Vector-Borne Disease Update

- West Nile Virus
- Brucellosis
- Rabies
- CO Tick Fever
- Tularemia
- Swimmers Itch

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West Nile Virus Update
West Nile Virus: 11+ Years Later
WNV Surveillance Totals, U.S., 1999-2008

- WNV human cases, total ........28,900+
- WNV assoc. human deaths.......1,100+
- WNV+ mosquito pools ............65,130+
- WNV+ animals ....................25,290+
- WNV+ dead birds ..................62,690+
- WNV+ # bird species...............300+
- WNV+ sentinel animals..........9,700+
WNV, U.S., 2009

- Total: 720  Fatal: 32
- Neuroinvasive: 386 (54%)
  - Encephalitis – 229
  - Meningitis – 117
  - Acute flaccid paralysis - 40
- Fever / Other: 334 (46%)
- Age Range: 2 – 91 yrs; Median: 60
- Viremic Donors: 116 (23% dvp sx)
WNV Infections, U.S., 2009

- For every case of neuroinvasive WNV, there 140 infections and 20%+ have sx (mostly “WNV fever”)
- CDC estimates for Year 2009:
  - 54,000 infections
  - 10,000 cases w/ clinical sx
- Surveillance only detects 3% of non-neuroinvasive clinical cases.
- Reduced case numbers can be deceiving.
2009 – Reduced WNV Activity

• Many states reported ↓ WNV activity 2009.
• Lowest WNV stats since 2001.
• 2009 – cool summers reported across U.S.
• High temps accelerate extrinsic incubation period in mosquitoes – ie, shorten time to become infective.
West Nile virus, Arizona 2003-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>No. cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>0</td>
</tr>
<tr>
<td>2004</td>
<td>400</td>
</tr>
<tr>
<td>2005</td>
<td>100</td>
</tr>
<tr>
<td>2006</td>
<td>150</td>
</tr>
<tr>
<td>2007</td>
<td>100</td>
</tr>
<tr>
<td>2008</td>
<td>150</td>
</tr>
<tr>
<td>2009</td>
<td>20</td>
</tr>
</tbody>
</table>
WNV, AZ, 2009

- 20 human cases (vs. 107 in 2008)
- 88 WNV+ mosquito pools (vs. 208 in 2008)
- 2009 monsoon was a “Non-soon” – rains were late (late August) and scant.
- Don’t assume that WNV is declining!
  (Mother nature is rarely predictable.)
## WNV+ Mosquito Pools by Month

<table>
<thead>
<tr>
<th>Month</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>June</td>
<td>0</td>
<td>23</td>
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<tr>
<td>July</td>
<td>39</td>
<td>34</td>
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<tr>
<td>August</td>
<td>91</td>
<td>12</td>
</tr>
<tr>
<td>September</td>
<td>65</td>
<td>9</td>
</tr>
<tr>
<td>October</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>208</strong></td>
<td><strong>88</strong></td>
</tr>
</tbody>
</table>
# WNV, U.S., 2010

<table>
<thead>
<tr>
<th>STATE</th>
<th>HUMAN CASES</th>
<th>DEATHS</th>
<th>VIREMIC DNR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arizona</td>
<td>17</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>California</td>
<td>2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Colorado</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Georgia</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kansas</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mississippi</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N. Dakota</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S. Dakota</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Texas</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>
West Nile virus (WNV) activity reported to ArboNET, by county, United States, 2010

as of July 20, 2010

- No WNV activity
- Non-human activity only
- Human disease cases or PVDs*

PVDs = Presumptive viremic blood donors
*These jurisdictions may have also reported non-human WNV activity.
WNV Mosquito Surveillance, 2010

TOTAL : 146 WNV+
- MAR – 116
- PINAL – 29
- YUMA – 1

SPECIES
- Culex quinq. – 89
- Cx. tarsalis – 46
- Cx. sp. -2
- Ae. vexans – 2
- An. franc. – 1

*(<40 in 2008 & 2009)
# WNV + Mosquito Pools X Year, Mid-July

<table>
<thead>
<tr>
<th>YEAR</th>
<th># WNV+ MOZZIE POOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>141</td>
</tr>
<tr>
<td>2006</td>
<td>5</td>
</tr>
<tr>
<td>2007</td>
<td>65</td>
</tr>
<tr>
<td>2008</td>
<td>5</td>
</tr>
<tr>
<td>2009</td>
<td>54</td>
</tr>
<tr>
<td>2010</td>
<td>130</td>
</tr>
</tbody>
</table>
WNV: What lies ahead?

- 2010: the worst months are still ahead.
- Monsoon rains might ↑ mosquitoes & WNV
- Expansion of WNV activity = likely.
- Human cases #’s ↑
- 2011: Elimination of Federal Funding
- NPDES
Brucellosis, AZ-2010

- Five human cases
- MAR-3; PIMA-2
- Age: 7-43; Med – 7
- All Hispanic
- *Brucella melitensis*
- Source: eating unpasteurised dairy – esp. queso fresco (goat cheese – homemade)
# Arizona Rabies Stats, 2009

<table>
<thead>
<tr>
<th>Animal Species</th>
<th>Number Rabid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bats</td>
<td>69</td>
</tr>
<tr>
<td>Skunks</td>
<td>144</td>
</tr>
<tr>
<td>Foxes</td>
<td>51</td>
</tr>
<tr>
<td>Bobcats</td>
<td>8</td>
</tr>
<tr>
<td>Coyotes</td>
<td>2</td>
</tr>
<tr>
<td>Horses</td>
<td>3</td>
</tr>
<tr>
<td>Cat</td>
<td>1</td>
</tr>
<tr>
<td>Other: cow-1,ringtail-1</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>280 New Record!</strong></td>
</tr>
</tbody>
</table>
Rabies Exposures - 2009

- # human exposures = 44+
- Bats – 12
- Foxes – 8
- Bobcats – 8
- Horses – 6
- Skunks – 6
- Cow – 3
- Cat - 1

- # pet exposures = 166 (mostly dog/skunk)
Rabies Update 2010 (July 21)

- Current stats – 69 rabid animals
- 49 – skunks
- 4 – bobcats
- 2 – javelina
- 4 – fox
- 9 – bats
- 1 – coati
- July 2009 – 160+
Colorado Tick Fever

Case History - CTF

- 70+ y.o. male from Yavapai County
- Onset: late June
- Sx: fever 102° F, malaise, loss of appetite
- Labs: leukopenia (low WBCs)
- Adm: hospital – 4 days
- Travel: South Pass, Wyoming – “boggy pasture” – approx. 5-7 days prior to onset.
- Tick attached to leg. ID – D. andersoni – blood engorged.
Colorado Tick Fever

- **Agent**: Coltivirus
- **Vector**: Rocky Mt Wood Tick (*Dermacentor andersoni*)
- **Reservoirs**: chipmunks, ground squirrels, porcupine, wild mice & *Dermacentor* ticks
- **Occurrence**: mountainous regions (>5,000 ft. elev.) in western U.S. & Canada
- **Approx. 200+/- cases/year in U.S.**
Colorado Tick Fever

- **Incubation**: 4 - 5 days after tick-bite
- **Clinical**: fever, chills, headache, photophobia, often diphaseic, transient rash = infrequent, neutropenia & thrombocytopenia on 4th day+
- **Complications**: encephalitis, myocarditis, or bleeding disorders
- **Diagnosis**: virus isolation or serologic tests (IFA, CF). IgG Ab detected after 10 days
- **Treatment**: supportive care
Tick-Borne Disease DX

- Save / submit ticks for ID
- Tick species & patient travel hx will disclose which disease(s) are possible, and will help w/ lab testing & rx decisions.
- Many patients & MDs automatically think Lyme disease.
Tularemia

- Tularemia dx in cat – Yavapai Co. - July
- “Oreo” – outdoor hunter – caught a rabbit.
- Sx: fever, oral lesions, abd. tenderness, stopped eating, antisocial behavior
- Susp. plague vs. tule
- Specimens → ASHL
Tularemia Response

Typical Follow-up by Local Health &/or State

• Contact cat owners, veterinary staff & other persons w/ contact to sick cat
• Consider fever watch or prophy
• Notification of local hospitals / EDs
• Notification of local DVMs
• Notification of Game & Fish
• Local press release
• Notification of local residents
Swimmer’s Itch
Swimmer’s Itch
a.k.a. Cercarial Dermatitis

• June 2010, suspected cases of SI reported in June in Mohave County in people swimming in coves along the Colorado River.

• SI has been reported in past years in Arizona lakes & ponds, including Roper Lake (Safford) & Coors Lake (Bagdad).

• SI cases occur during warmer months when people are spending more time in water.
What is Swimmer’s Itch

• Swimmer’s itch (SI) is caused by a schistosome (blood fluke) that affects mostly waterfowl.
• SI affects people wading or swimming in natural bodies of water – especially shallow areas of ponds, river coves, lakes, etc. where aquatic vegetation, snails & waterfowl occur.
• Human’s are a dead-end host.
• An immature stage of the fluke – called cercaria – attempt to burrow into skin causing tingling, itching, burning or “electrical” sensation.
Swimmer’s Itch

- Cercaria - an immature stage - penetrate outer layers of skin and then die.
- Itchy lesions develop – people react to different degrees.
- People with previous exposure are sensitized & tend to react quicker and more intensely.
Swimmer’s Itch Life Cycle

- Accidental penetration into man produces rash
- Bird (adult parasite in beak)
- Eggs
- Minute larvae
- Snail (Cercariae develop in tissues)
- Many larvae (Cercariae)

Diagram shows the life cycle of the parasite causing Swimmer’s Itch.