Mosquito-Based Surveillance to Detect and Monitor Arbovirus Risk in CT

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Arbovirus Surveillance

Detection relies on robust surveillance to inform public and guide control measures
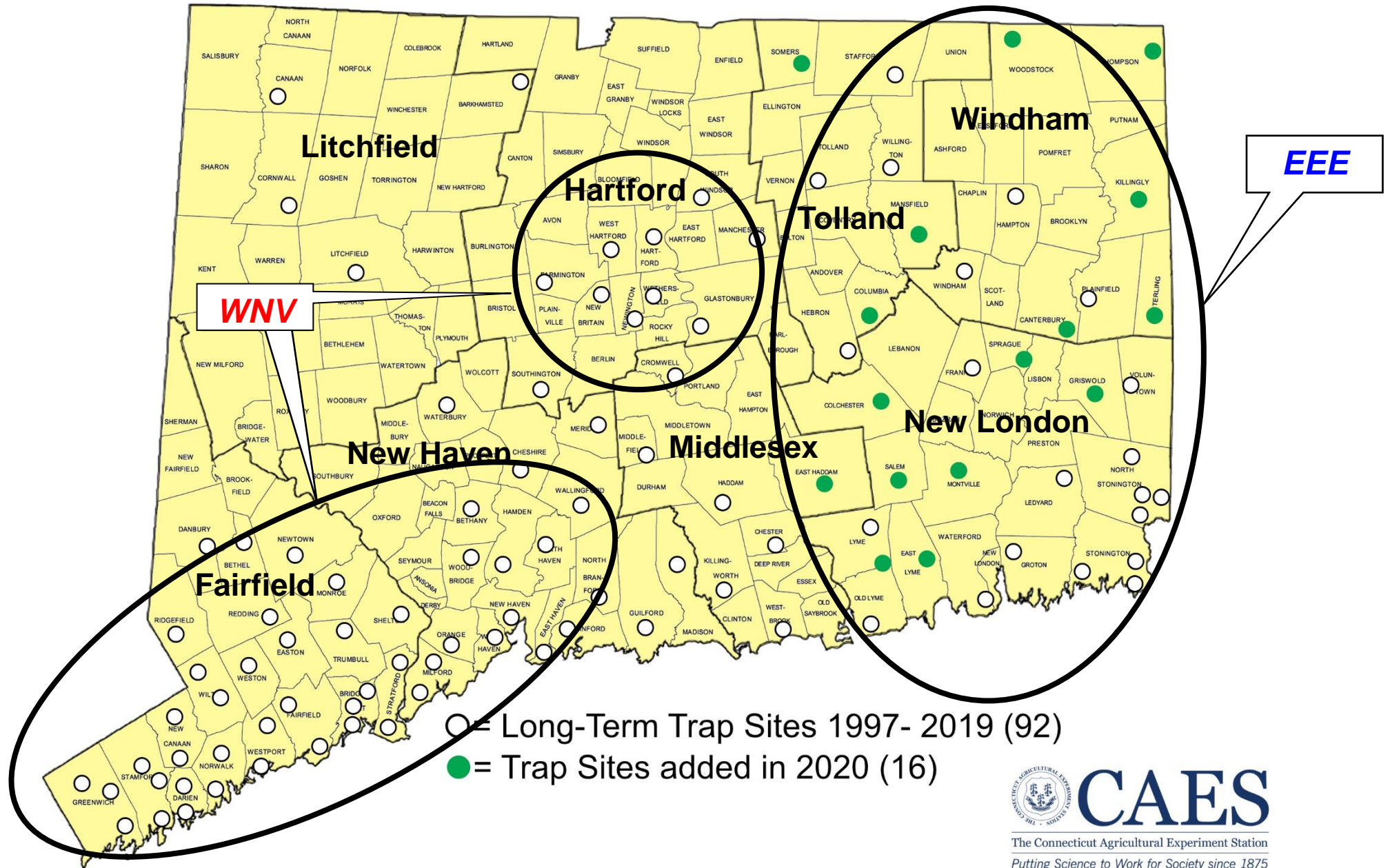
GOALS:

- **Detect virus and Assess risk in mosquitoes prior to human or animal cases**

- **Prevent a *sustained* disease outbreak**

Time delay in human disease diagnosis *can be WEEKS from exposure*

Mosquito Surveillance

- **Mosquito trapping from June 2 – late October**

- **7 seasonal staff to set & retrieve traps**

- **108 permanent trapping stations**
  - 16 sites ADDED in 2020
  - Trap on a Rotational Basis (about every 10 days)
    - If *WNV* or *EEE* detected in mosquitoes
      - Trap once or twice per week to monitor entomological risk

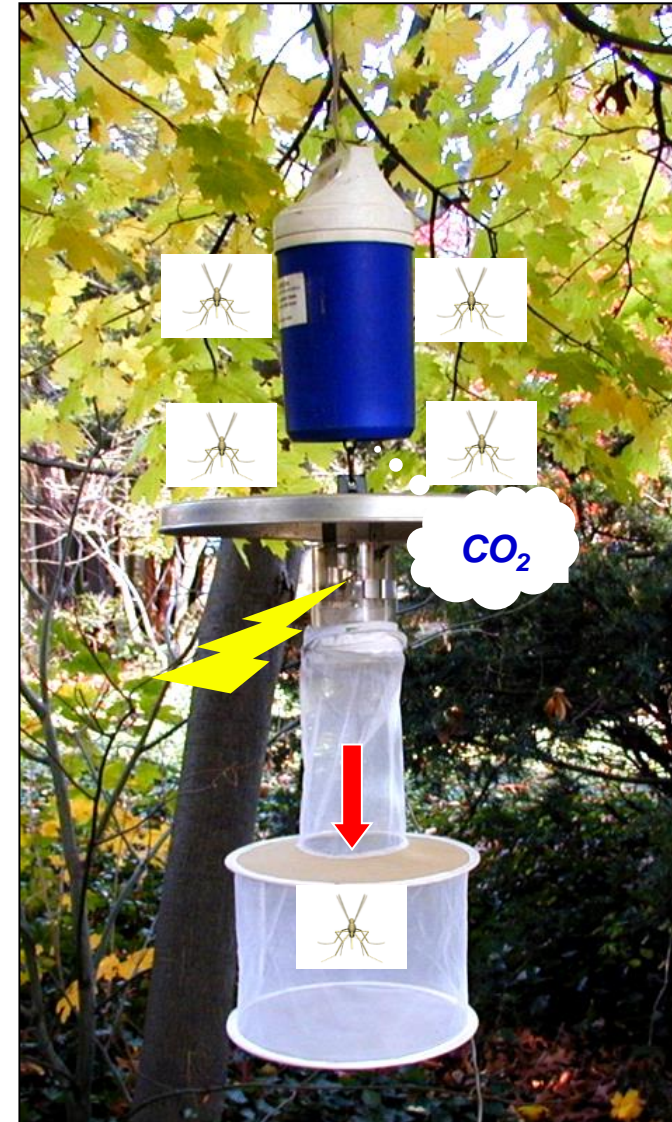- **2 or 3 types of trap per location**

Mosquito Trapping Stations

○ = Long-Term Trap Sites 1997- 2019 (92)
● = Trap Sites added in 2020 (16)

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CDC Light Trap – All Sites

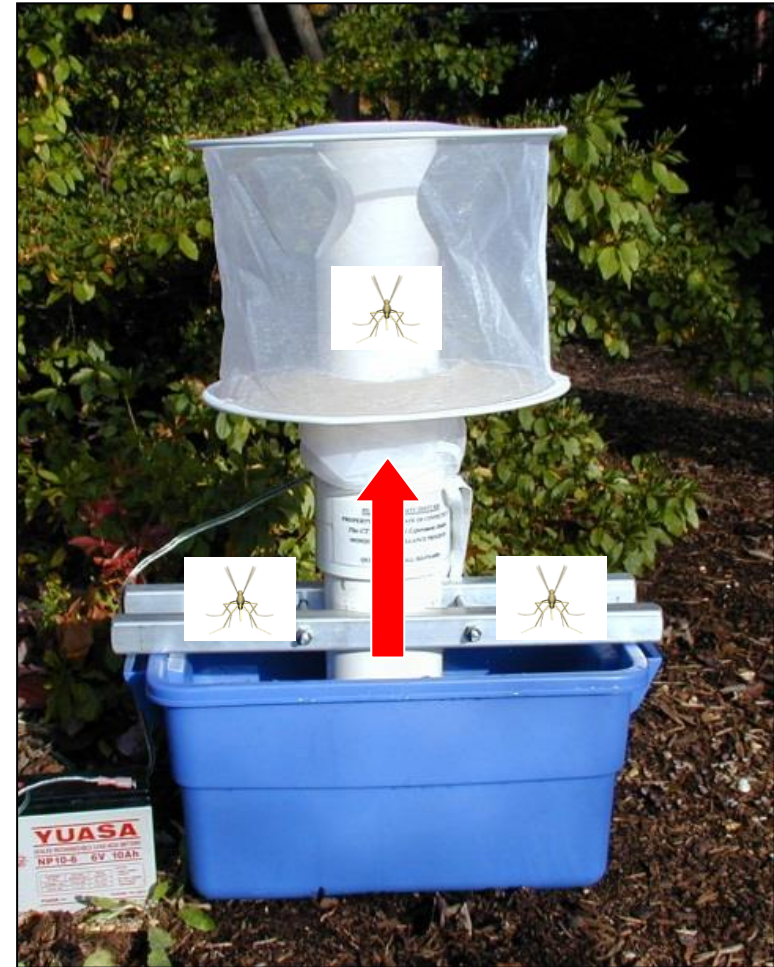- Host seeking females
  - **Carbon dioxide bait**
  - **Out for blood**
- Relative populations of:
  - *Aedes/Ochlerotatus*
  - *Coquillettidia*
  - *Culex*
  - *Culiseta*
  - *Psorophora*

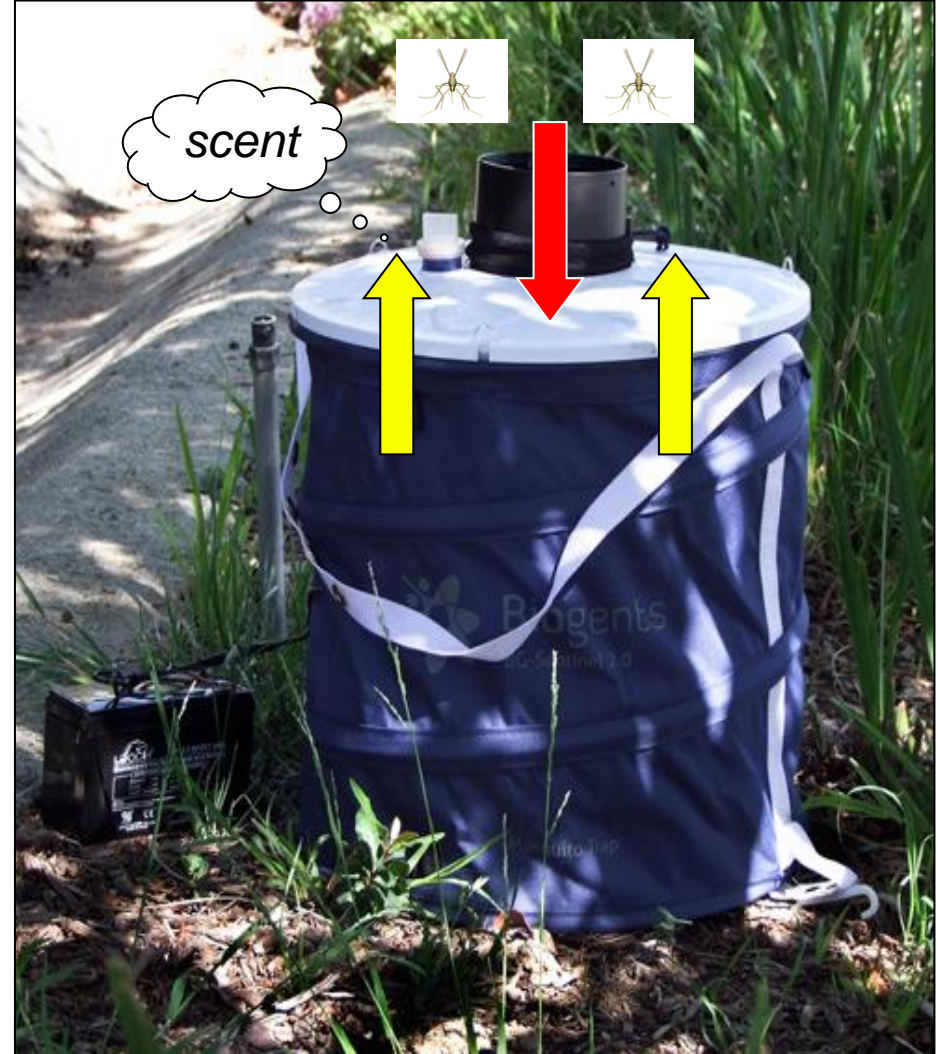*Can collect 1000s of mosquitoes per night*

CDC Gravid Trap – All Sites

- Hay-yeast-lactalbumin infusion

- *Culex pipiens* **& *Cx. restuans***
  - Ready to lay eggs
  - Obtained blood meal
  - **More Likely to be WNV (+)**
  - 90% of collections

- **Gravid Traps**: >75% of WNV (+) isolates from *Cx. pipiens* **and** *Cx. restuans*
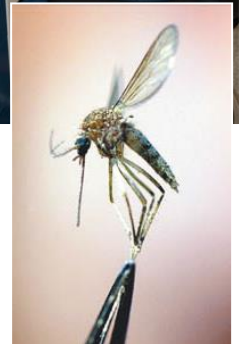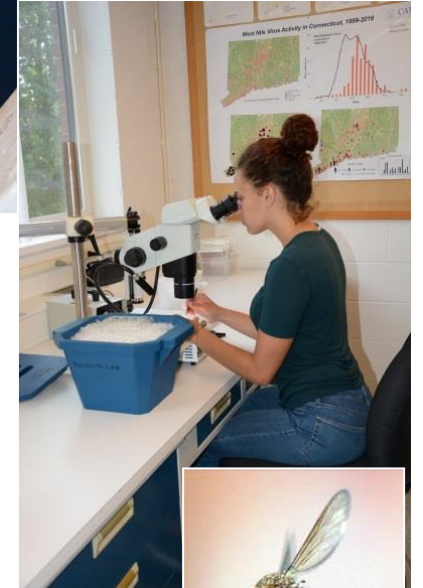
BG Sentinel Trap – Select Sites

- Designed for *Ae. albopictus*

  - Used at sites to evaluate population size

  - Primarily coastal Fairfield and New Haven counties

  - Invasive Species

  - Aggressive Human Biter

    - **Secondary Vector of Zika, Chikungunya and Dengue**

Mosquito Identification

- Females identified to species

  - 41(of 54) species identified in 2024

- Completed on day of collection

  - 7 identifiers during peak season

- Pooled by species, site and trap type

  - 1 to 50 mosquitoes per pool (aka sample)

- All species tested for arboviruses

  - **251,587 Tested (261,864 ID)**
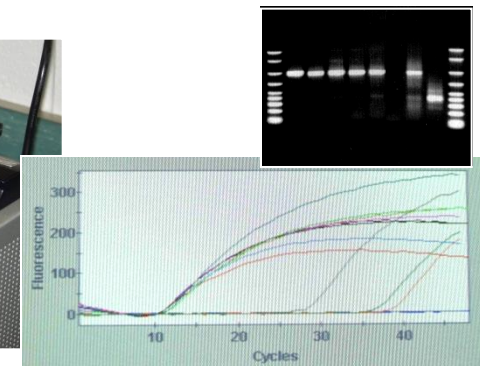
  - **17,863 Pooled Samples Tested**

Virus Isolation & Identification

- **Biosafety Level 3 Laboratory**

  - Virus isolation in Vero cell cultures (African Green Monkey)

    - Incubate for 7 days at 37°C in 5% CO_2
    - Examine daily for virus growth

  - Virus identification by Real time RT-PCR, molecular techniques, sequencing
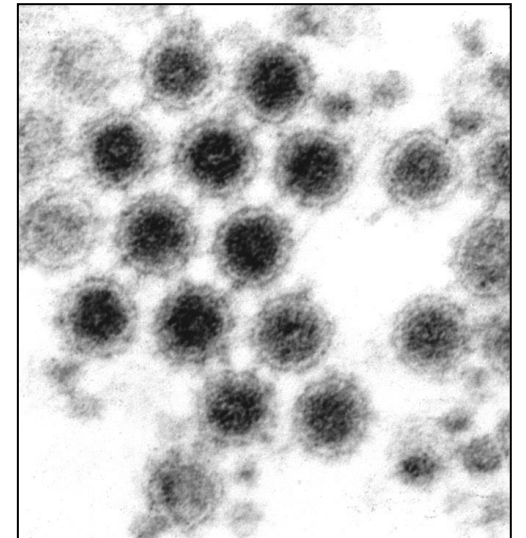
Mosquito-Borne Viruses in Connecticut

Cause Human Disease:

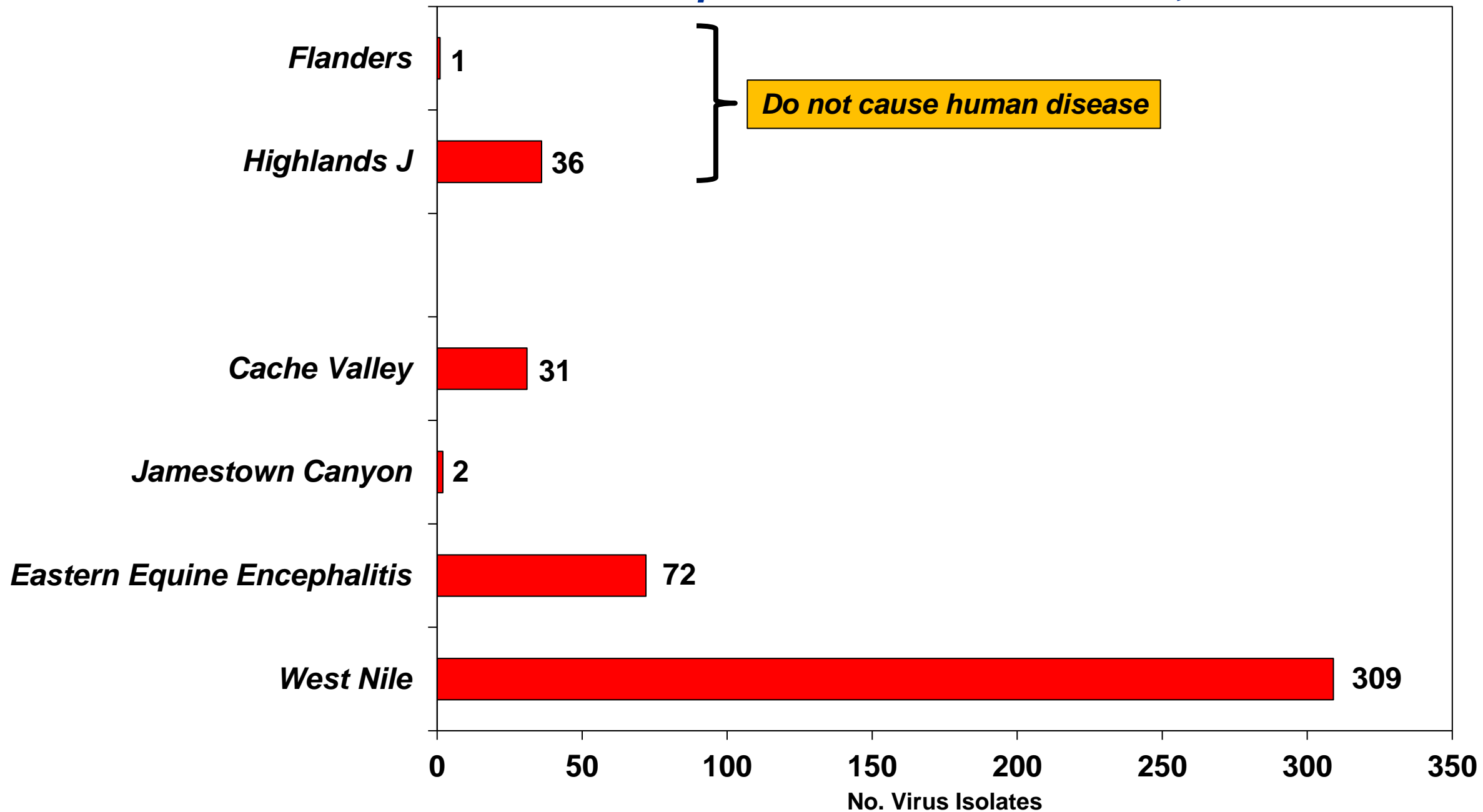- **Eastern Equine Encephalitis**
- **West Nile Virus**
- **Jamestown Canyon**

  of Greatest Concern CT

- **Cache Valley**
- **Trivittatus**
- **La Crosse**
- **St. Louis Encephalitis**
- Can detect **Zika, Chikungunya**

- Highlands J
- Potosi
- Flanders

Arbovirus Isolations from Mosquito Pools – Connecticut, 2024

Do not cause human disease

Virus	No. Virus Isolates
Flanders	1
Highlands J	36
Cache Valley	31
Jamestown Canyon	2
Eastern Equine Encephalitis	72
West Nile	309

Reporting of Results

- **EEE**, **WNV**, or exotic virus identified
  - **Notify CT DPH, DEEP**
    - **DPH contacts local Health Dept.**
  - **Report to CDC (ArboNet)**

- **Post on CAES/Mosquito Management Website**
  - *https://portal.ct.gov/caes*
  - **www.portal.ct.gov/mosquito**

  - **Cumulative Mosquito Testing Summaries**
  - **Activity Maps, Graph**

- **Press Release may be issued (state or local)**

RESPONSE PLANS

CT Mosquito Management Program

- **UPDATED in 2025**

- **Provide full details for** data driven **responses**

  - *Agency Roles*

  - *Levels of Action & Recommendations*

- **Will Be Posted on Website(s) for REFERENCE**

  - **Eastern Equine Encephalitis**

  - **West Nile Virus**

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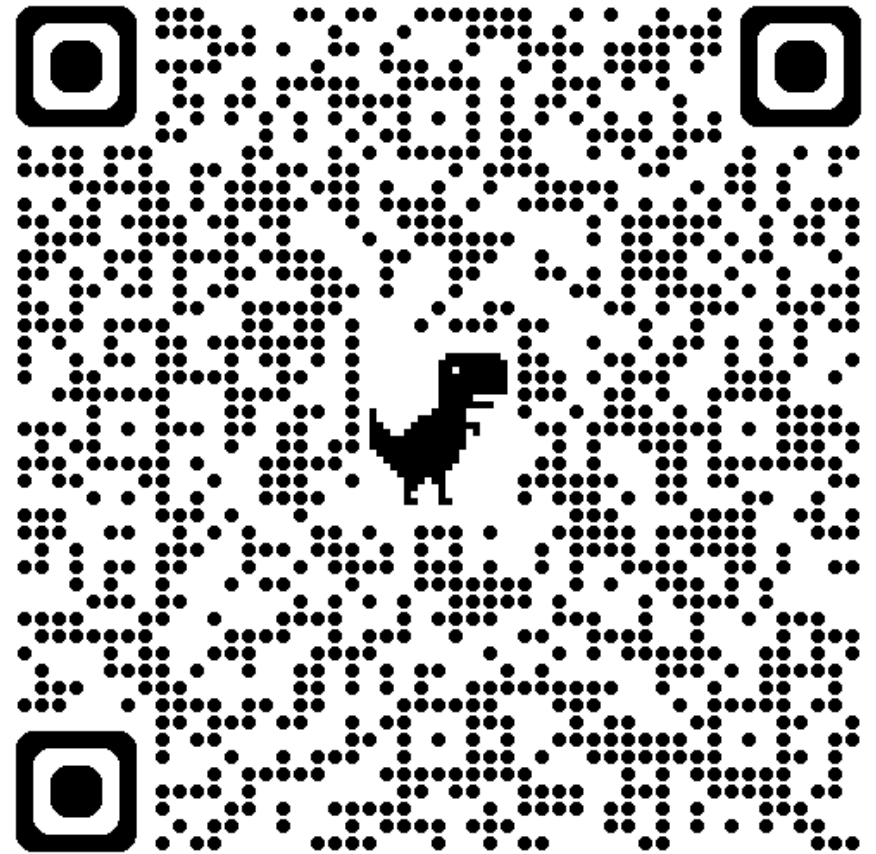
HM2 Nate Gerry

https://portal.ct.gov/caes

Questions?

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Mosquito Trapping and Arbovirus Surveillance Program