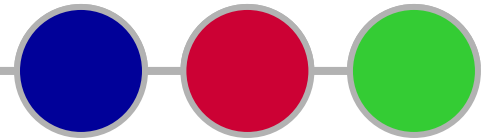


Susan Kerr

WSU-Klickitat County Extension Educator

- **Bachelor's in Animal Science from Cornell University**
- **DVM from Cornell University**
- **Private practice for seven years**
- **PhD in Education from Kansas State University**
- **Employed with WSU-Klickitat County since 1995**



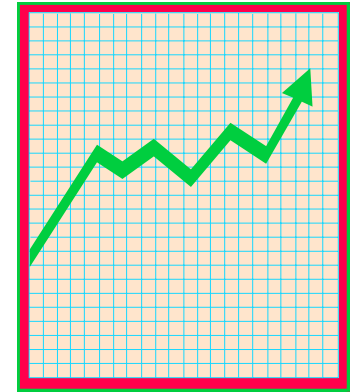


West Nile Virus and Animals

Susan R. Kerr, DVM, PhD
Klickitat County Extension Chair

WNV: A Brief History

- Virus first detected in Uganda in 1937
- Many cases in Israel in the 1950s
- Cases in Egypt and France in the 1960s
- First detected in U.S. in 1999
- Between Jan. 1, 2002 and Jan. 29, 2003, 4,007 human cases of West Nile virus-related illness have been reported to the CDC, including 263 fatalities

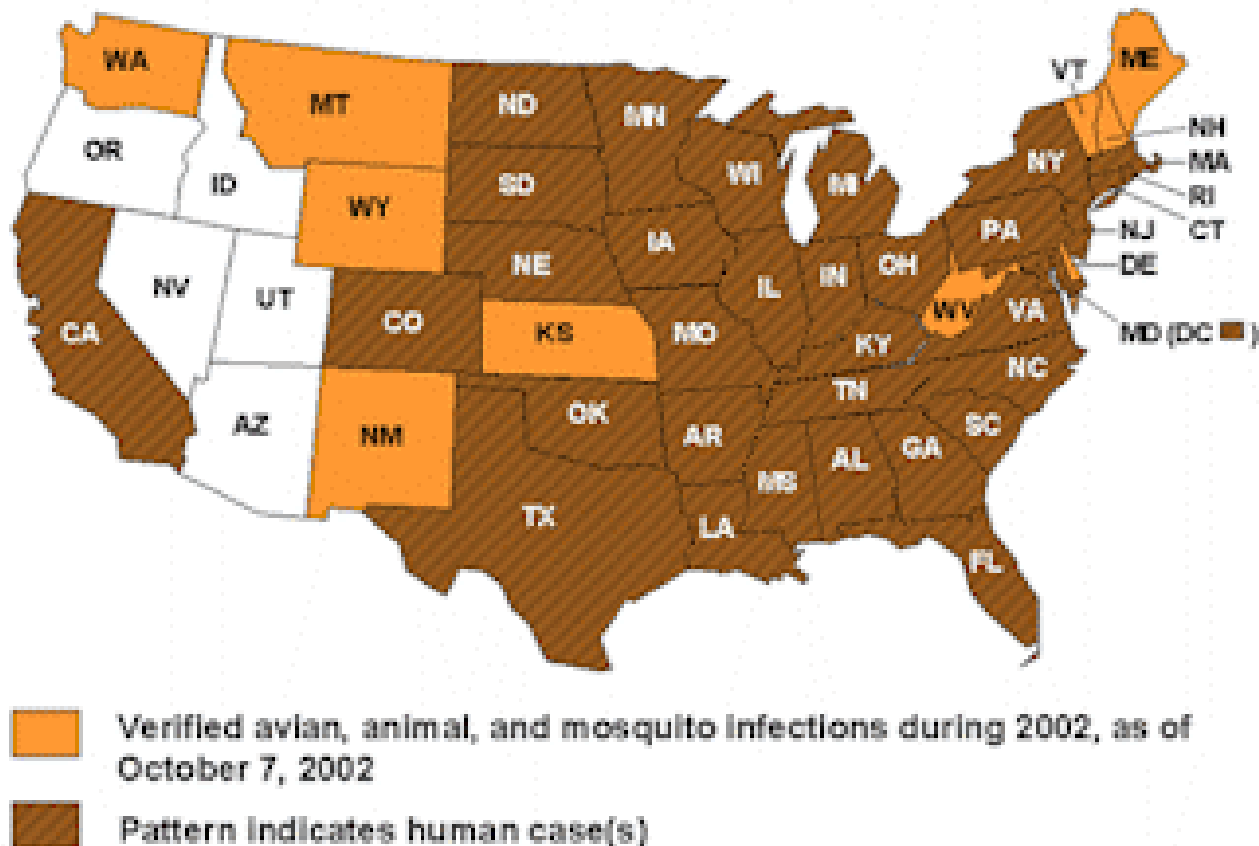


U.S. WNV Case Summary, 1999-2002

Year	Humans (deaths)	Horses (deaths)
2002	3,873 (246)*	14,358**(5,000)
2001	66 (9)	733 (156/470)
2000	21 (2)	60 (23)
1999	62 (7)	25 (8)

***As of December 31, 2002 **As of December 1, 2002**

West Nile Virus in the United States, 2002



Map from Washington State Department of Health Web Site



How Did WNV Get Here? Some Theories...



- **International travel (mosquito stowaways)**
- **Human-transported birds (legal or illegal)**
- **Tropical storms carry birds and mosquitoes hundreds of miles off course**
- **Global warming allowing infected birds to change migration patterns**
- **Intentional introduction (bioterrorism)--unlikely**
- **Infected human traveler--unlikely**

History of WNV in Washington State



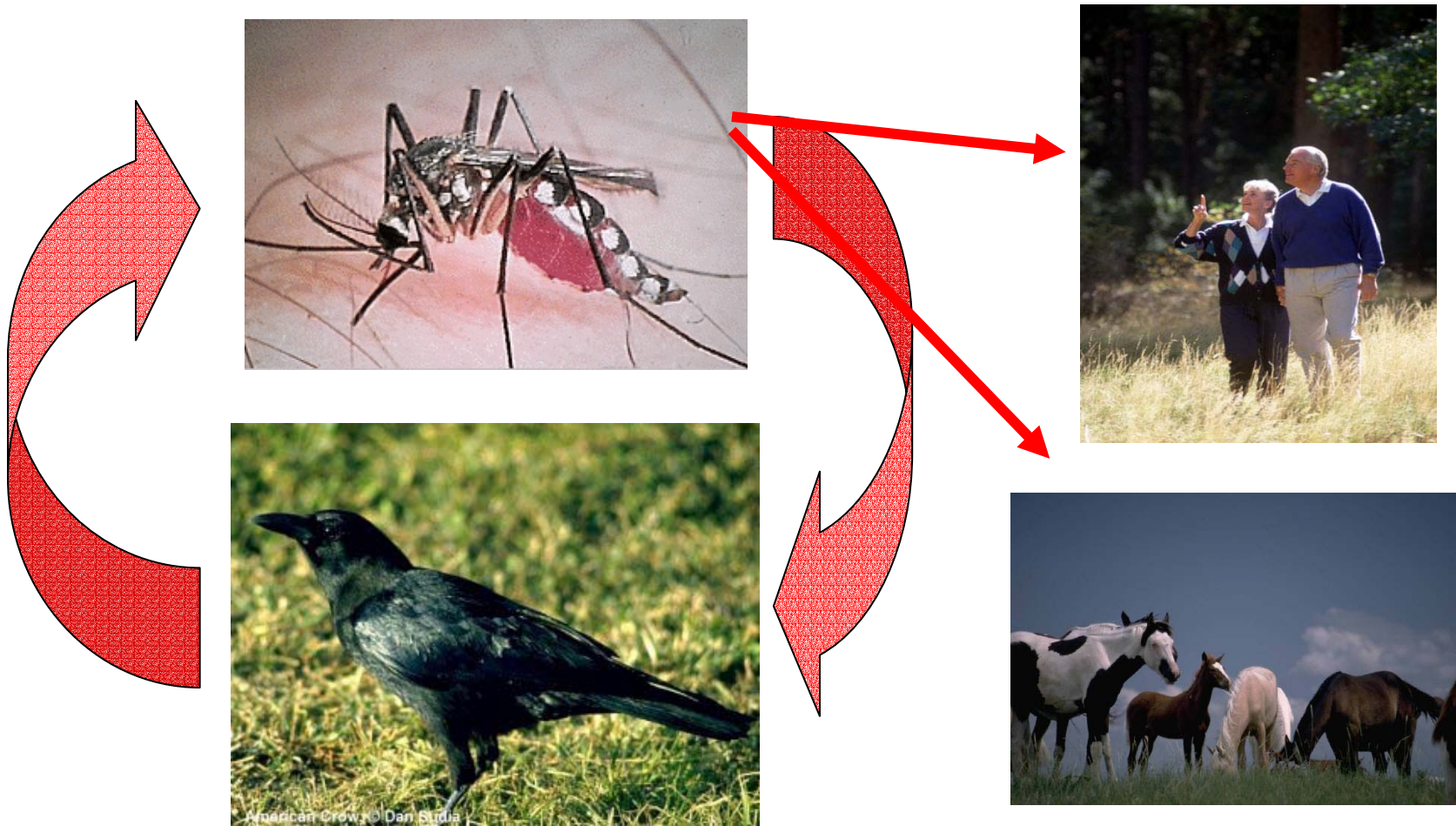
- **Dead raven in Pend Oreille County, WA tested positive in September 2002**
- **Dead crow tested positive in Snohomish in October, 2002**
- **Sick horse tested positive in Island Co., WA, Nov. 2002**
- **Sick horse tested positive in Whatcom Co., WA, Dec. 2002**
- **No cases of human illness originated in WA yet**

Life Cycle of WNV

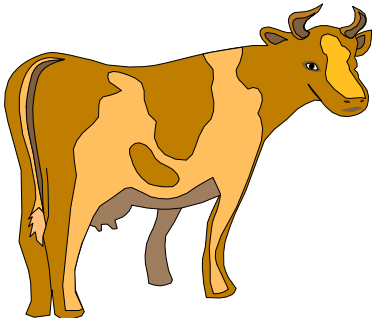
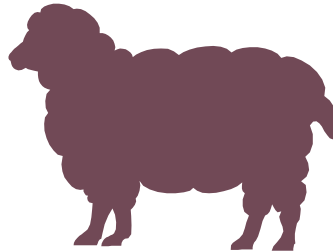
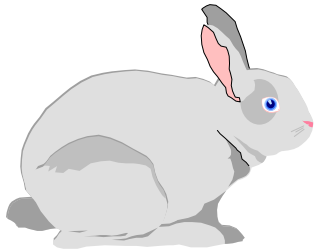
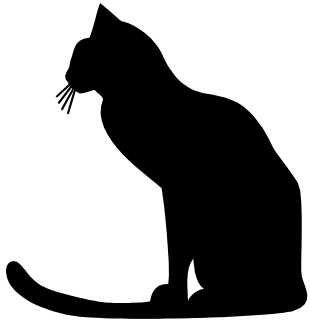
- Birds are reservoirs of infection (over 130 species can be infected; corvids most frequently involved)
- Mosquitoes pick up virus from infected birds, potentiate it, and transmit to other birds, horses, or humans
- Horses and humans are “dead end” hosts (EXCEPTIONS: blood transfusions, organ donations, breast milk, trans-placental)
- The virus is amplified through birds and mosquitoes



West Nile Virus Transmission Cycle



Species That Have Tested Positive for WNV



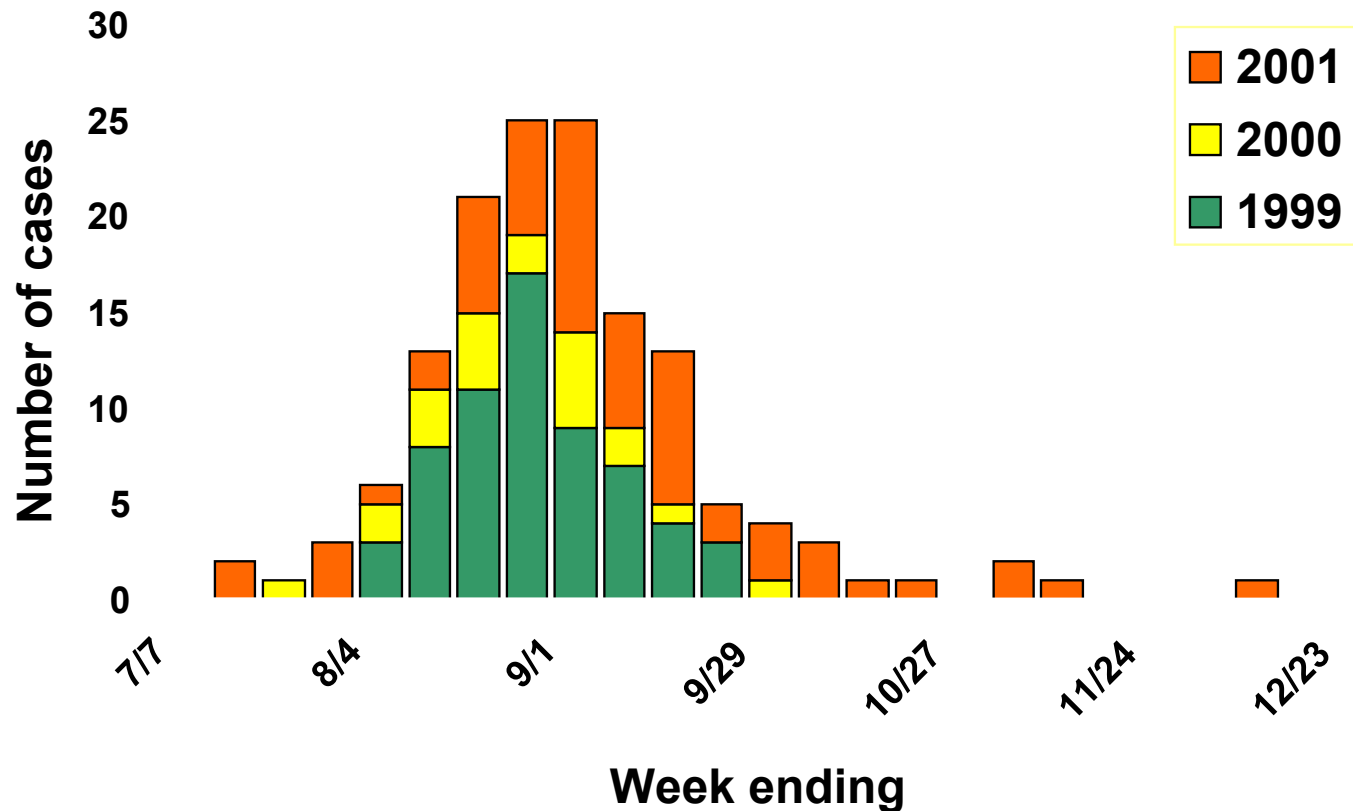
- Cats
- Cows
- Dogs
- Bats
- Chipmunks
- Skunks
- Squirrels
- Rabbits
- Alpacas
- Sheep
- Alligators

Key Points



- **Horses affected more than any other species of animal**
- **Human, equine, and avian illness is rare even in affected areas**
- **<1% of mosquitoes in affected areas carry the virus; <1% of humans bitten develop serious complications**
- **Many cases are subclinical or mild (flu-like)**
- **Illness most severe in elderly, ill, or immunocompromised individuals**
- **Corvids are most likely to develop clinical signs**

Date of Symptom Onset, West Nile Virus United States, 1999-2001



Summary: cases usually first appear in mid-to late summer.

WNV Symptoms in Humans

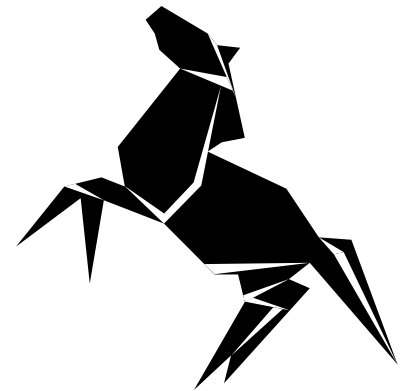


- **High Fever**
- **Headache and body aches**
- **Skin rash**
- **Swollen lymph glands**
- **Neck stiffness**
- **Disorientation**
- **Convulsions**

The incubation period for West Nile Virus is generally 3-14 days following a bite from an infected mosquito.

Signs of WNV in Horses

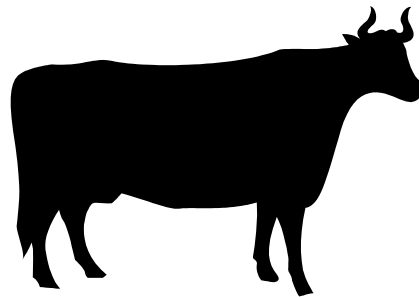
- **Ataxia, difficulty walking, dragging a leg**
- **Stumbling, knuckling over, falling**
- **Head tilt, drooling**
- **Muscle tremors, weakness**
- **Down**
- **Depressed**
- **Poor appetite**
- **Fever**
- **Hypersensitivity**
- **Paralysis**
- **Convulsions**



WARNING! These signs are also typical of rabies!

Some Statistics:

- **Humans: about 30% of those bitten by positive mosquitoes develop some signs of illness; about 1% develop serious signs or die**
- **About 33% of symptomatic horses die.**
- **Signs of illness in other species are rare.**



Preventing WNV

- 1. Surveillance steps**
- 2. Personal protection and education**
- 3. Mosquito Control**
- 4. Vaccinations**

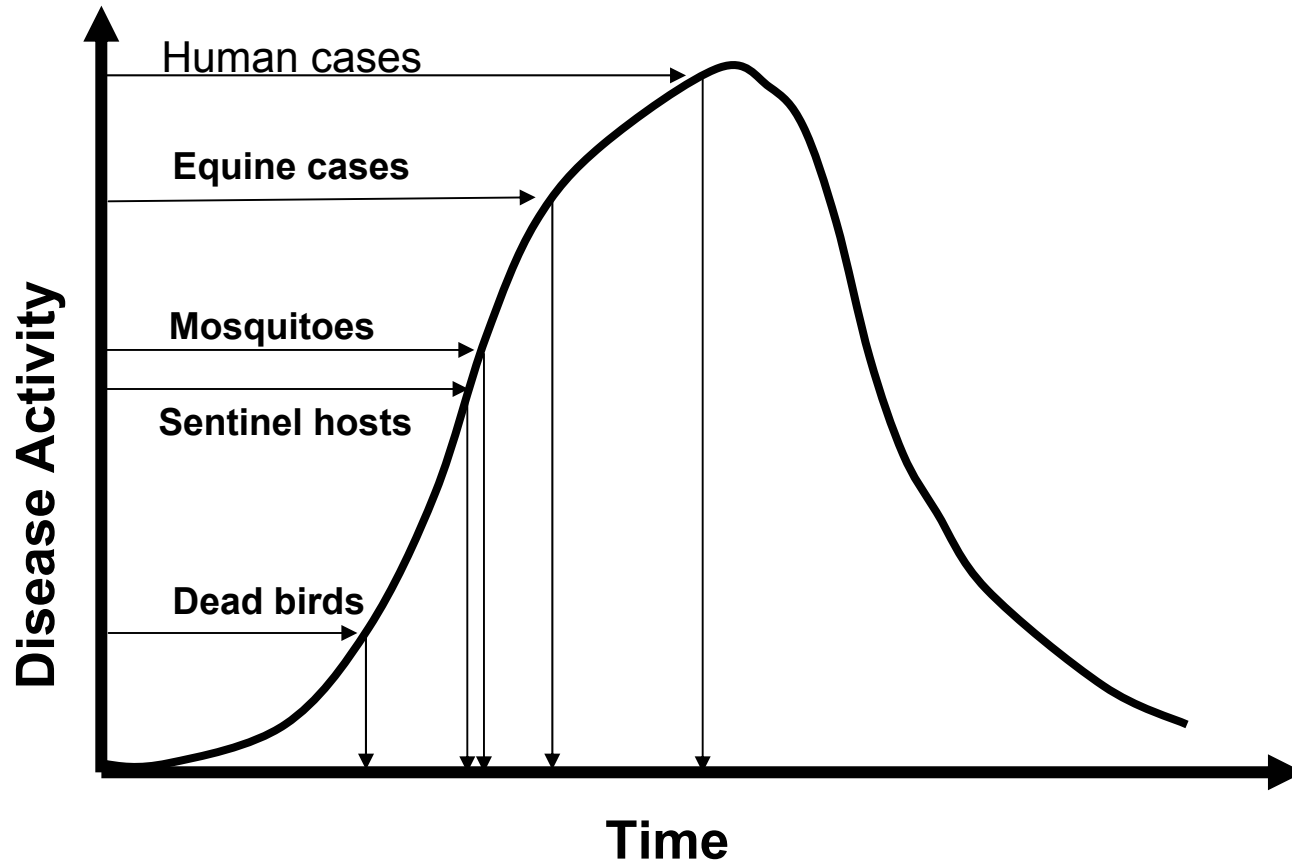


Surveillance Measures

- Mosquito pool analysis for vector species
- Serology on horses and cattle
- Captive sentinels (chickens)
- Human surveillance
- Dead bird testing: “An increase in the number of dead crows is considered the best early indicator of WNV presence.” Call 360-236-3060 to report dead crows, jays, ravens, magpies, or raptors; form available on-line at WA State DOH Web site. Submit fresh, whole birds; handle with gloves



Estimated Sensitivity of WNV Surveillance Methods



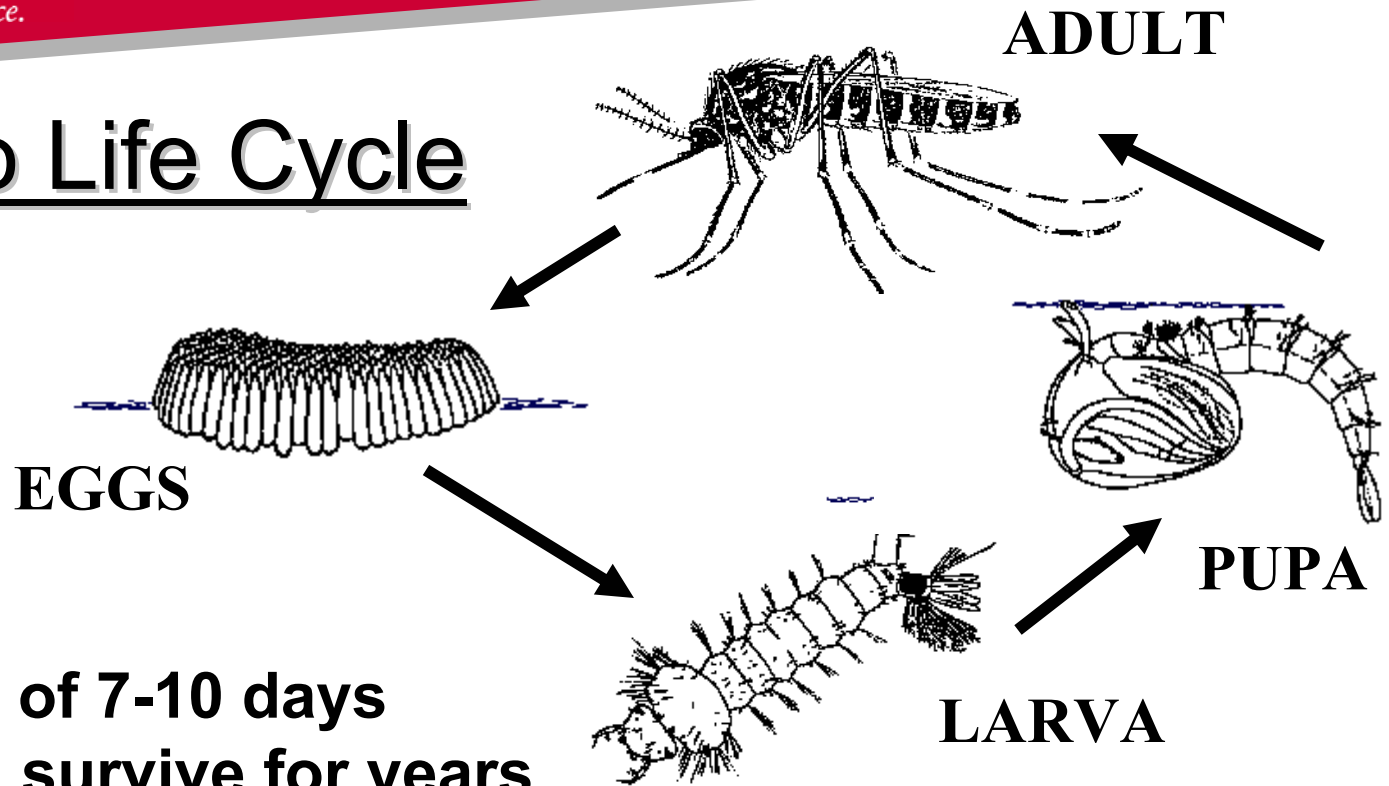
About 6 to 8 weeks between first dead bird and human cases...

Prevention and Personal Protection

- Use insect repellents containing DEET (humans)
- House horses in well-screened barns during prime mosquito-feeding hours (dawn, dusk, and evening)--**HA!**
- Eliminate mosquito breeding grounds
- Wear long sleeves and pants
- Limit outdoor activities at dawn and dusk
- Repair holes in door and window screens
- Encourage bat and insect-eating bird habitat
- Vaccinate horses (1 cc IM in two doses 3 to 6 weeks apart with annual booster in Spring, at least 5 weeks before start of mosquito season; killed vaccine; full licensure since Feb. 6, 2003; only available through veterinarians; not licensed for pregnant mares, but no ill effects noted)



Mosquito Life Cycle



- **Minimum of 7-10 days**
- **Eggs can survive for years**
- **Four stages of larval development**
- **Adults live a few weeks to several months**
- **Over-winter as eggs, larvae, adults**
- **WNV can be carried from + adult, through eggs, to next adult!**



Mosquito Habitat Reduction

- **Eliminate standing water (flower pots; tires; wheelbarrows; wading pools)**
- **Change the water in birdbaths and water troughs every 4 to 7 days, or use special larvicidal products**
- **Aerate and chlorinate swimming pools and hot tubs; cover if possible**
- **Consider mosquito-eating fish for ponds and troughs**
- **Keep gutters clean to prevent standing water**
- **Special license needed to apply insecticides to water**
- **Spread the word: educate your friends and neighbors**

Resources

- www.cdc.gov/ncidod/dvbid/westnile
- westnilevirus.nbii.gov
- www.cfe.cornell.edu/erap/WNV/
- www.aphis.usda.gov/lpa/issues/wnv/wnv.html
- www.doh.wa.gov/ehp/ts/Zoo/WNV/WNV.html
- www.mosquito.org
- npic.orst.edu/wnv
- www.vetmed.wsu.edu/announcements/westNile/info.html
- www.avma.org/communications/brochures/wnv/wnv_faq.asp
- www.wa.gov/agr/FoodAnimal/AnimalHealth/WNVdefault.htm



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