Arbovirus Surveillance Summary, 2012

Massachusetts Department of Public Health (MDPH)
Arbovirus Surveillance Program

WEST NILE VIRUS (WNV)

Birds

The MDPH Arbovirus Surveillance Program discontinued routine dead bird reporting in 2009. Bird die-offs can and do occur for reasons unrelated to WNV infection and they can be reported to the Massachusetts Division of Fisheries and Wildlife (MDFW). Poultry flocks experiencing sudden illness or mortality should be reported to the Massachusetts Department of Agricultural Resources (MDAR).

Mosquito Samples

Of 6,828 mosquito samples collected in Massachusetts in 2012, 307 (4.5 %) were positive for WNV. Positive samples were identified in 109 towns in 9 counties. Positive mosquito samples included 203 *Culex pipiens/restuans* complex, 60 *Culex* species, 30 *Culiseta melanura*, 2 *Aedes vexans*, 5 *Culex salinarius*, and 7 *Coquillettidia perturbans*. Mosquitoes in the *Culex* genus feed mainly on birds and occasionally on mammals, including humans. *Culex pipiens* and *Culex restuans* are primarily responsible for WNV transmission between birds in Massachusetts. *Culiseta melanura* feeds almost exclusively on birds and is the primary enzootic vector of eastern equine encephalitis (EEE) virus, although it can also carry WNV. *Coquillettidia perturbans* is an aggressive mammal-biting mosquito and can be involved in the transmission of both WNV and EEE virus to humans in Massachusetts. For a complete list of positive mosquito samples by city/town, please see the annual Cumulative Mosquito Summary by County and Municipality report.

Animals

21 veterinary samples were submitted for arbovirus testing. Two horses tested positive for WNV in 2012. The results are summarized in the table below.

County	Animal Species	Onset Date	Virus Result
Hampden	Horse	7/31/2012	WNV
Hampden	Horse	8/23/2012	WNV

Humans

There were 33 human cases of WNV infection identified in Massachusetts in 2012, the most ever recorded in a single season. This increase in human cases was also seen across the country where the number of confirmed human cases nationwide was dramatically higher in 2012 (5,387) compared with 2011 (712). The 5,387 cases reported as of December 11, 2012 was the highest number of WNV cases reported to CDC through the second week in December since 2003. Of those, 2,734 (51%) were classified as neuroinvasive disease (such as meningitis or encephalitis) and 2,653 (49%) were classified as non-neuroinvasive disease. Eighty percent of the cases have been reported from 13 states (Texas, California, Louisiana, Illinois, Mississippi, South Dakota, Michigan, Oklahoma, Nebraska, Colorado, Arizona, Ohio, and New York) and a third of all cases have been reported from Texas.

2012 Confirmed Cases of Human WNV Infection				
County	Age Range	Onset Date	Virus Result	Clinical Presentation
Berkshire	>64	8/10/2012	WNV	Meningoencephalitis
Bristol	40-64	9/24/2012	WNV	WNV Fever
Hampden	>64	8/4/2012	WNV	Meningitis
Hampden	40-64	8/30/2012	WNV	Meningoencephalitis
Hampden	40-64	9/3/2012	WNV	Meningitis
Middlesex	>64	7/23/2012	WNV	Meningoencephalitis
Middlesex	40-64	8/2/2012	WNV	WNV fever
Middlesex	>64	8/8/2012	WNV	Meningoencephalitis
Middlesex	25-39	8/10/2012	WNV	WNV fever
Middlesex	40-64	8/10/2012	WNV	Meningitis
Middlesex	40-64	8/17/2012	WNV	Meningitis
Middlesex	>64	8/18/2012	WNV	WNV fever
Middlesex	>64	8/22/2012	WNV	Meningoencephalitis
Middlesex	>64	8/23/2012	WNV	Meningoencephalitis
Middlesex	40-64	9/3/2012	WNV	WNV fever
Middlesex	40-64	9/4/2012	WNV	Meningoencephalitis
Middlesex	40-64	9/5/2012	WNV	Meningitis
Middlesex	40-64	9/12/2012	WNV	Meningoencephalitis
Norfolk	18-39	8/18/2012	WNV	WNV fever
Norfolk	>64	9/12/2012	WNV	Meningitis
Norfolk	18-39	9/14/2012	WNV	Meningitis
Plymouth	>64	10/10/2012	WNV	Meningoencephalitis
Suffolk	40-64	8/26/2012	WNV	Meningitis
Suffolk	40-64	9/5/2012	WNV	Meningitis
Suffolk	>64	9/10/2012	WNV	Meningoencephalitis
Suffolk	40-64	9/9/2012	WNV	Meningitis
Suffolk	40-64	9/13/2012	WNV	Meningoencephalitis
Suffolk	40-64	9/14/2012	WNV	Meningitis
Worcester	40-64	8/18/2012	WNV	Meningoencephalitis
Worcester	40-64	8/28/2012	WNV	Meningitis
Worcester	18-39	9/3/2012	WNV	Meningitis
Worcester	>64	10/7/2012	WNV	Meningitis
Worcester	40-64	10/14/2012	WNV	Meningitis

Presumptive Viremic Blood Donors

WNV is transmissible through blood transfusion. Since June 2003, U.S. regulations have required that blood banks screen all donated blood for WNV using a nucleic amplification test (NAT). Positive units are not used and donors are deferred from future donation for 120 days. The American Association of Blood Banks notifies states of all presumptive viremic donors (PVDs) - individuals whose donated blood tests positive using a NAT.

There were three presumptive viremic donors identified in Massachusetts in 2012, as summarized below. The number of presumptive viremic donors nationwide was higher in 2012 (597) compared with 2011 (137).

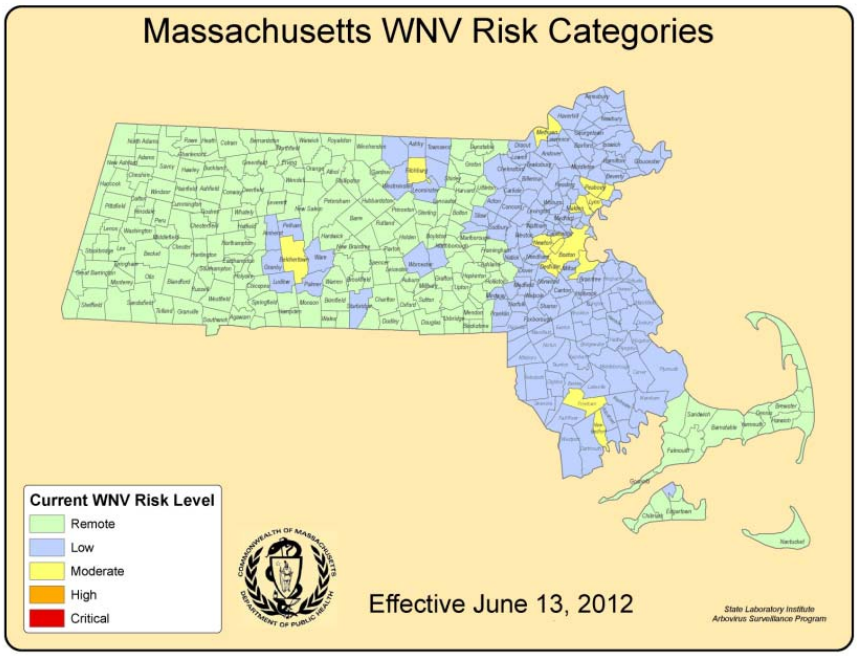
County	Donation Date
Middlesex	9/27/2012
Middlesex Suffolk	10/1/2012 10/15/2012

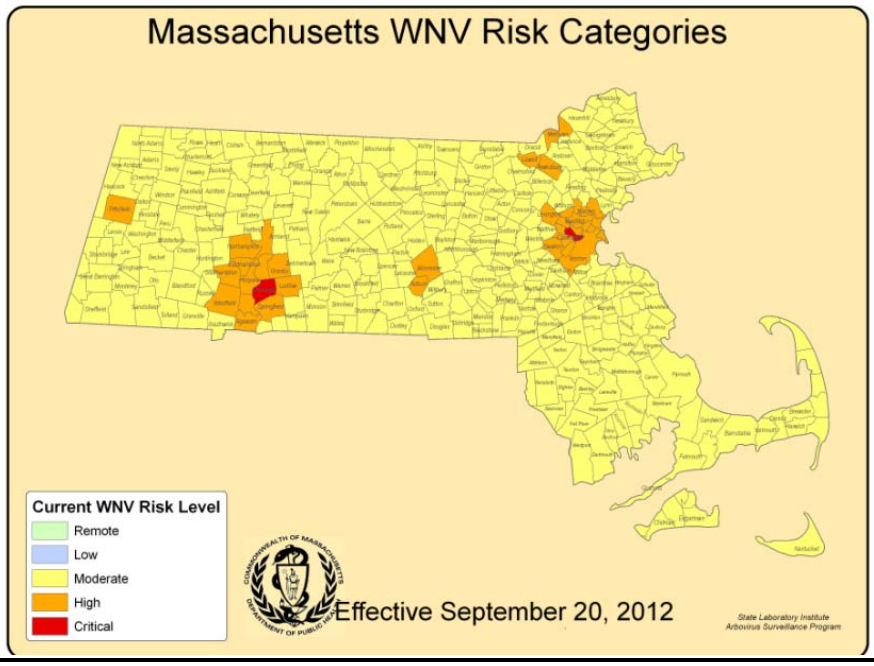
WNV Geographic Risk Levels

Arbovirus risk maps are produced by integrating historical data and areas of mosquito habitat with current data on positive virus isolations (in humans, mosquitoes, etc) and weather conditions. Risk levels served as a relative measure of the likelihood of an outbreak of human disease and are updated weekly based on that week's surveillance data. Initial and final WNV risk levels from the 2012 season are provided in the following maps. This information will be used to help predict risk in 2013, and will be revised as 2013 surveillance data are collected.

Initial and Final 2012 WNV Risk Categories

(As described in Table1 of the 2012 MDPH Arbovirus Surveillance and Response Plan which can be found at www.mass.gov/dph under "Information for Local Boards of Health")





EASTERN EQUINE ENCEPHALITIS (EEE) VIRUS

Birds

Birds are not routinely tested for EEE virus in Massachusetts because the results do not provide useful information on the level of human risk. Exotic bird flocks, comprised of species such as emus or exotic quail, may experience sudden illness and mortality due to EEE. Flocks showing these signs should be reported promptly to the Massachusetts Department of Agricultural Resources (MDAR).

Mosquito Samples

Two hundred and sixty seven of the 6,828 (3.9%) mosquito samples collected in Massachusetts were positive for EEE virus in 2012. They were collected from 43 towns in 8 counties. Positive EEE virus mosquito samples included 146 *Culiseta melanura*, 62 *Coquillettidia perturbans*, 15 *Ochlerotatus canadensis*, 13 *Culex salinarius*, 7 *Aedes vexans*, 16 *Culex pipiens/restuans*, 3 *Culex territans*, and 5 *Culex* species. *Culiseta melanura* feeds almost exclusively on birds and is the primary enzootic vector of EEE virus. *Coquillettidia perturbans, Ochlerotatus canadensis, and Aedes vexans* species are aggressive mammal-biting mosquitoes and can be involved in the transmission of both WNV and EEE virus to humans in Massachusetts. For a complete list of positive mosquito samples by city/town, please see the annual Cumulative Mosquito Summary by County and Municipality report.

Animals

21 veterinary samples were submitted for arbovirus testing. There were eight animal cases of EEE identified in Massachusetts in 2012, as summarized below.

County	Animal Species	Onset Date	Virus Result
Essex	Horse	8/12/2012	EEE
Essex	Horse	9/23/2012	EEE
Hampshire	Horse	8/31/2012	EEE
Plymouth	Alpaca	8/10/2012	EEE
Plymouth	Horse	8/24/2012	EEE
Plymouth	Horse	9/1/2012	EEE
Plymouth	Horse	9/6/2012	EEE
Worchester	Alpaca	10/16/2012	EEE

Humans

There were seven human cases of EEE infection identified in Massachusetts in 2012, as summarized below.

County	Age Range	Onset Date	Virus Result	Clinical Presentation
Essex	>64	9/2/2012	EEE	Meningoencephalitis
Essex	40-64	9/6/2012	EEE	Meningoencephalitis
Franklin/Worcester	<18	8/30/2012	EEE	Meningoencephalitis
Middlesex	40-64	7/28/2012	EEE	Meningoencephalitis
Plymouth	<18	8/22/2012	EEE	Acute febrile illness
Plymouth	>64	9/3/2012	EEE	Meningoencephalitis
Worcester	>64	8/9/2012	EEE	Meningoencephalitis

EEE Geographic Risk Levels

Arbovirus risk maps are produced by integrating historical data and areas of mosquito habitat with current data on positive virus isolations (in humans, mosquitoes, etc) and weather conditions. Risk levels served as a relative measure of the likelihood of an outbreak of human disease and are updated weekly based on that week's surveillance data. Initial and final EEE risk levels from the 2012 season are provided in the following maps. This information will be used to help predict risk in 2013, and will be revised as 2013 surveillance data are collected

Initial and Final 2012 EEE Risk Categories

(As described in Table 2 of the 2012 MDPH Arbovirus Surveillance and Response Plan which can be found at www.mass.gov/dph under "Information for Local Boards of Health")