

# Arbovirus Infections and the animal reservoir

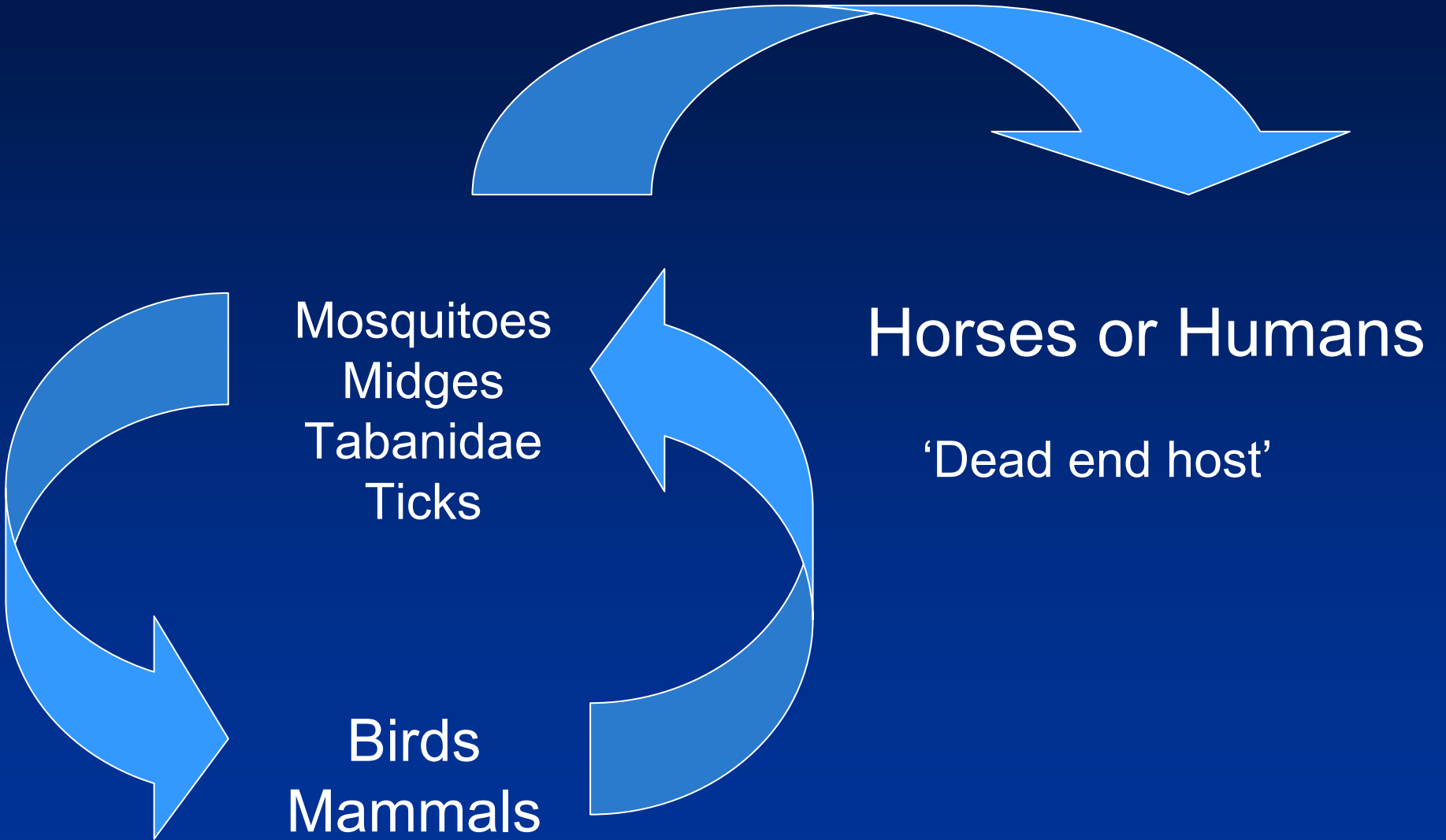


# Arboviruses

- ecologically based designation
  - >100 cause disease in humans and animals
- changes in taxonomy
  - viral morphology, structure, and function
- distributed among several families:
  - Togaviridae (1 RNA +, enveloped)
  - Flaviviridae (1 RNA +, enveloped)
  - Bunyaviridae (1 RNA -, enveloped)
  - Reoviridae (2 RNA Dimer, non-enveloped)
  - Retroviridae (1 RNA +, enveloped)
  - ASF virus (DNA, enveloped)

# Arboviruses

- most of these viruses are reliant on vector for transmission because they are relatively fragile (e.g. not resistant to desiccation),
- vectors are frequently insects or other arthropods and therefore tend to limit them to tropical & sub-tropical regions or have seasonal occurrence
- complex life-cycles and replication in both the vertebrate and invertebrate hosts
- eradication practically impossible - animal reservoir
- control possible - block transmission !



# Arboviral animal diseases in the OIE Animal Health Code (I)

- List A:



– Rift Valley Fever

(Bunyaviridae, Phlebovirus)



– Bluetongue/EHD

(Reoviridae, Orbivirus)



– African horse sickness

(Reoviridae, Orbivirus)

– African Swine Fever

(ASF virus)

# Arboviral animal diseases in the OIE Animal Health Code (II)

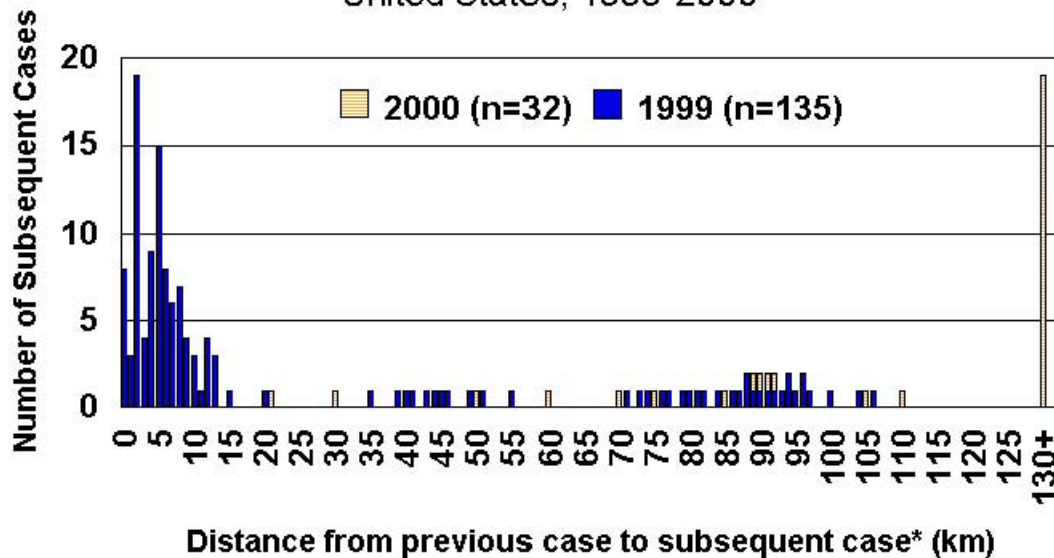
- List B:
  - Eastern/ Western Equine Encephalomyelitis  
(Togaviridae, Alphavirus)
  - Venezuelan Equine Encephalomyelitis  
(Togaviridae, Alphavirus)
  - Japanese B-encephalitis (Flaviviridae, Flavivirus)
  - E. Infectious anemia (Retroviridae, Lentivirus))

# Prevention and Control

- Veterinary Legislation
  - Notifiable diseases
  - Import and trade requirements
    - freedom of country/region for x seasons
    - freedom of holding
    - pre-export quarantine, testing or vaccination
- Movement control
- Surveillance and monitoring
- Vaccination (vaccine stocks)

## What distance around a known equine clinical case has an increased risk for subsequent West Nile virus cases?

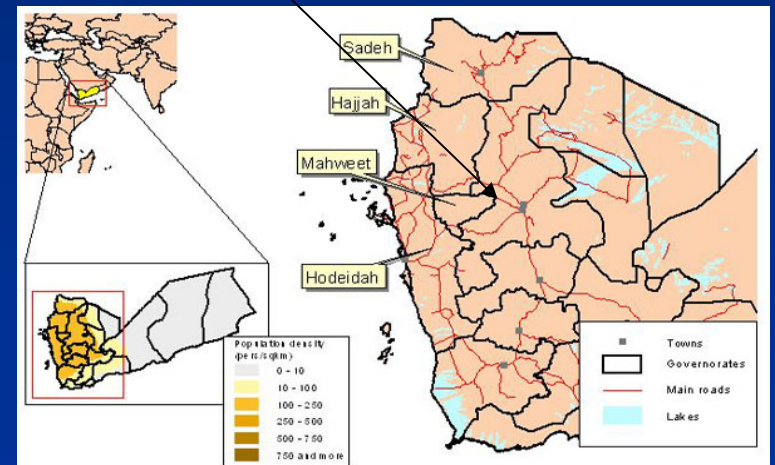
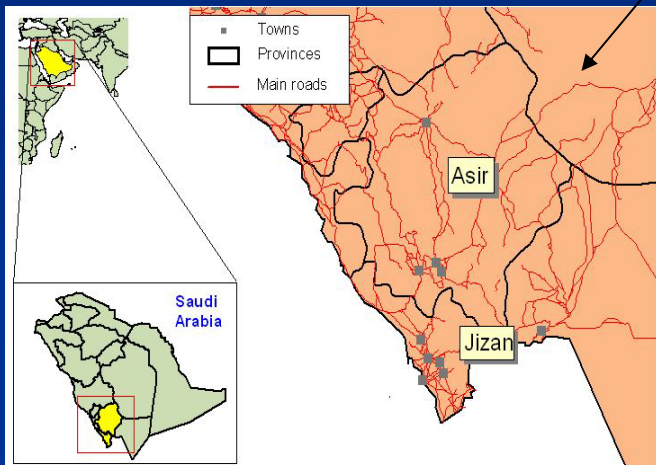
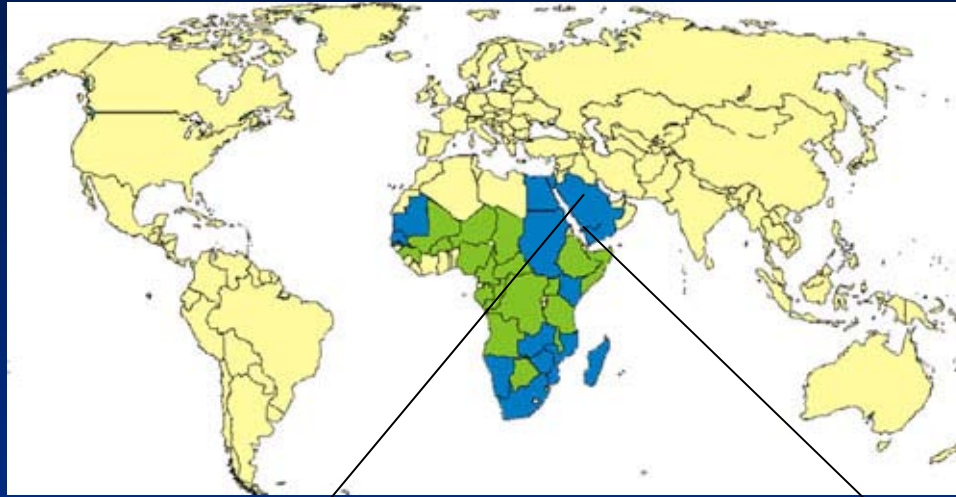
United States, 1999-2000



\* Equine case with onset 15 days or less after any other equine case

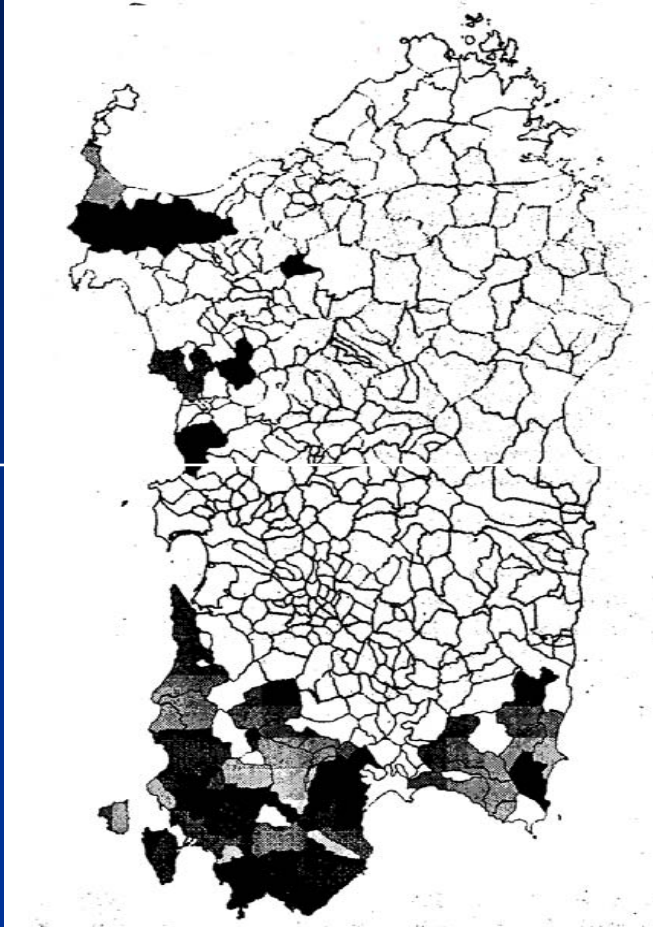


# Rift Valley Fever 2000



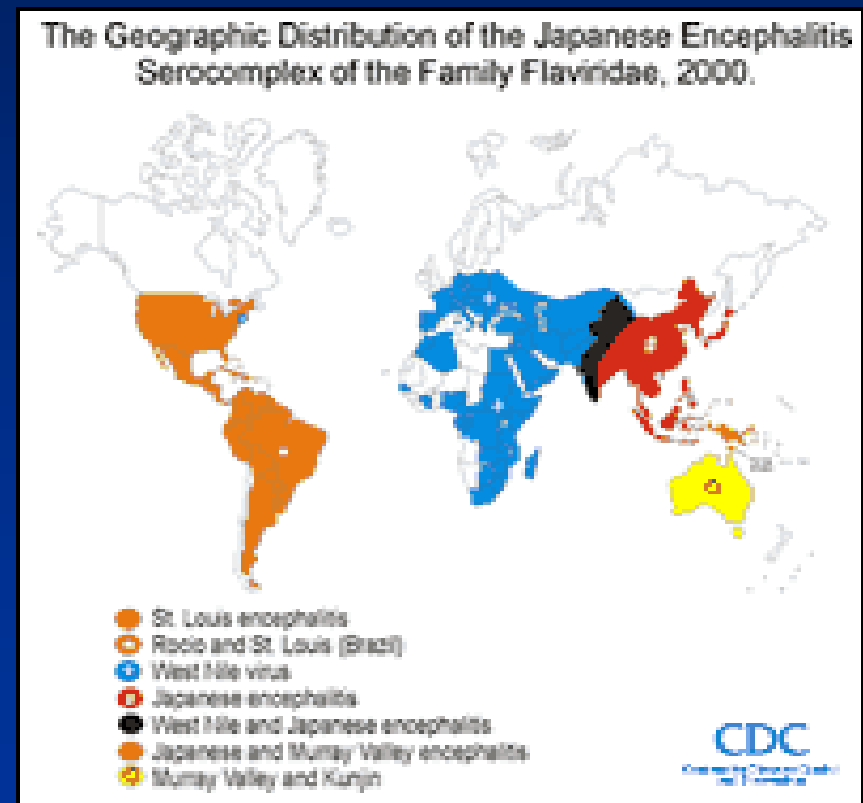
# Bluetongue Sardinia

40°



- Type 2 = as in Tunisia
- >1000 outbreaks
- EC Vaccine bank  
CD 2000/477/EC 24.7.00
- Bluetongue Directive
- Discussion in OIE

# Equine Arboviral Infections



# West Nile Virus

- First seen in 1937 in Uganda, Africa
- Flavivirus (other strains cause JBE)
- Outbreaks have occurred in the Middle East (Israel), West Asia, Eastern Europe and Africa
- Morocco (1967)
- France (1962-64) (2000)
- Italy (1998)

# WNV France 2000



The virus identified in September is similar by phylogenetic analysis to viruses isolated

- from horses in
  - Morocco in 1996,
  - Italy in 1998
- from mosquitoes in
  - Senegal in 1993

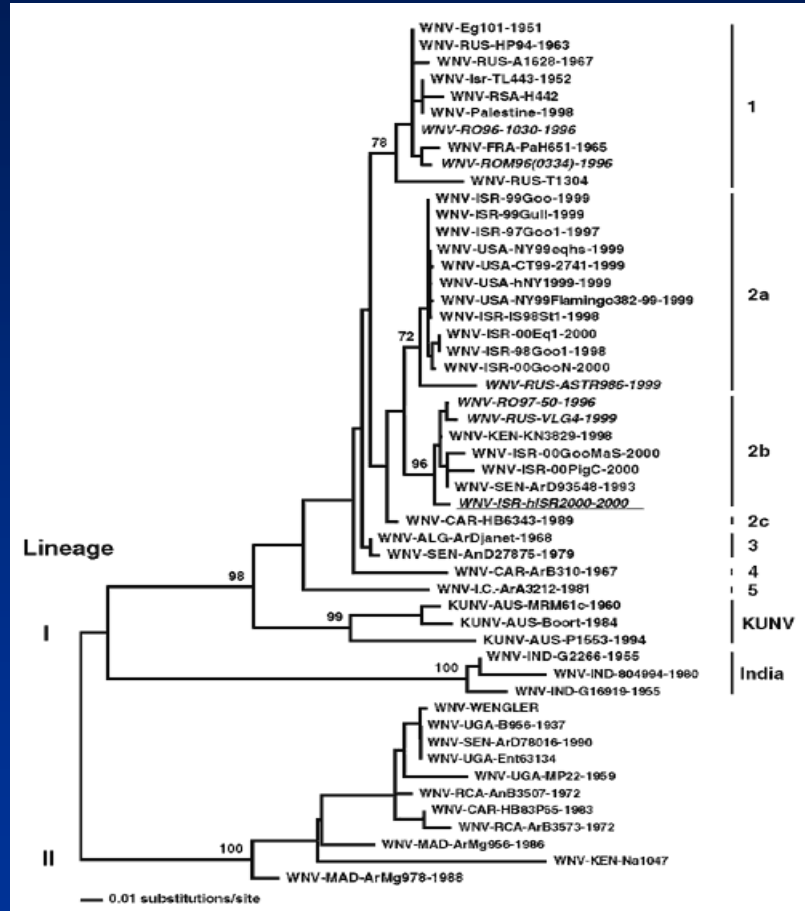
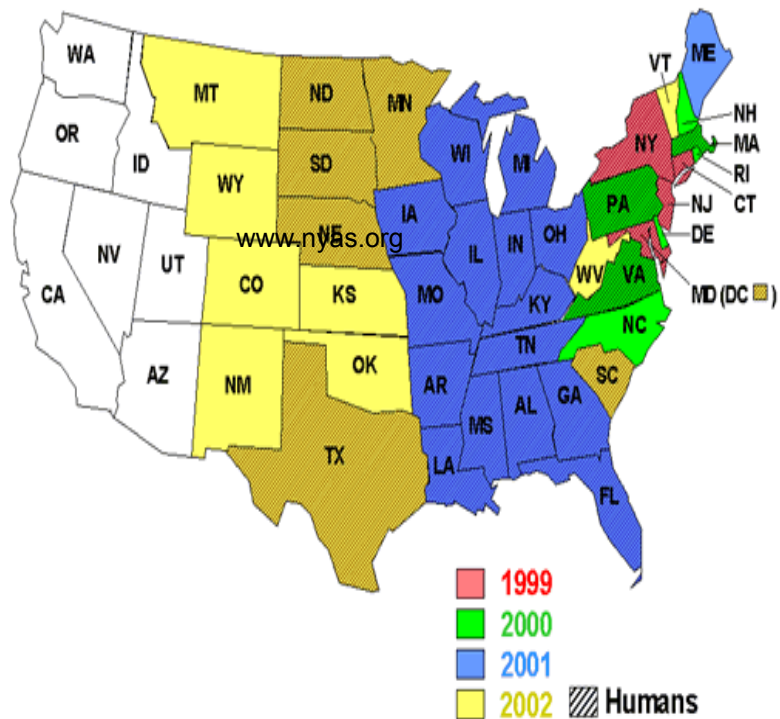
# WNV in Western hemisphere

- First seen in the US in 1999 (New York)
- Now established, can only be controlled
- Certain Mosquitoes = invertebrate host
  - Disease usually occurs August to October
- Birds = principle vertebrate host
  - particularly migratory birds
  - black birds, crows, blue jays & cardinals die
  - others such as house sparrows don't die
- Humans & horses = dead end hosts



# WNV - USA - '99/2002

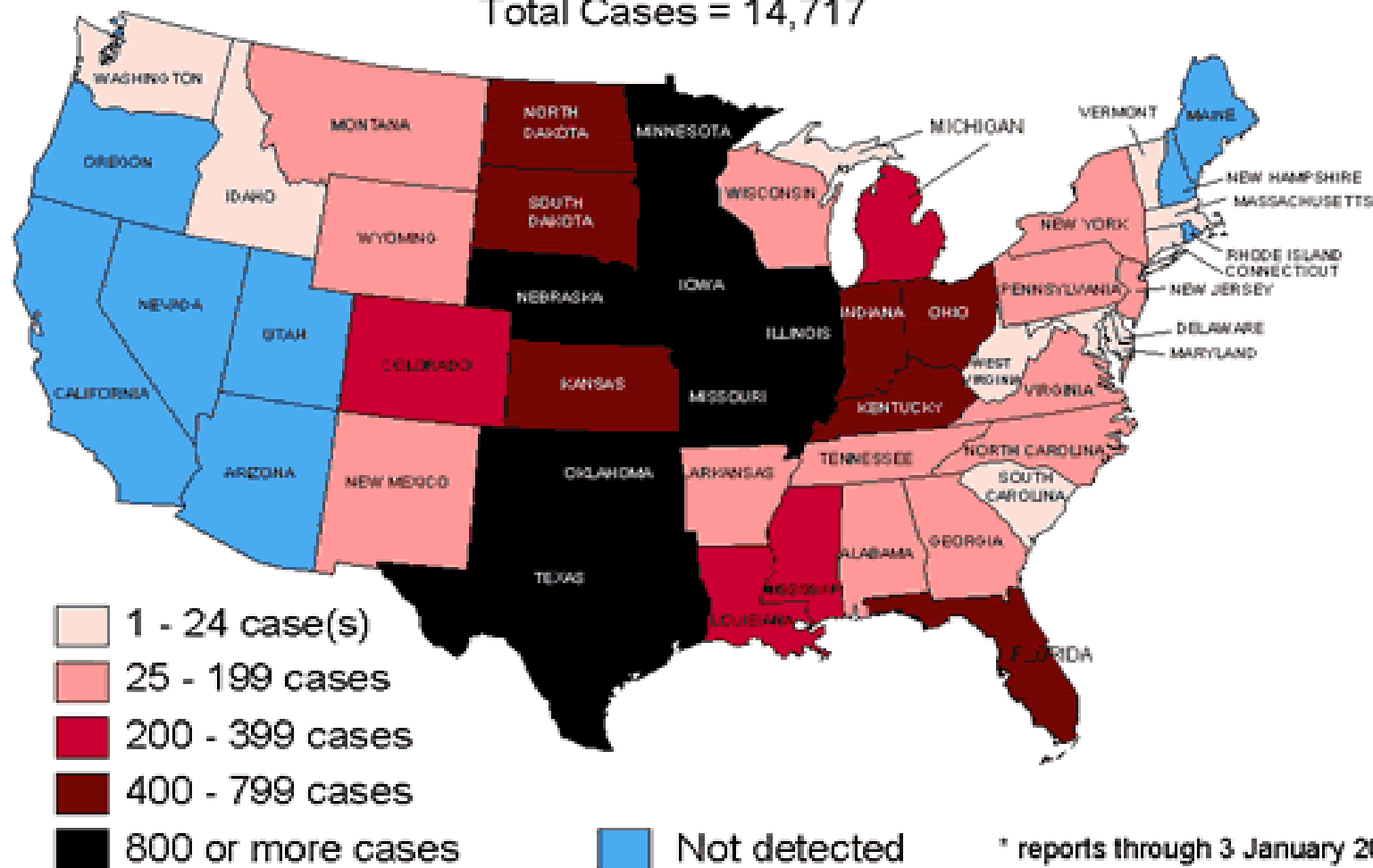
West Nile Virus in the United States, 1999 - 2002



# West Nile Virus in 2002\*

States with an Equine Case(s)

Total Cases = 14,717





# NORTH AMERICA



Human Case ex Michigan

Suspect Human Cases

# Symptoms of West Nile Fever

- Horse
  - 7 day incubation period
  - Lethality up to 20 to 30%
  - Depression, fever or subnormal temperature.
  - Staggering gait, paralysis, coma, death

Encephalomyelitis

# Prevention

- Control of Vector
  - Remove sources of stagnant water
  - Insecticide spraying
- Protection of Host
  - Body protection, repellants
  - Housing during vector active time (dusk and dawn)
- Vaccination
  - Fort Dodge has a formaline inactivated vaccine for horses under temporary license for horses, produced similar to JBE-vaccine

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