected from Bird Carcasses, N. Komar et al. Emerging Infectious Diseases; 8: 7; 741-742 2002

Cooperation

Goals

- PH needs data
 - Zoos are ideal sentinels
- Zoos need testing
 - '99-'00 – crows only
- Zoos are a part of the community
- Care about the larger 'AZA picture'
 - Care about public and animal health



Zoos as Sentinels

- Susceptible species
- Stationary population
- Serial sampling
- Urban and rural
- Spread over entire US
- Close proximity to humans

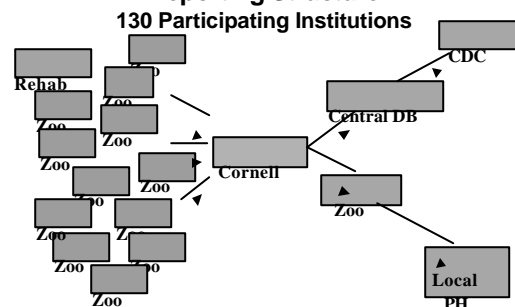
US States (plus AK) from which captive wildlife WNV samples have been submitted (8/01 – 2/03) = 123 zoos + 7 affiliated programs



Working Group

- | | |
|--------------------------|-----------------------|
| • CDC | • State DNR |
| • USDA | • Zoo clinicians |
| • USGS | • Zoo pathologists |
| • State PH | • Zoo epidemiologists |
| • County/City PH | • AZA |
| • State Agriculture | • AAZV |
| • University/Vet schools | |

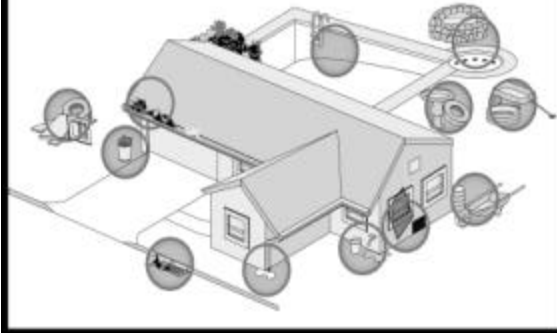
Reporting Structure



Future Directions

- Provide real-time diagnosis for Zoos;
Provide real-time reporting to PH
- This project created a framework that may be applied to other biologic threats of concern
- Create regional diagnostic centers for the testing of captive and free ranging wildlife

Protect Your Home against Mosquitoes



What have we learned since 1999?

- WNV can be transmitted in several ways. Mosquitoes still the primary method.
- Surveillance in several species is important to prevent human illness.
- Crows most sensitive bird species. Report any dead crows – indicator of human risk.
- Personal protective measures can help reduce your risk of acquiring WNV.
- WNV is here to stay.

Web Sites

New York State Department of Health
www.health.state.ny.us/nysdoh/westnile/index.htm

Centers for Disease Control
www.cdc.gov/ncidod/dvbid/westnile/index.htm
www.cdc.gov/ncidod/dvbid/westnile/conf/February_2003.htm

Environmental Protection Agency
www.epa.gov

United States Geological Survey Maps
<http://westnilemaps.usgs.gov>