Sentinel Chickens
Challenges and Solutions

Al Hom, DHS/VBDS
Liz Baylis, DHS/VRDL
Bill Reisen, UC Davis/ CVEC
Chicken WNV seroconversions in 2004

May
Chicken WNV seroconversions in 2004

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Chicken WNV seroconversions in 2004
Chicken WNV seroconversions in 2004
Chicken WNV seroconversions in 2004

September
Chicken WNV seroconversions in 2004

October
Chicken WNV seroconversions in 2004

- 805 seroconversions
- 22 counties with seroconversions
- 143/231 flocks seroconverted
**Issue:** To efficiently direct mosquito control activities, local agencies indicated a shorter turn-around time would be helpful.

**Proposed solutions:**
- Preliminary results to be reported to local agencies for early warning. Note that these results are “non-specific”, “probable flavivirus”, or possible false-positive, not confirmed WNV seroconversions.
Issues & challenges faced in 2004

• For confirmation testing, local agencies will be requested to provide whole chicken sera within 2-3 days of preliminary result notification.

• Quickest turn-around time achieved if sera received before Monday.

• After initial WNV seroconversion in a flock, agencies may opt to collect confirmatory sera at next scheduled bleeding.

• Confirmatory testing is critical to distinguish WNV and SLE infection.
Outstanding issues to be addressed before 2005 season

To facilitate confirmatory sera collection, microtainers, instead of vacutainers (for sample collection from the comb), will be provided.
Importance of the sentinel chicken surveillance program:
As a key factor in the Arbovirus Response Plan

<table>
<thead>
<tr>
<th>Surveillance Factor</th>
<th>Value</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentinel chicken WNV seroconversion</td>
<td>1</td>
<td>No seroconversion</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>One seroconversion in single flock over broad area</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>One seroconversion in multiple flocks in region</td>
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<tr>
<td></td>
<td>4</td>
<td>Two to three seroconversions per flock in multiple flocks in region</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>More than three seroconversions per flock in multiple flocks in region</td>
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</table>
Sentinel Chicken Surveillance in arboviral response plan

Counties with a benchmark of > 1 by end of September 2004

- 1: No seroconversion
- 2: One seroconversion in single flock over broad area (4 counties)
- 3: One seroconversion in multiple flocks in region (0 counties)
- 4: Two to three seroconversions per flock in multiple flocks in region (2 counties)
- 5: More than three seroconversions per flock in multiple flocks in region (16 counties)
Importance of the sentinel chicken surveillance program:

As an epidemiological tool for monitoring WNV and other arboviruses in California

- Provides precise data on the location and time of viral transmission.
- Provides continuous detection of WNV activity throughout the season.
Importance of the sentinel chicken surveillance program:

As an epidemiological tool for monitoring WNV and other arboviruses in California

- Detects WNV activity in locations where dead bird and/or mosquito surveillance is not practical or performed.
- Detects presence of St. Louis encephalitis and Western equine encephalomyelitis, unlike dead birds that only detect WNV.
Importance of the sentinel chicken surveillance program: Compared with other surveillance tools

- When the arboviral prevalence is low, sentinel chickens are more sensitive than mosquito testing.
  - Chickens “collect” mosquito bites.
  - With MIR < 1.0, then > 1,600 mosquitoes/week/site needed to detect virus*

- When arboviral prevalence increases, sentinel chicken seroconversion and positive mosquito pools may occur together (e.g. 1993 WEE activity in Sacramento Valley)

Importance of the sentinel chicken surveillance program:

Compared with other surveillance tools

No single surveillance tool is “the best”. Need to combine and consider information from all sources.