

Eastern Equine Encephalitis in Michigan--2010

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Historic Distribution of EEE United States

- Alphavirus
- First identified in 1930's
- East coast, Gulf coast, Great Lakes



EEE Human Neuroinvasive disease, 1964-2008

EEE in Humans

- Incubation period 4-10 days
 - Fever, h/a, malaise, arthralgia, myalgia
 - Systemic signs plus mental status changes, v/d, seizures, coma
- Persons >50 yrs and <15 yrs are at increased risk for serious disease
- An estimated 1/3 of ill patients die, survivors can have mild to severe neurologic sequelae.
- Survivors likely have lifelong immunity



Deresiewicz, RL, et al: N ENGL J MED 1997; 336:1867-1874

EEE in Horses

- Fever, depression, listlessness
- Progress to neurologic signs such as stumbling, circling, head pressing
- Often leads to coma and death or euthanasia due to severity of illness
- Fatal in 90% of ill horses

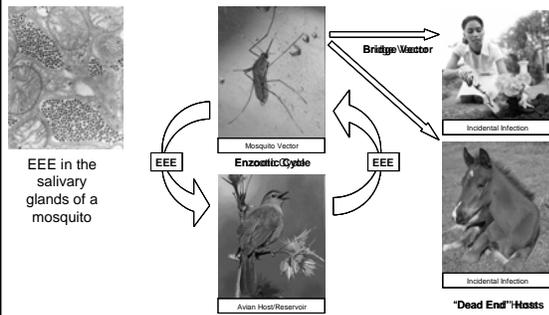


Photo: American Assoc of Equine Practitioners

EEE in Wildlife

- Wild birds are natural reservoir; can cause mortalities in birds
- Emus are uniquely sensitive
- Rare documented mortality attributed to EEE in white-tailed deer;
 - Georgia (2001) – a single deer
 - Wisconsin (2004) – a single deer
 - Michigan
 - 2005 (Kent, Ionia, Montcalm) – seven deer
 - 2009 (Branch) – a single deer, (also mortalities on emu farms in Oakland and Schoolcraft counties)
 - 2010 (Livingston, Missaukee) – two deer

Transmission Cycle



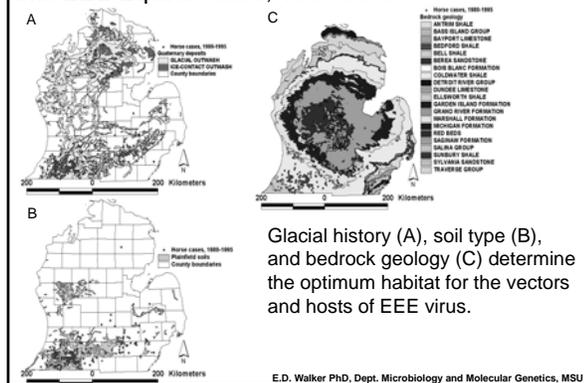
Ecology of EEE

- Primary vector is the *Culiseta melanura* mosquito
 - Prevalent in fresh water hardwood swamps
 - Bite birds almost exclusively
 - Short flight range (1 km)
- Virus reservoir is birds (develop high viremia)
 - The natural cycle of EEE in Michigan has not been elucidated (overwintering in mosquito larvae or reservoir species, reintroduction by migrating birds, ???)
- Bridge vectors include *Aedes* (floodwater mosquitoes), *Coquillettidia*, and *Culex* sp.
 - Bite birds and mammals
 - Longer flight range

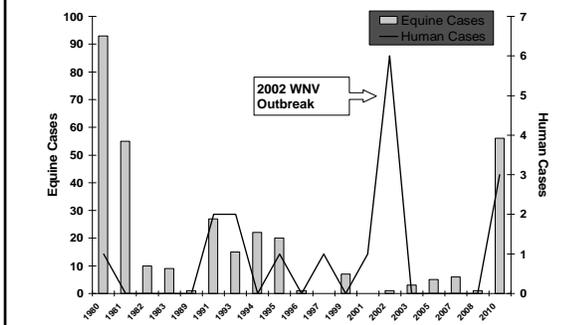
History of EEE in Michigan

- Considered endemic in the state
- Equine, human and wildlife cases identified sporadically
- Outbreaks occur every decade or so
- Historically large equine outbreak in 1980-1981
- EEE “zone” from southwest lower Michigan, extending northeast into the “thumb”

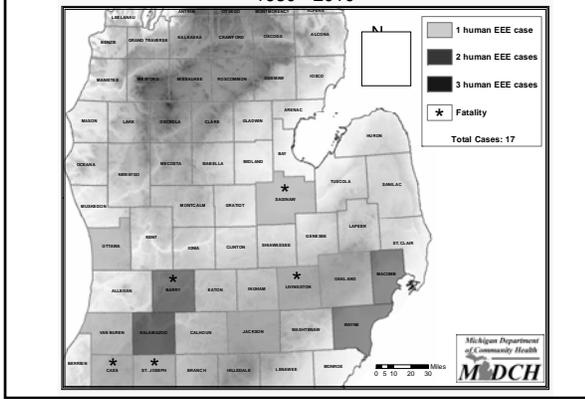
Michigan Geologic Features associated with EEE Equine cases, 1980-1995



MI EEE Cases, Equine and Human: 1980-2010

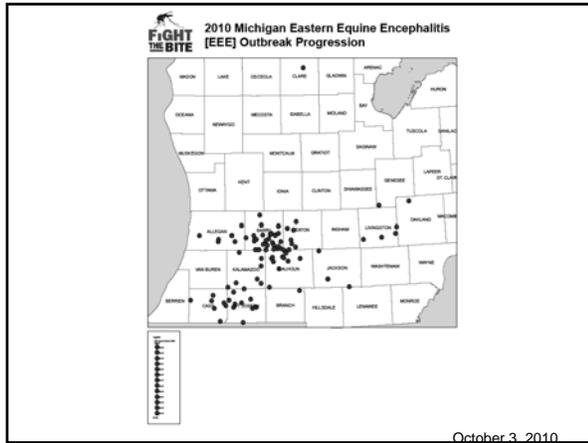


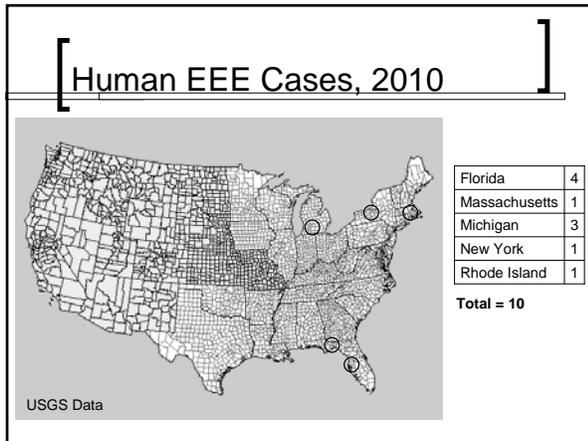
Eastern Equine Encephalitis - Human 1980 - 2010



Confirmed Equine EEE Cases in Michigan 1980-2010







- ### [2010 MI Human Cases]
- 3 Cases
 - 2 Male, 1 Female
 - Age range: 41y-61y
 - Average Age: 51 y
 - Onset dates: July 12-August 3
 - All experienced meningoencephalitis
 - All three patients discharged to rehabilitation hospitals

Laboratory Testing: Human

- CDC and MDCH offer an EIA test for EEE, not available through commercial labs
- IFA is methodology utilized by commercial laboratories offering EEE serology
- Less sensitive than EIA
- MDCH asked hospitals to submit CSF on patients with suspect viral meningitis/encephalitis for arbovirus testing, particularly if the IFA IgM was negative or not performed, but IgG was positive.

Serologic Testing: 2010 Human Cases

	IFA				MIA	PRNT
	S-IgM	S-IgG	C-IgM	C-IgG	IgM	Neut Ab
Pt #1	+	+	n/a	1:2	+	1:16
Pt #2	>=1:10	>=1:40	<1:10	<1:10	+	1:32
Pt #3	n/a	n/a	<1:4	<1:4	+	n/a

2011 Michigan EEE Surveillance Plans

- May-July; conduct targeted mosquito surveillance in select EEE endemic counties
 - MSU and Summer Student
 - MI Mosquito Control Districts
- May-October; conduct active surveillance for equine EEE cases with veterinarians and human EEE cases with hospitals
- Press Release for first EEE positive mosquito, equine or human identified
- Weekly updates of surveillance data on the Emerging Diseases website throughout the season

Prevention in Humans



- Avoid mosquito bites when outdoors in the summer months, particularly at dusk and dawn
 - Use insect repellent
 - Cover exposed skin
- Keep windows and screens in good repair
- Community Integrated Mosquito Management
 - Monitor mosquito populations
 - Conduct larviciding
 - Utilize targeted adulticiding based on presence of vector mosquito populations

Prevention in Horses

- Vaccinate!
- Stable horses indoors from dusk to dawn
- Remove/reduce standing water around barns and pastures
- Use of mosquito screening and fans in barns can reduce risk
- Discuss use of insect repellents with your veterinarian

Michigan Resources

- Emerging Diseases Website

www.michigan.gov/emergingdiseases

National Surveillance Data

- www.cdc.gov/
- Epi-X: CDC Arboviral Activity Update
 - All arboviruses
 - Updated weekly



Eighteen states have reported EEEV activity to ArboNET for 2010, including five states with reported human EEEV infections and 13 additional states with reported non-human EEEV activity only. In the past week, six states reported EEEV activity for the first time in 2010.

Questions?



Courtesy: NorthEscambia.com
