

# Infectious Disease Headlines 2010-11: Updates & Trends

Rob MacKay, BVSc, PhD, DACVIM

Large Animal Medicine

University of Florida

# Outline

- Equine herpesvirus myeloencephalopathy (EHM)
- Equine piroplasmosis (EP)
- Contagious equine metritis (CEM)

# Equine Herpesvirus-1 Myeloencephalopathy (EHM)

- Emerging disease?
- Criteria for classification
  - Identified for the first time
  - Change in virulence, host range, or other behavior
  - Change in geographic range or incidence within range

# EHV-1 Background

- Horses infected as juveniles
- Lifelong latent infection
  - Recrudescence
- Clinical syndromes
  - Fever
  - URT signs
  - Abortions
  - Neonatal infections
  - Neurologic disease (i.e., EHM)



9-yo Tennessee Walking Horse mare

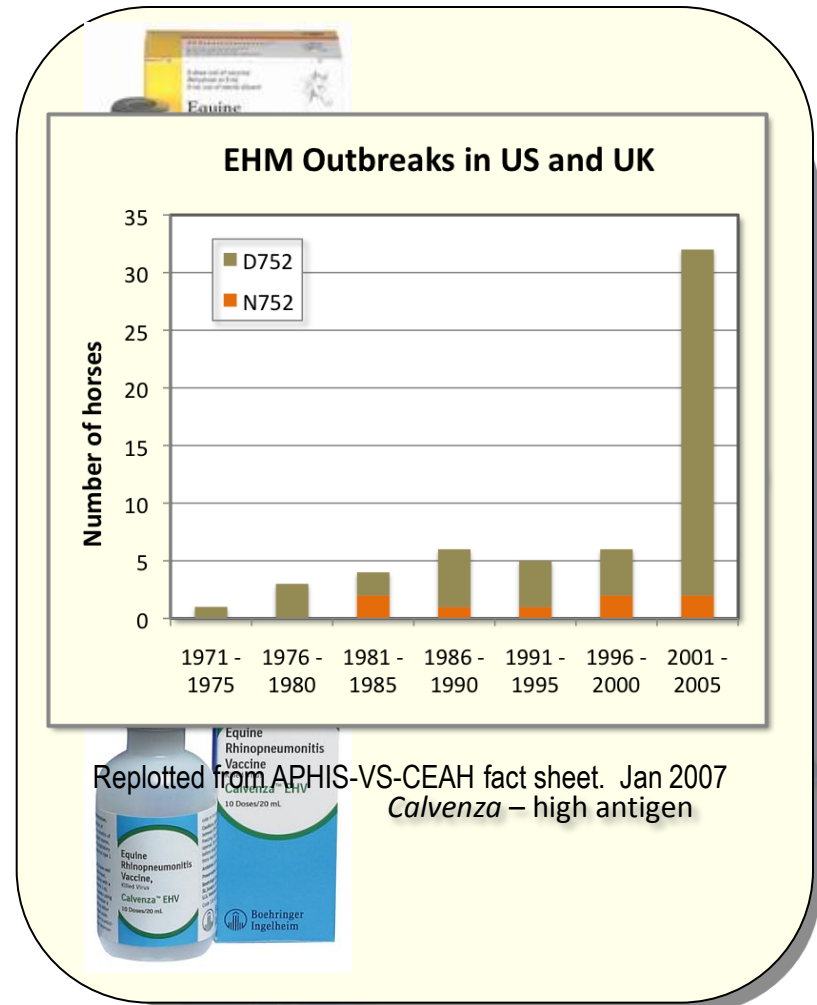


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18-yo Thoroughbred gelding

# EHM Background

- First reported in Ontario in 1958
- Dramatic increase since 2000
- Neuropathogenic variant
  - N<sub>752</sub> vs D<sub>752</sub>
  - Higher viremia
  - 162-fold higher risk
- Age and season risk factors
- 6 outbreaks (2001 – 2005)
  - 33% attack rate
  - 40% mortality
- Vaccines not protective against EHM
  - Reduce nasal shedding ± viremia



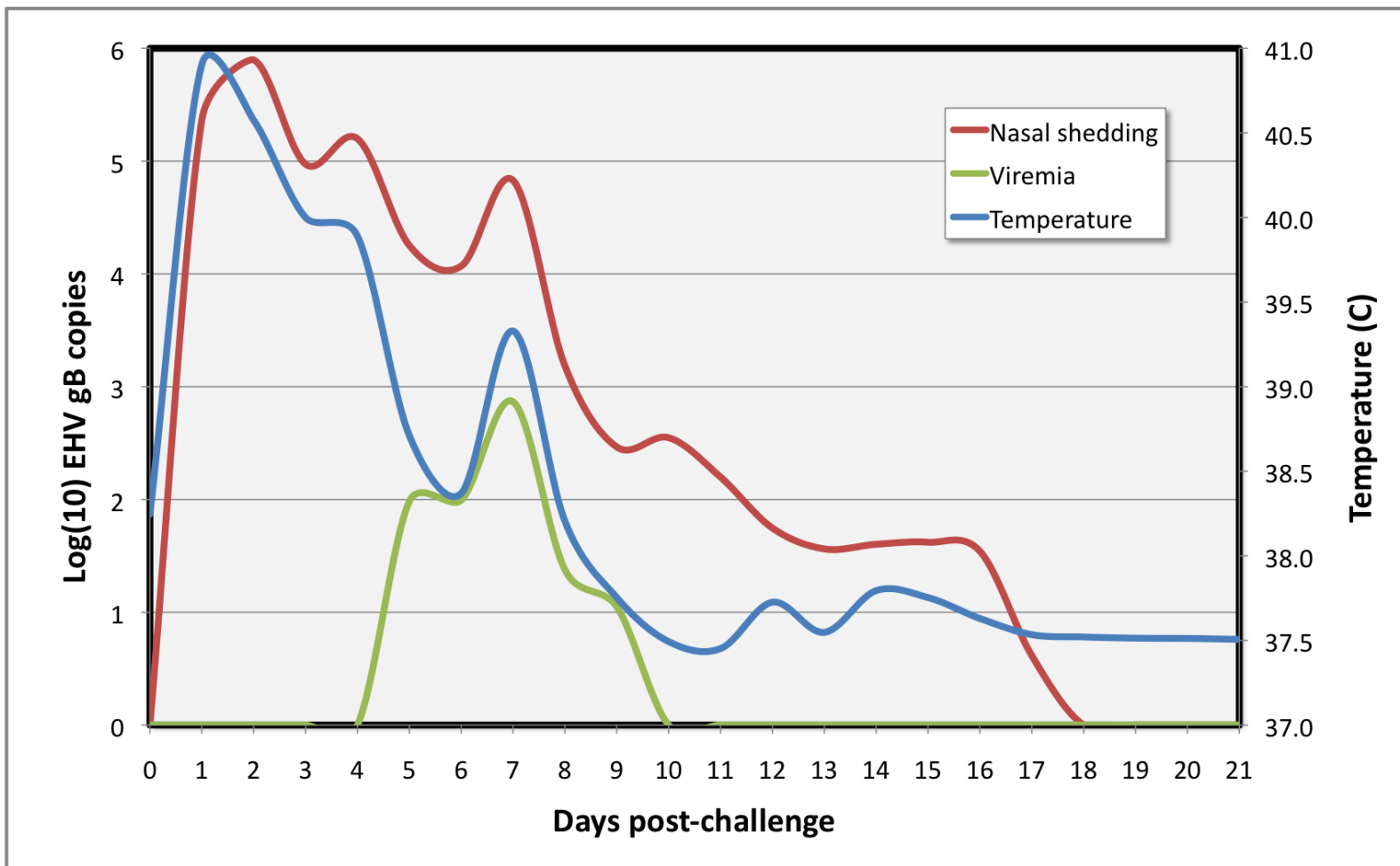
# Increasing National Concern

- ➔ • **2007** – USDA releases EHM fact sheet
- **2008** – USDA reporting includes EHM
  - Previously EHV-1 & EHV-4 *yes/no*
- **2009** – EHV Project: Meeting of regulators, scientists & clinicians\*
- **2007 - 2009** – Promulgation of EHV infection control guidelines by USDA and AAEP

\*Equine Herpesvirus Myeloencephalopathy: Mitigation Experiences, Lessons Learned, and Future Needs

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# EHV-1 Viral Shedding



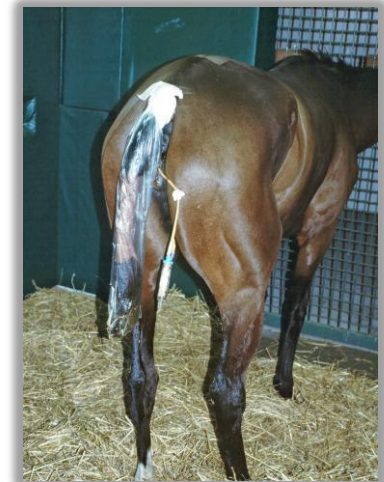
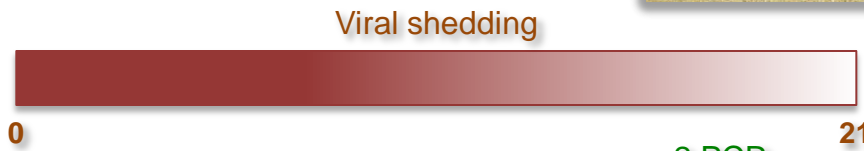
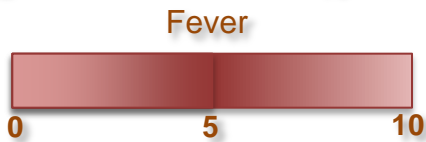
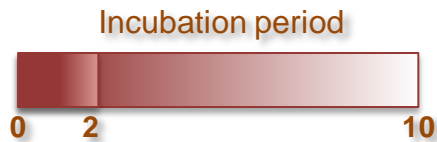
Replotted from Goehring *et al. Vaccine*. 2010 28:5203-11

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# Basis for Infection Control Recommendations

Isolate, monitor temp 2X daily



2 PCR  
↓  
1 PCR  
↓  
No PCR  
↓



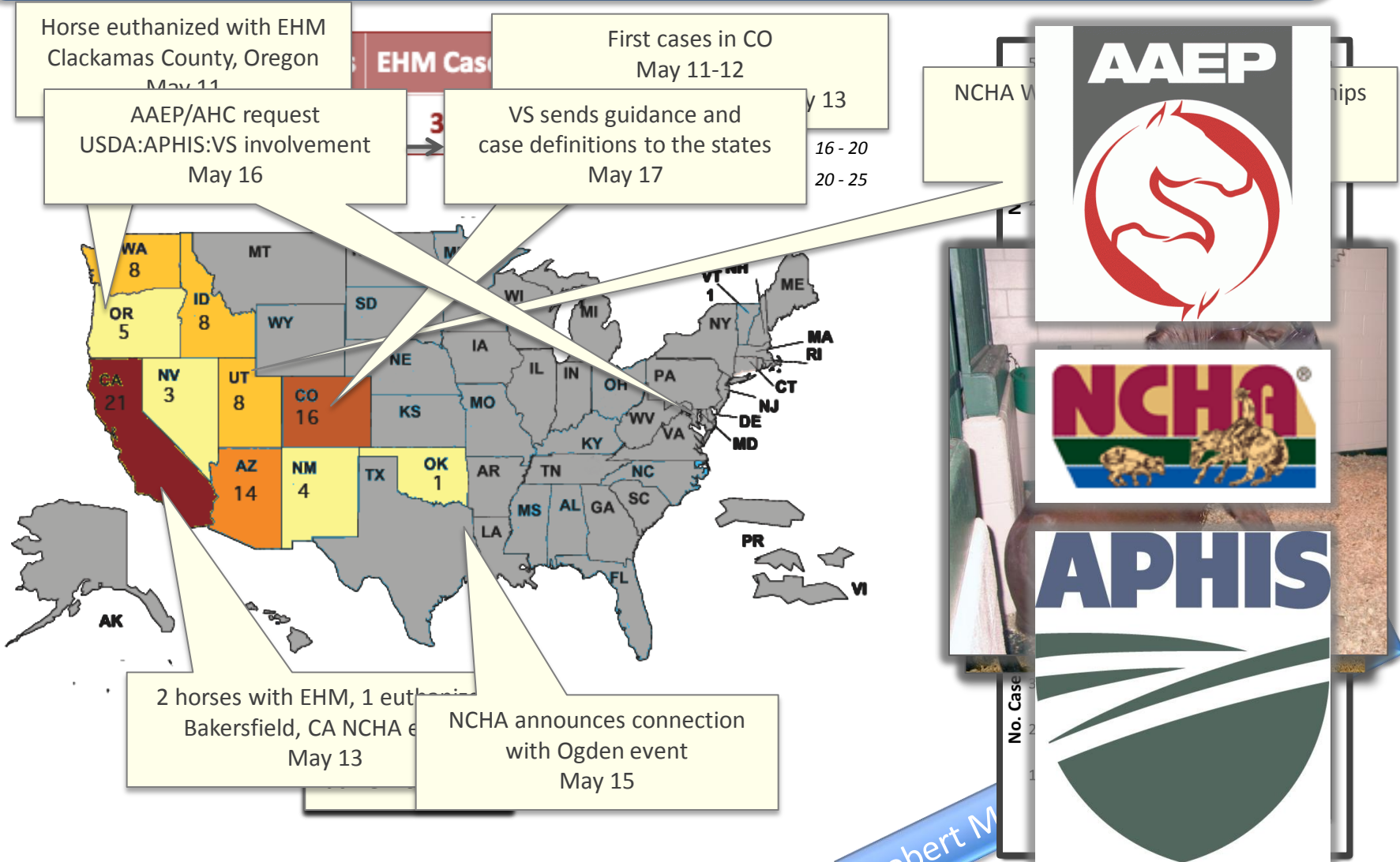
Days

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# Case Definitions

- ➔ • ***EHV-1 Suspect*** – Exposed to EHV-1 that develops fever
- ***EHV-1 Confirmed*** – Suspect with lab confirmation
- ***EHM Suspect*** – Exposed to EHV-1 that develops neurologic signs
- ***EHM Confirmed*** – Suspect with lab confirmation

# EHV Outbreak: May 11 – June 16, 2011



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# Summary Data

	Primary	Secondary/Tertiary	Total
Exposed (n)	421	1685	2106
Clinical attack rate (%)	13	2	4
Neuro attack rate (%)	6	<1	2
Neuro virulence (%)	48	19	37
Mortality rate (%)	38	43	40

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# What we have learned

- EHM has the potential for explosive spread
- EHM is highly lethal
  - 4/10 horses with EHM died or euthanized
- Response by private, state, and USDA veterinarians was remarkably effective
- Vaccination reduces shedding but is not protective against EHM
- Valacyclovir therapy ineffective, ganciclovir modest effect on ataxia

# Equine Piroplasmosis

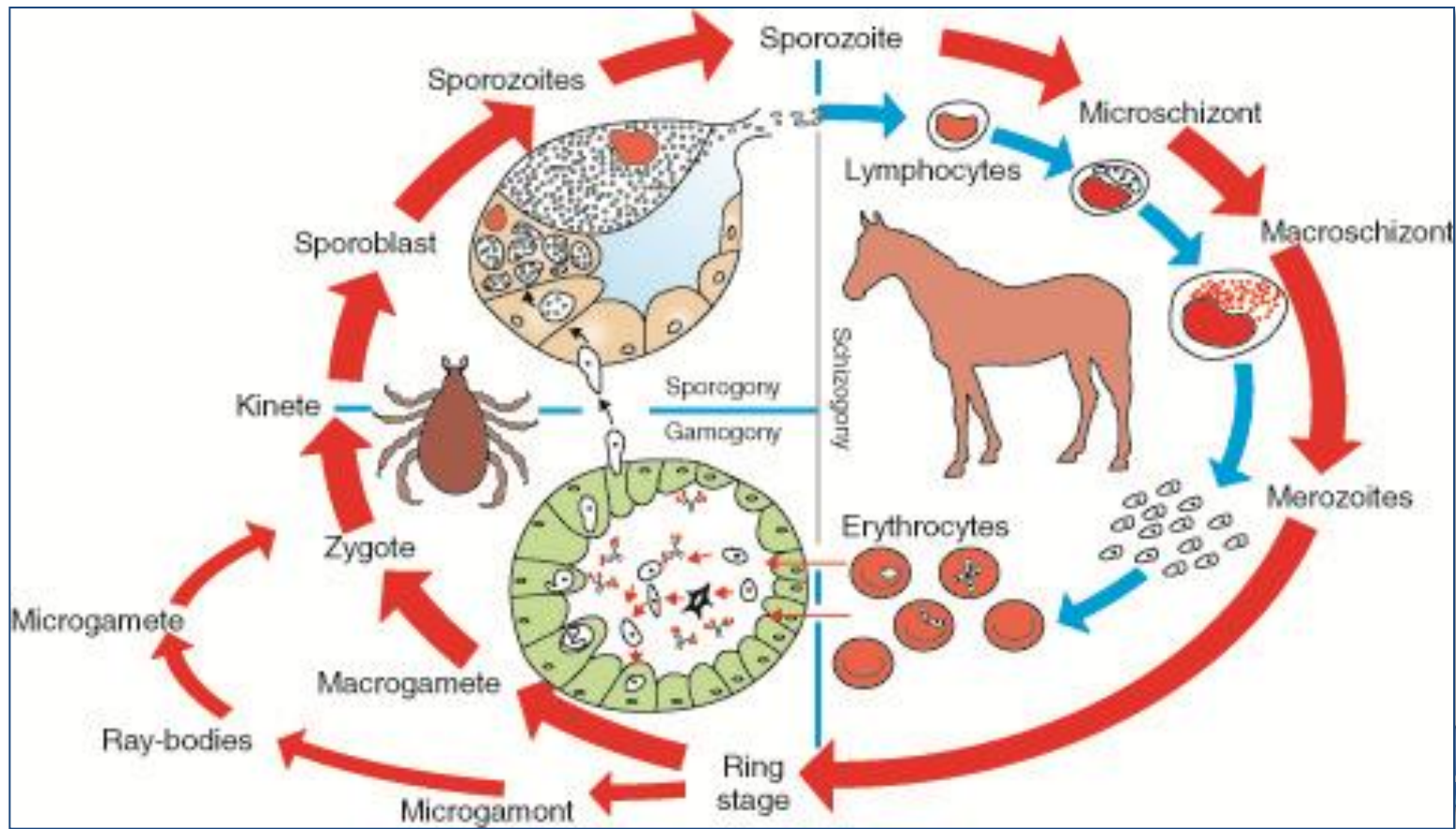
- *Babesia caballi* and *Theileria equi* (*Babesia equi*)
- Transmitted naturally by ticks
- Incubation period 7-22 d
- Lifelong infection in horses
- Endemic in most countries
- REPORTABLE disease in US
  - OIE, USDA, most states



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# EP Life cycle

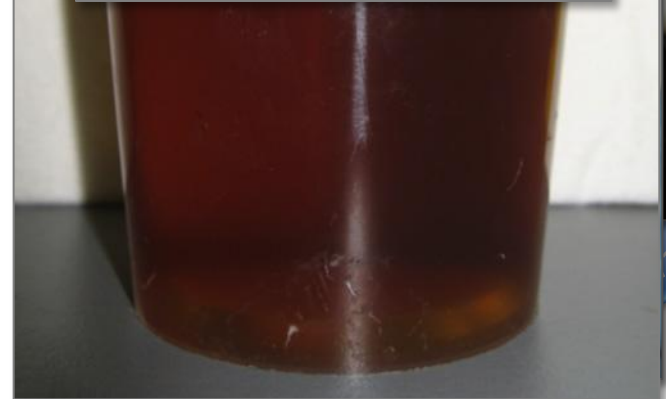


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# Clinical Signs of EP

- Inapparent to fatal
- Lethargy, fever, icterus, hemorrhages, edema, hemoglobinuria
- Hemolytic anemia, thrombocytopenia, leukocytosis
- Clinical recovery with persistent infection
- Mortality 5 - 50% in premune to naïve populations



# Diagnostic Tests

- Serology
  - CF test
    - Official US test until 2005
    - Sensitivity problems in chronic cases
    - Good for acute testing
  - cELISA official US test
  - IFA also accepted by OIE
- PCR
  - Research only
  - Nested and real-time PCR

# Piroplasmosis in the US

- 1961 – *B caballi* S. Florida
- Cuban Walking Horses imported in 1958 source?
- *Dermacentor nitens* (tropical horse tick)
- 1165 cases reported by 1984
- 1984 – 35 recently imported Peruvian Pasos positive by CF test in Florida
- \$7-8 million spent for control by 1988
- *B caballi* and *D nitens* both eradicated in FL





# Piroplasmosis in the US contd.

- 2009 Texas outbreak

- Clinical horse positive for *T equi* Oct 2009
- 292/360 horses on index premises positive
- Trace-out found 117 more horses in 15 states
- Tick transmission on 5 Texas premises



VS – CAEH  
Geospatial modeling  
for EP vector -  
American Dog Tick  
(*D variabilis*)

- *Amblyomma cajennense*
- *Dermacentor variabilis*



ROU

# Serological data

- Entry testing at racetracks in 11 states followed by trace-out of positives
  - 74 horses in first quarter 2011
  - Mostly QH racehorses
  - Almost all *T equi*
- Surveillance of EIA serums
  - 2007-2008
  - 0.054% *B caballi*
  - 0.007% *T equi*



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# EP-Positive Horses

- Lifetime quarantine
  - 10-30 foot distance, no vegetation
- Euthanasia
- Transport out of Country
- NVSL Quarantine and Treatment Research Program
  - In conjunction with Dr. Don Knowles/WSU
- Future option?
  - Imidocarb sterilization



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# EP Summary

- Very low-level infection in US
  - Minimal vector host transmission
- Originate from false-negative horses imported before 2005
- Spread iatrogenically
  - Multi-dose vials
  - Blood doping
- At least 3 natural tick vectors
  - Potential for expansion in US

# Contagious equine metritis

- Endemic in Europe since 1977
- *Taylorella equigenitalis*
- Fastidious to culture
- Seroconversion in mares
- Venereal transmission
- Mares
  - Acute or chronic endometritis
  - Infertility/abortions
  - Persistent carrier state
- Stallions
  - Persistent carrier state



# CEM in the United States

- 1978-79 outbreak in Kentucky and Missouri
  - Traced to 2 imported French stallions
  - Quickly controlled
  - CEM-free status since 1980
  - State and federal import testing
    - Negative tests in country of origin
    - Quarantine in US
      - Culture of 3 sites
      - Culture of 3 mares bred to stallion
      - Treatment and re-testing of positives

# Recent problems with Import Testing

- 28 carriers detected at quarantine stations
  - Negative at country of origin
- 2006 – stallion imported in 2004 found *T equigenitalis*-positive on BSE
- 2006 – imported mare found positive weeks later on fortuitous CF serology
- 2008 – Danish stallion imported 2000 likely source for outbreaks in KY & Wisconsin
  - 23 stallions and 5 mares

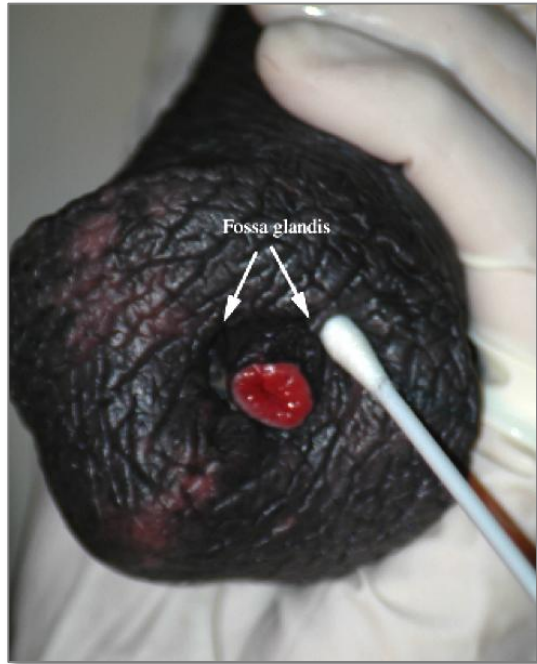
# Problems with import testing

- 2010 - Arabian stallion in CA imported from non-endemic country found positive
- 2011 – Arabian stallion found positive in AZ. Still under investigation
- No mandated domestic testing program
- Positive cases found through semen testing

# New Rule (July 25, 2011)

- Certification of breeding status of <2-yo horses
- 3 rounds of negative cultures required from country of origin
- 3 rounds of cultures of stallion required in quarantine
- Additional culture site for stallion and mare
- CF test required for mare

# Culture sites - stallion

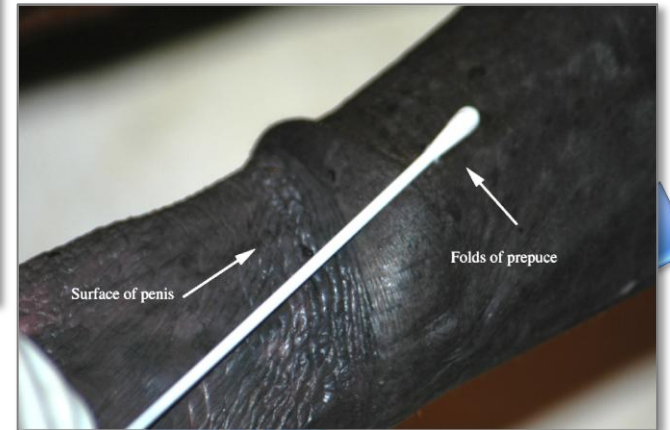


Fossa glandis

Urethral orifice



Urethral sinus



Prepuce

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# Culture sites - Mare



Clitoral sinuses



Uterine or cervical swab



Clitoral fossa

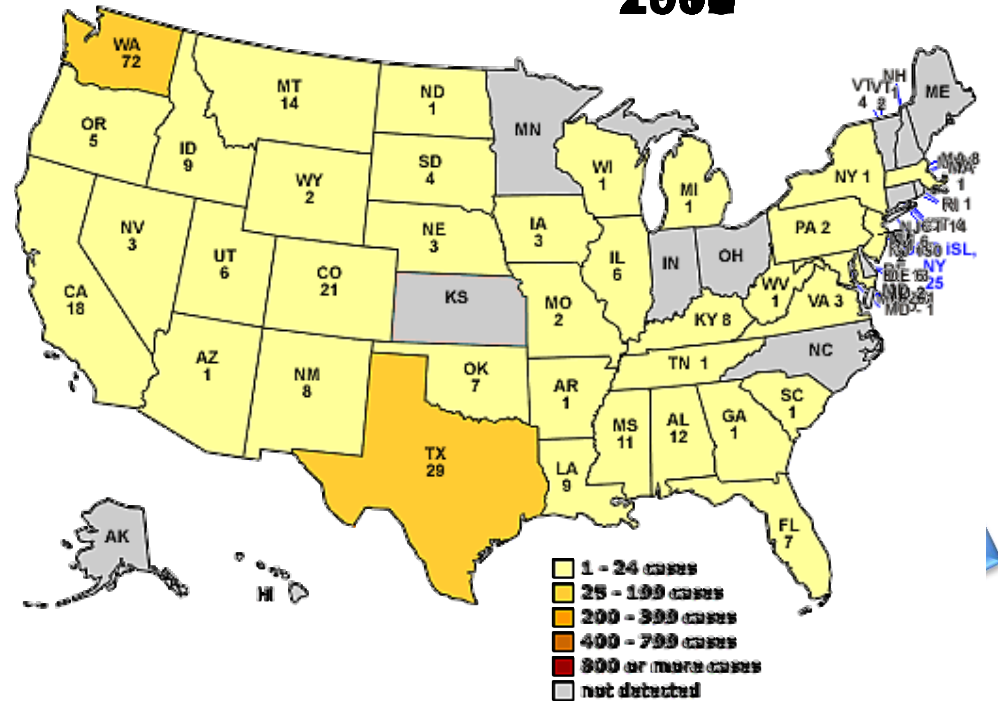
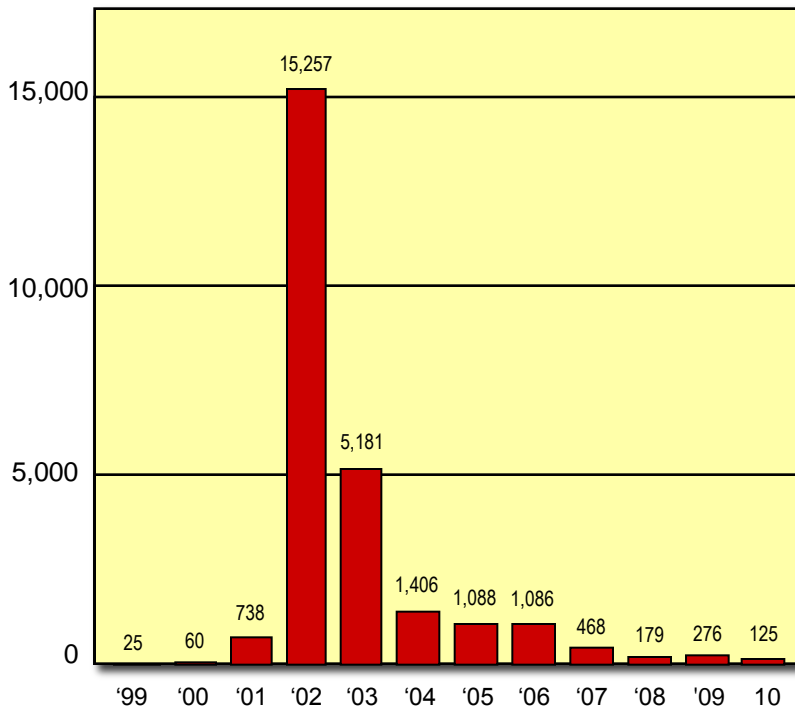
# CEM Summary

- Import biosecurity has been leaky
- Too early to evaluate new rule
- Time for internal testing program?
  - Part of pre-season BSE

# West Nile – enzootic but ticking up?

## West Nile Cases

**2000**



Robert Mackay, MD

