The West Nile Virus: An Environmental Perspective

Shannon J. Cox-Kelley EdD MCHES

Assistant Professor

Occupational Health Sciences

PEHSU Program Disclaimer

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What is West Nile

- arbovirus" - derived from phrase "arthropod-borne."
- Infects birds, humans, other vertebrates (Africa, E. Europe, W. Asia, Middle East.)
- Crosses the blood brain barrier
- **Closely related to St. Louis encephalitis virus found in US.**

West Nile Virus

- Wild and domestic birds - primary host.
- Spreads from birds to man and other animals via mosquitoes feeding on an infected bird and then biting another host.
- Mosquitoes that transmit WNV and SLE usually prefer to bite birds.
- Human infections with these mosquito-borne viruses are very rare and can be prevented by taking simple measures to avoid mosquito bites.

Amplifying hosts

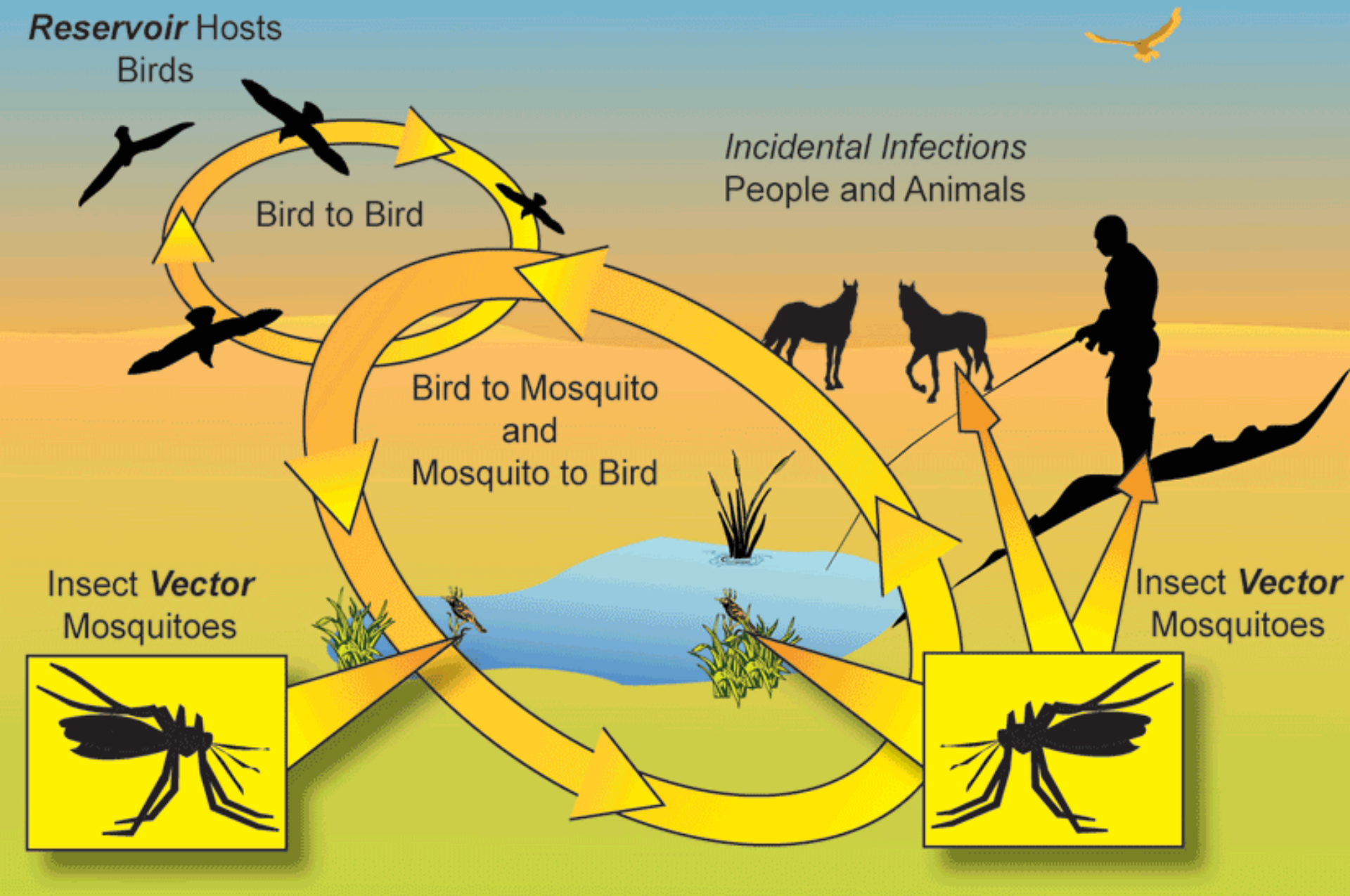
Vectors

Culex spp., *Aedes* spp.,
Ochlerotatus spp.

Incidental hosts

Humans, horses, and other animals

West Nile Virus Transmission Cycle



Mosquito Vectors

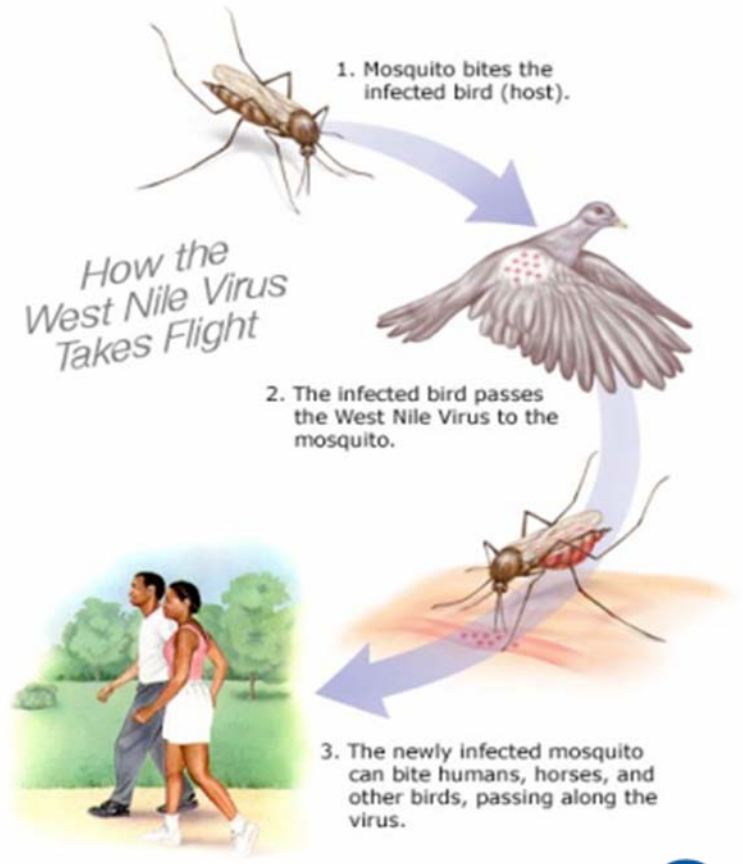
Nearly 60 (59) species of mosquitoes capable (at least in the lab) of transmitting WNV

Culex tarsalis feeding

- Important vectors vary by geography, e.g.
  - *Culex tarsalis* (western states)
  - *Culex pipiens* (Midwest, and elsewhere)
  - *Culex quinquefasciatus* (south)
- Different behaviors – some fly very long distances
- Feeding habits, infection rates, breeding areas all important

Human Transmission

- Direct contact
  - Infected birds, tissues
- Laboratory acquired
- Blood transfusions
  - Screening implemented in 2003
- Organ transplants
- Trans placental transmission
- Breast feeding

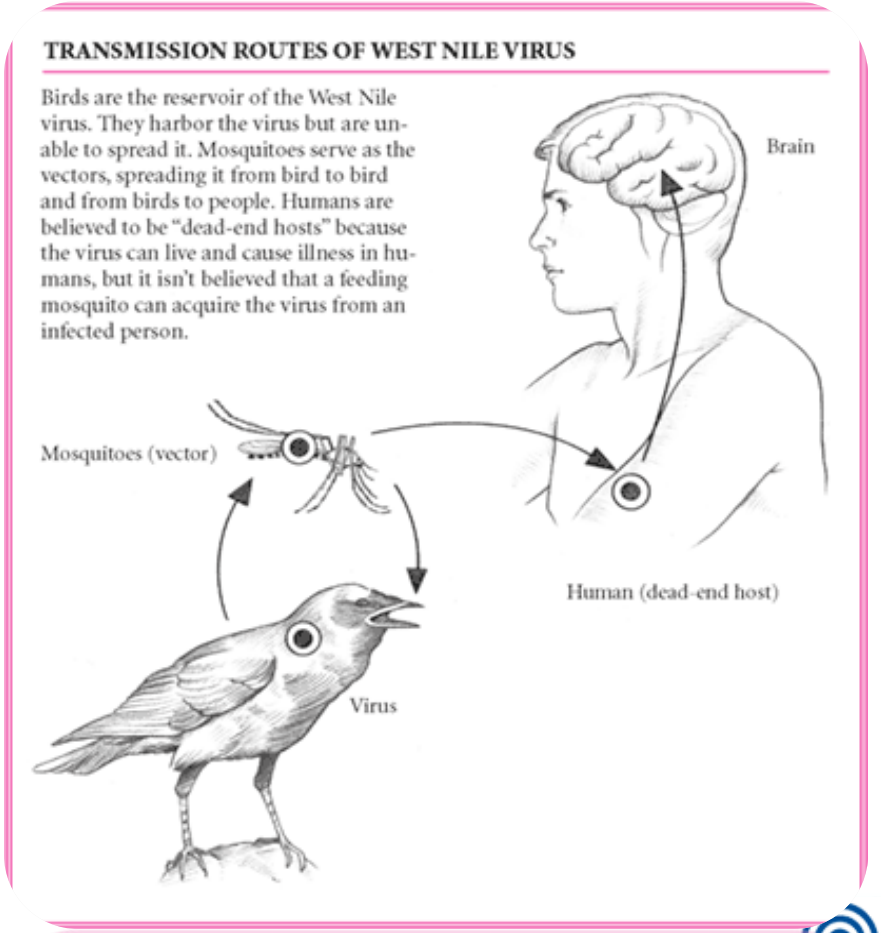


Disease in Humans

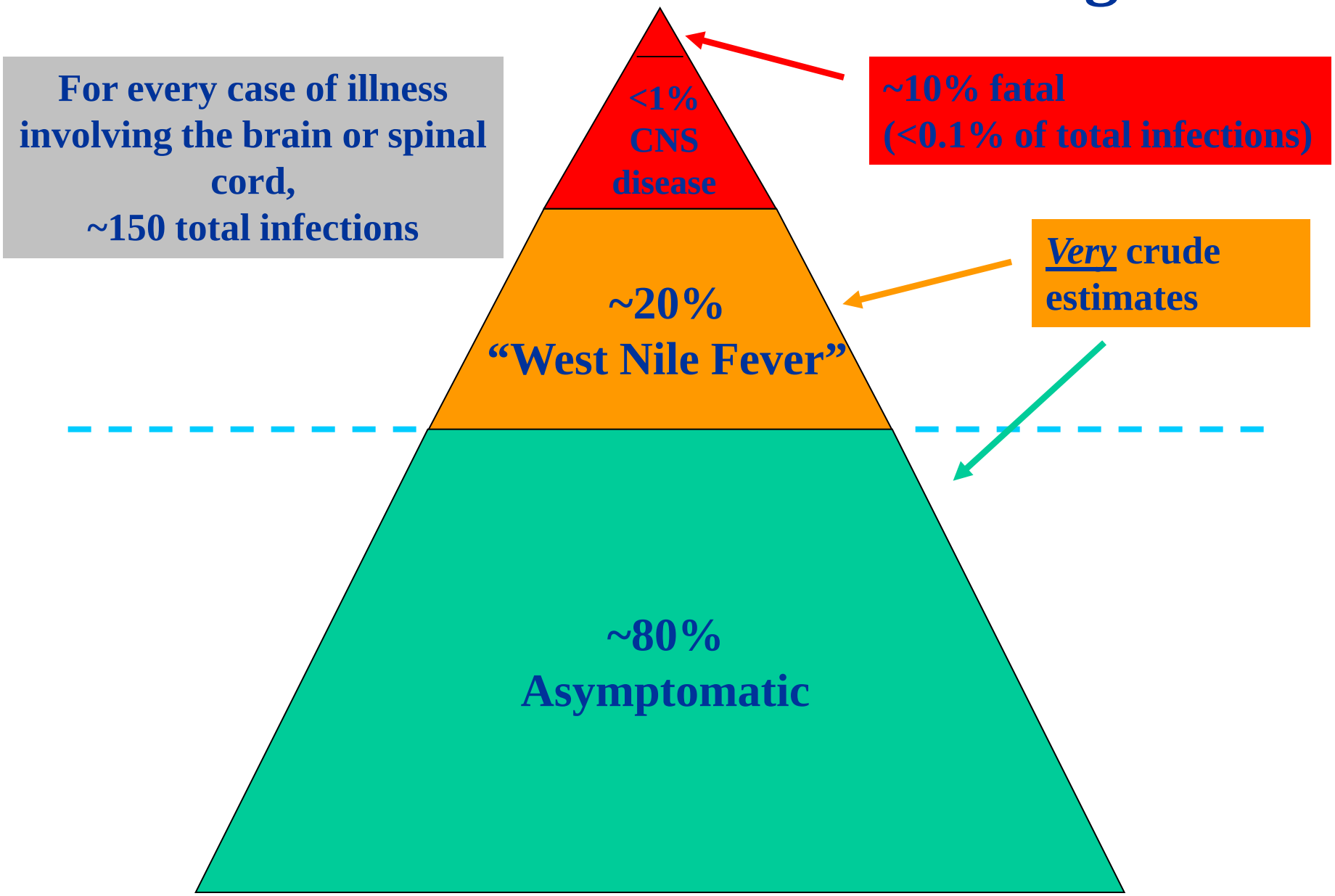
- Incubation: 2 to 14 days
- Many WNV infections asymptomatic
- Two forms of disease
- **West Nile fever**
  - Most common form
  - Resembles influenza
  - Most infections resolve in 2 to 6 days
  - Persistent fatigue can occur

Disease in Humans

- **West Nile neuroinvasive disease**
  - **Occurs rarely**
    - Progression of West Nile fever
  - Can be severe and life-threatening
  - Three syndromes
    - Encephalitis
    - Meningitis
    - Acute flaccid paralysis
  - Persistent neurological dysfunction may occur



WNV Human Infection "Iceberg"



Diagnosis and Treatment

- Serology – Antibody Testing
- Supportive Care
- Level dependent on severity of disease
- Vaccine available for veterinary purposes only at this time

The Four Ds of WNV Prevention

• **Dusk to Dawn – Those are the prime mosquito feeding** hours and that is when they are most likely to take a drink Out of you.

• **Dress – Wear long sleeves and long pants to avoid being bit.**

• **DEET – Buy an insect repellant that contains DEET** and be sure to follow the manufacturer’s instructions.

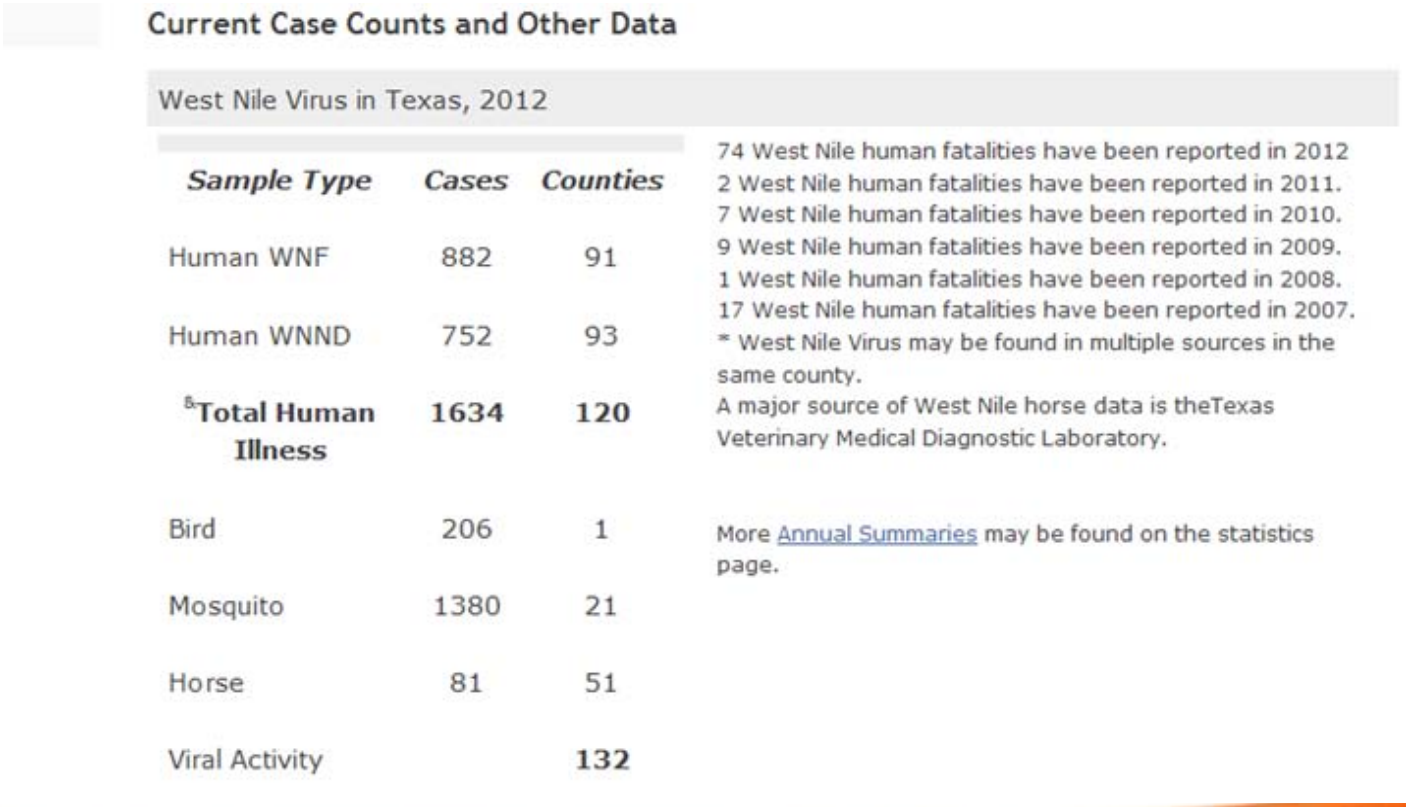
• **Drainage – Make sure flower pots, water dishes, bird Baths** and children's swimming pools are properly drained so they're not breeding grounds for mosquitoes.

Environmental Concerns of Control

- Aerial Spraying
  - Research shows it is effective, Dallas reports a cutting of Culex by 93% since spraying.
- Potential Downfalls
  - Killing off insects important to environmental homeostasis (bees, butterflies, etc)
  - Human exposure to pesticides
  - Drift leading to items such as water contamination
  - Insecticide resistance

Where to Obtain Up to Date Info

http://www.dshs.state.tx.us/idcu/disease/arboviral/westnile/



Current Case Counts and Other Data

West Nile Virus in Texas, 2012

Sample Type	*Cases*	*Counties*
Human WNF	882	91
Human WNND	752	93
[5]**Total Human Illness**	**1634**	**120**
Bird	206	1
Mosquito	1380	21
Horse	81	51
Viral Activity		**132**

74 West Nile human fatalities have been reported in 2012
2 West Nile human fatalities have been reported in 2011.
7 West Nile human fatalities have been reported in 2010.
9 West Nile human fatalities have been reported in 2009.
1 West Nile human fatalities have been reported in 2008.
17 West Nile human fatalities have been reported in 2007.
* West Nile Virus may be found in multiple sources in the same county.
A major source of West Nile horse data is theTexas Veterinary Medical Diagnostic Laboratory.

More Annual Summaries may be found on the statistics page.

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