Fight the Bite!
Preventing West Nile Virus

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Outline

• History and recent spread
• Mosquito biology
• Symptoms and treatment
• Control and management
• Predicting outbreaks
History of West Nile Virus

• First discovered in Uganda (1937)
• Common in Africa, Europe and Middle East
• First appeared in U.S. in 1999 (New York)
• Spread to 48 U.S. States, Canada, and Mexico by 2004
• In U.S., >400 people, 1000’s of horses have died
West Nile Virus Activity

- Non-Human West Nile Virus Activity
- Human Disease Cases

National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 1999 calendar year

www.cdc.gov
West Nile Virus Activity
- Red: Non-Human West Nile Virus Activity
- Blue: Human Disease Cases

National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 2002 calendar year reported as of April 15, 2003
West Nile Virus Activity
2003_AllActivity_vs_HumanActivity.VALUE

- Red: Non-Human West Nile Virus Activity
- Blue: Human Disease Cases

National Center for Infectious Diseases
West Nile Virus Activity
Cumulative results for 2003 calendar year reported as of October 24, 2003
Recent WNV history in UT 2004

Human cases

Non-human cases

http://health.utah.gov/epi/diseases/wnv/
Mosquito biology

- Piercing sucking mouthparts
- Feed on nectar, but females require blood
- Persistent biters, attracted to CO₂ and heat
Life cycle of the vector

- Eggs
- Larvae
- Pupae
- Adult mosquito

Virginia Tech Entomology
Mosquito biology

• Mosquitoes lay eggs in water
• Females lay ~200 eggs every 3 days
• Egg --> Adult takes 14 days
• Polluted, standing water is preferred
• Water standing for >4 days is ideal
**Culex tarsalis** is #1 vector of WNV

- Very efficient vector
- Are most active July - September
- Mostly feeding at dawn and dusk
- Birds are preferred hosts
- Will feed on small and large mammals
Life cycle of WNV

• Virus overwinters in mosquitoes

• Bird-to-bird in spring
  – American crows and blue jays are susceptible

• Bird-to-mammal in summer
  – Horses and humans are dead-end hosts
Symptoms of WNV

- None
  - 80% of people will not show any symptoms
  - Most healthy people will produce antibodies to fight against infection
Symptoms of WNV

• Mild
  – 20% of people have flu-like symptoms
  – Fever, headache, vomiting, skin rash
  – Symptoms last a few days in most people
Symptoms of WNV

• Severe (<1%)
  – Less than 1% of people get seriously ill and require hospitalization
  – High fever, headache, tremors, vision loss, coma, paralysis, encephalitis, meningitis
  – Symptoms last several weeks
  – Neurological effects can be permanent
  – People over 50 are at the most risk
Diagnoses and Treatment of WNV

- Antibody blood test confirmation
- For mild symptoms:
  - Rest, fluids, Advil, etc.
- For severe symptoms:
  - IV fluids and nutrition
  - Respiratory support
  - Prevention of secondary infections
Is there anything YOU can do to prevent WNV infection??

YES!!!
Prevention around the home...

Eliminate standing water
  – Clean gutters
  – Remove spare tires and equipment
  – Make holes in garbage cans and recycling bins
  – Use landscaping to avoid pooling water
Prevention around the home...

Keep standing water fresh

- Aerate fish and ornamental ponds
- Change bird baths and pet bowls
- Chlorinate pools and keep covers dry
- Turn over wading pools when not in use
- Keep watering cans and pots clean and dry
Mosquito-proof your home

• Keep doors and windows closed
• Repair tent and screens tears
• Insulate window AC’s, fans
• Avoid peak feeding times
• Wear pants and long sleeves
• Use repellent!
What kind of mosquito repellent is best?

It depends….

– Level of outdoor activity
– Sensitivity to chemicals
Mosquito control programs

• Integrated Mosquito Management (IMM)
  – Surveillance and targeted application
  – Low risk to animals and environment
• Adults
  – Ultra low volume (ULV) application
  – Ex., malathion, permethrin
• Larvae
  – Pellet, granule or film/oil application
  – Ex., methoprene, temephos, B.t.i.
What is UT doing to prevent WNV?

• City-wide mosquito control programs
• Limited applications
  – Public parks and recreation areas
  – Contracted special occasions
    • 4th of July, picnics, weddings, etc.
How can you find more (and current) information about WNV?

- Look for cases in the news
  - TV, radio and newspapers
  - USU Department of Biology

- Visit local and national websites
  - health.utah.gov/epi/diseases/wnv/
  - www.cdc.gov
What else can you do to help?

West Nile virus

Dead bird reporting form

The DWR is currently testing only birds of the corvid family (ravens, crows, jays, and magpies) and raptor (hawks, eagles, falcons, and owls) for West Nile Virus.

If you want to report a dead bird, please fill in as much of the following form as possible. We might contact you for additional information and/or collect the bird for testing. Birds must have died within 24 hours to allow for West Nile Virus testing.

Species or common name of bird.

If you cannot identify the bird, please describe it (i.e., length, color, markings, etc.):

Was the bird found dead?

- Yes
- No
- Unknown

If no, please describe any unusual behavior before death (i.e., difficulty flying, etc.):

www.wildlife.utah.gov/wnv     www.extension.usu.edu
Predicting WNV outbreaks

• Very difficult to predict WNV
• Mosquito populations can vary
  – Develop faster in hot weather
  – Availability of standing water
• Horses already sick in ND and MN
  – Warm April and wet May/June
Summary of WNV

• Can cause serious illness (<1%)
• Undetected in most healthy people
• Reduce your risk:
  – Local updates in your area
  – Source reduction, eliminate standing water
  – Mosquito-proof your home
  – Use repellent when necessary
THANK YOU FOR YOUR ATTENTION!!

QUESTIONS??
Types of repellents

- DEET – most effective, strong smelling
- Picaridin – effective, odorless
- Permethrin – very effective, not for skin
- Oil of eucalyptus – short term repellency
- Skin So Soft® – somewhat effective, <1 hour
- Other “plant-based” repellents
  - Peppermint, garlic, vanilla