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Potential for the Introduction and Spread of Exotic Viruses in the Mid-Atlantic Region

Michael J. Turell

U.S. Army Medical Research Institute of Infectious Diseases, Fort Detrick, Maryland

**Opinions, interpretations, conclusions,
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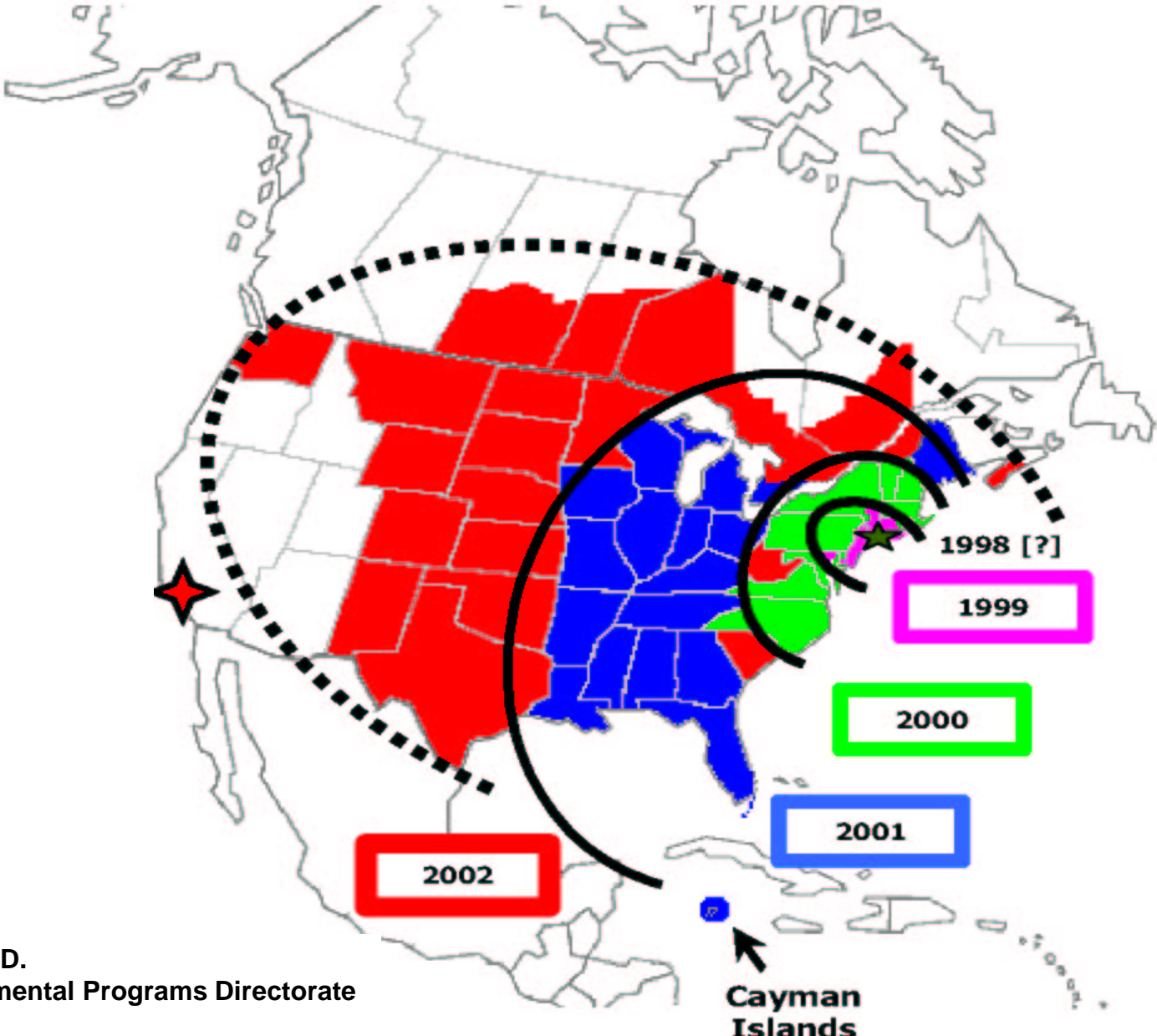
1999

New York City

West Nile Virus

WEST NILE VIRUS IN NORTH AMERICA

[From CDC and Health Canada data as of 25 Oct 2002]



Joseph Dudley, Ph.D.
U.S. Army Environmental Programs Directorate
Versar, Inc.

ARBOVIRAL DISEASES IN THE MAMCA AREA

- 1. West Nile**
- 2. Eastern equine encephalitis**
- 3. St. Louis encephalitis**
- 4. La Crosse encephalitis**

VECTOR-BORNE DISEASES HISTORICALLY FOUND IN THE MAMCA AREA

- 1. Malaria**
- 2. Yellow fever**
- 3. Dengue**

What else is out there?

and

**Why West Nile and not
dengue, malaria, yellow
fever or chikungunya?**

BASIC TRANSMISSION CYCLE TYPES

Zoonosis

vs

Anthroponosis

Anthropozoonosis

Malaria

Dengue

Chikungunya

Wuchereria filariasis

Zoonoses

West Nile (**birds**)

Eastern equine encephalitis (**birds**)

St. Louis encephalitis (**birds**)

Rift Valley fever (**domestic ungulates**)

Venezuelan equine encephalitis (**horses**)

Japanese encephalitis (**birds and pigs**)

Infection triad

1. The pathogen
2. Vectors
3. Susceptible hosts

West Nile virus

- 1. Pathogen:** reintroduced each year by overwintering mosquitoes
- 2. Vectors:** numerous species
 - Maintenance cycle – various *Culex* species
 - Epidemic cycle – various bridge vectors
- 3. Susceptible hosts:** numerous bird species

Malaria

1. **Pathogen:** For the past 20 years:

- >1,000 cases diagnosed/year in the USA
- Averaging just under 1,500 cases/year
- 1,925 cases diagnosed in 2011

2. **Vectors:** *Anopheles quadrimaculatus*

3. **Susceptible hosts:** Virtually all Americans are susceptible.

CHIKUNGUNYA

Aedes albopictus

versus

Aedes aegypti

Ae. albopictus vs. *Ae. aegypti*

<i>Ae. albopictus</i>	Inf. rate	<i>Ae. aegypti</i>	Inf. rate
GENTILLY	47	ROCKEFELLER	15
OAHU	39	LAS VIRTUDES	14
MADAGASCAR	39	GENTILLY	9
SABAH	38	FOSTER	4
SAO PAULO	32	DAKAR	4
OKINAWA	32	REX	2
ZAMA	28	THAILAND	0
POLK	22		
HOUSTON	20		
TAIWAN	16		

Which viruses are of particular concern?

Rift Valley fever

Venezuelan equine encephalitis

Japanese encephalitis

Rift Valley fever

Disease

Vertebrate hosts

Vectors

Venezuelan equine encephalitis

Disease

Vertebrate hosts

Vectors

Japanese encephalitis

Disease

Vertebrate hosts

Vectors

and what needs to be done

- 1. Restore our mosquito control infrastructure**
- 2. Public education**
- 3. Basic knowledge on which mosquitoes should prioritized for control**
- 4. Better diagnostics**

Questions?