

Potential for the Introduction and Spread of Exotic Viruses in the Mid-Atlantic Region – Dr. Michael Turell

- a) VBD triad
 - i) The pathogen
 - ii) Vectors
 - iii) Susceptible hosts
- b) Background
 - i) WNV
 - (1) Made the jump to the US in 1999
 - (2) Spread throughout the entire US by 2003
 - (3) Triad
 - (a) Pathogen - introduced every year by overwintering mosquitoes
 - (b) Vector
 - (i) Maintenance - *Culex* spp
 - (ii) Epidemics - various bridge vectors
 - (c) Hosts - birds
 - ii) Current VBDs in the MAMCA area
 - (1) LAC
 - (a) Virus is maintained in mosquitoes via transovarial and vertical transmission
 - (b) The chipmunk host is not really needed
 - (c) Mike Turell did his dissertation on vertical transmission in California-type arbovirus (LOOK THIS UP)
 - (2) EEE
 - (3) WNV
 - iii) Historic VBDs
 - (1) Malaria
 - (a) The vector is here
 - (b) The pathogen is continually being reintroduced
 - (c) People are the host
 - (d) It has not re-established
 - (2) Yellow fever
 - (3) Dengue
- c) Basic transmission cycles
 - i) Zoonoses - other animals primary amplifying host
 - ii) Anthroponosis - human primary amplifying host
- d) What is here?
 - i) Zoonoses have done well here
 - ii) Why don't we have anthroponotic diseases here?
 - (1) Window screens
 - (2) Air conditioners
 - (3) Television
- e) What about chikungunya?
 - i) Vector
 - (1) *Aedes albopictus*

- (a) A more susceptible vector
 - (b) Virus replicates better
 - (2) *Aedes aegypti* - much more effective vector
 - ii) Transmission
 - (1) It could, and will likely, occur
 - (2) It is not likely to be persistent
 - (a) Public health disaster - no
 - (b) Media disaster - yes
 - iii) Vertical transmission is possible but not a like means of long-term viral persistence
- f) What might get here?
 - i) Rift Valley Fever
 - (1) Disease in livestock
 - (2) Dengue-like disease in people
 - (3) Vectors are likely present
 - ii) VEE
 - (1) Disease of rodents
 - (2) Can affect horses, who produce a high-level viremia
 - (3) People produce a high-level viremia
 - (4) *Oc taeniorhynchus* is a vector
 - iii) Japanese encephalitis
 - (1) Related to SLE and WNV
 - (2) Much more severe than WNV
 - (3) There is an FDA approved vaccine available
 - (4) Virus found in wading birds
 - (5) Produces a high-level viremia in pigs
 - (6) Possible vector in US is unknown
 - (a) *Oc japonicus* is a possibility
 - (b) Others? Not enough data
- g) What needs to be done
 - i) Restore the mosquito control infrastructure
 - ii) Public education needs a new push
 - iii) Basic knowledge on mosquito species needs to be prioritized for control
 - iv) Better diagnostics are needed to get a jump on control
 - (1) WNV was mis-diagnosed as SLE
 - (2) JE will likely be mis-diagnosed as WNV