WEST NILE VIRUS
1885 Framingham Malaria Outbreak
General Facts

• Originated in the African country of Uganda
• First appeared in the U.S. in New York City in 1999
• In US since 1999: **36,659 human cases**
  **15,904 Neuroinvasive human cases**
  **1,261 Fatalities** (CDC data)
• First appeared in MA in 2000
• Infects: birds, humans, horses, domestic animals and most other vertebrates
• Evolved genotype, WN02, spread across U.S. efficiently transmitted by Culex
  transmission increases with temperature
WNV and Humans

- Most susceptible - People over 50 years old
- Incubation period 2 - 14 days
- About 20% of people infected develop symptoms
  - West Nile Fever (most likely will be missed)
  - West Nile Meningitis
  - West Nile Encephalitis
Symptoms

• WNV can cause illness varying from mild fever to more serious encephalitis or meningitis.
  – High fever
  – Headaches
  – Swollen lymph nodes
  – Neck stiffness
  – Skin rash
  – Disorientation
Birds act as reservoirs for the virus. Crows, Hawks, Blue Jays and Kestrels can die from WNV infection because they are native species.

*Culex spp.* are the main amplification vector in the WNV cycle.

People serve as dead-end host, meaning they are unable to pass the virus on to anything including another mosquito.

Various Potential Bridge Vectors

Horses serve as dead-end host, meaning they are unable to pass the virus on to anything including another mosquito.

Various Potential Bridge Vectors
**Culex pipiens**

- Common name: *Northern House Mosquito*
- Will readily enter into homes
- Primarily bird feeder but will feed on mammals
- Greatest risk for transmission is from late July through September
Empty Backyard Breeding Sites:
Clogged Gutters, Trash Barrels, Empty Flower pots, Buckets, Wheel Barrels, Animal Water Troughs and anything that can hold water
Monitoring Tool: Gravid Traps

- **Gravid** = Full of Eggs
- Uses organically enriched water to attract mosquitoes
- Females come to lay eggs on the water surface
- Fan pulls the mosquitoes up into a collection chamber
Weather and West Nile Virus

Winter
- WNV is carried through the winter by adult culex mosquitoes
- Warm winters may increase survival rates

Spring
- Warm Spring provides early start to WNV cycle extending the season

Summer
- Warmer temperatures increase the transmission intensity through faster mosquito and virus development and increased biting rates
West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of October 31, 2012)
Population Density

- < 1,500
- 1,500 – 4,500
- > 4,500
2012 WNV Massachusetts
2012 Nationwide

- 5245 Cases
- 2663 neuroinvasive cases
- 236 Fatalities
- 589 infections in blood donors
