2010 - ARBOVIRUS FINAL REPORT

Summary of Human West Nile Virus and Other Arboviral Infections, Georgia 2010

West Nile virus (WNV) is a mosquito-borne disease of birds. Humans are occasionally infected with WNV through mosquito bites. Approximately 1 in 5 people infected with WNV develop symptoms of "West Nile Fever", which is often characterized by fever, headache, fatigue, and muscle pain or weakness. Less than 1% of people infected with WNV develop neurologic disease such as meningitis, encephalitis, or flaccid paralysis.

West Nile virus was first recognized in Georgia in July 2001. That year, there were 6 human cases of WNV encephalitis in Georgia, including one death. Since then cases have been reported each year with varying numbers of human deaths.

To improve identification of Georgians infected with WNV, surveillance for WNV illness in humans was expanded for the 2003 transmission season to include all acute infections of WNV. In addition, routine screening of the nation's blood supply began in 2003, resulting in the identification of persons infected with WNV prior to the development of symptoms, if symptoms developed at all.

For historical data on arboviral diseases in Georgia since 2001, see the end-of-year summaries posted at http://health.state.ga.us/epi/vbd/pastsurv.asp.

In 2010, Georgia reported 13 confirmed cases of WNV infection. One positive viremic blood donor was also identified, but is not counted as part of the 13 confirmed cases. Nine of the cases were fever case, while 4 experienced WNV neurologic illness (Guilllan Barre Syndrome, encephalitis, and/or meningitis). The viremic blood donor remained asymptomatic. Table 1 shows the clinical syndrome for each case.

The average age for all cases was 55.9 years (range 35-87). The average age of those with WNV neurologic illness was 56.5 years (range 39-74). Seven (53.8%) of the 13 cases were male. As in past seasons, the majority of cases were reported in August and September (Figure 1). Table 2 shows the counties of residence of each case.

Table 2: Cases by County

WNV Cases by County (includes asymptomatic case*)	
Bibb	1
Clayton	1
Cobb	1
DeKalb	5
Dougherty	1
Fulton*	2
Gwinnett	1
Henry	1
Muscogee	1

Table 3: Dengue - County of Origin

Country of Origin	Internationally-Acquired Arbovirus
Barbados	1
Brazil*	1
Columbia	2
Haiti	1
Honduras	2
India	2
Philipines*	1
Not Recorded	1

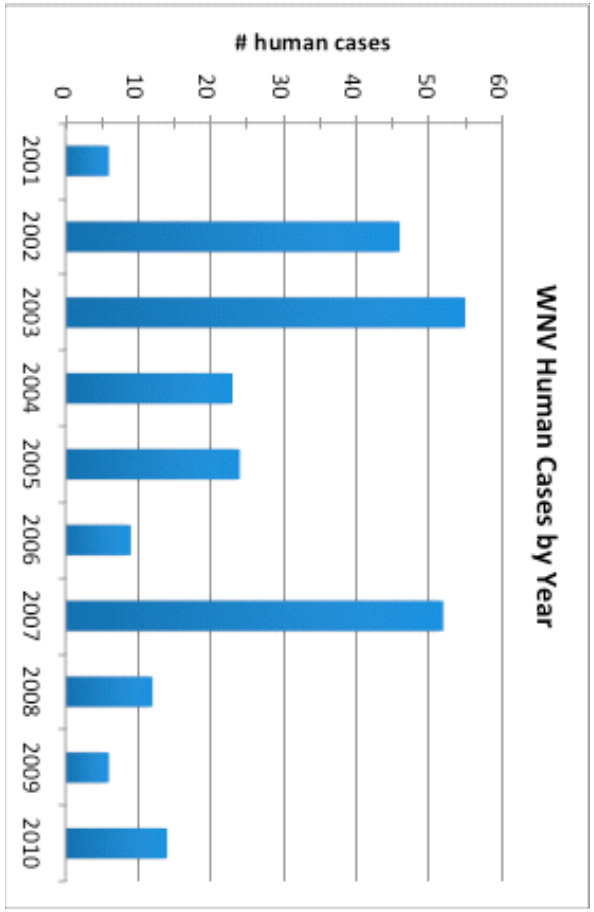
*DHF

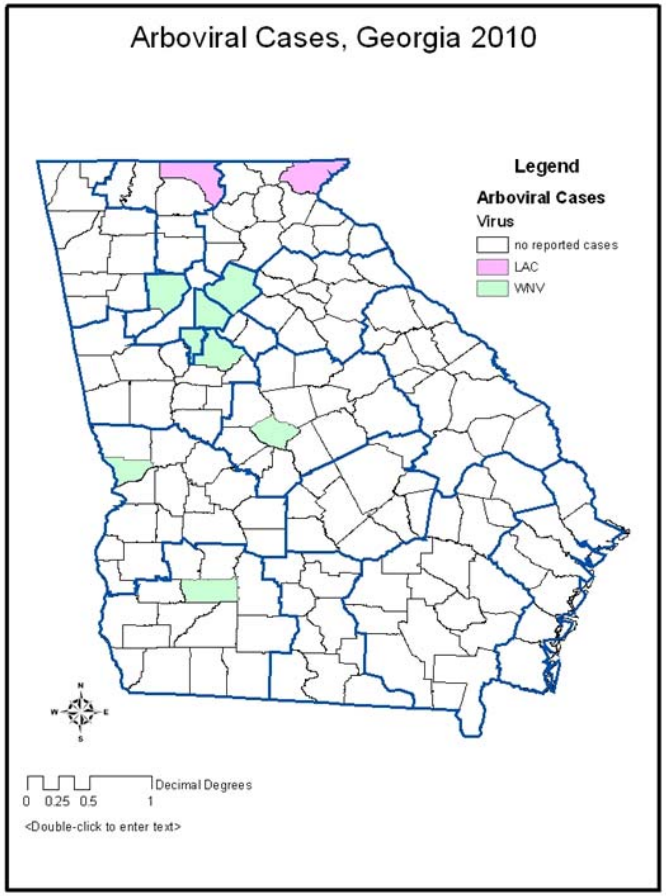
Table 1: Clinical Syndromes, 2010

Arbovirus	Onset Date	County	Clinical Syndrome	Fatality
DENGUE	Jan	Gwinnett	FEVER	NO
	May	Effingham	FEVER	NO
	June	Carroll	FEVER	NO
			FEVER	NO
		Schley	DHF	NO
	July	Gwinnett	FEVER	NO
		Fulton	DHF	NO
	Aug	DeKalb	FEVER	NO
		Fulton	FEVER	NO
	Sept	Gwinnett	FEVER	NO
CHIKUNGUNYA	May	DeKalb	FEVER	NO
LAC	July	Fannin	ENCEPHALITIS	NO
	Oct	Rabun	MENINGITIS	NO
WNV	March	Clayton	FEVER	NO
	April	Gwinnett	FEVER	NO
	May	Dougherty	FEVER	NO
	July	Fulton	MENINGITIS	NO
		Henry	ENCEPHALITIS	NO
	Aug	Bibb	FEVER	NO
		Cobb	FEVER	NO
		DeKalb	FEVER	NO
			FEVER	NO
			FEVER	NO
			GUILLIAN_BARRE_SYNDROME	NO
	Sept	DeKalb	ENCEPHALITIS	NO
		Fulton	ASYMPTOMATIC	NO
		Muscogee	FEVER	NO

In addition to WNV, two confirmed cases of LaCrosse Encephalitis were reported in Georgia in 2010 from Fannin and Rabun counties. Nine internationally acquired cases of Dengue were also reported, as were 2 cases of Dengue Hemmorrhagic Fever and one case of Chikungunya(Table 3).

If you have questions or comments, please contact Melissa Ivey, MPH, Human Arboviral Infections Surveillance Coordinator at the Georgia Division of Public Health, at 404-657-6442 or mlhall1@dhr.state.ga.us.


human cases
0
10
20
30
40
50
60
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
WNV Human Cases by Year


Arboviral Cases, Georgia 2010
Legend
Arboviral Cases
Virus
no reported cases
LAC
WNV
Decimal Degrees
0 0.25 0.5 1
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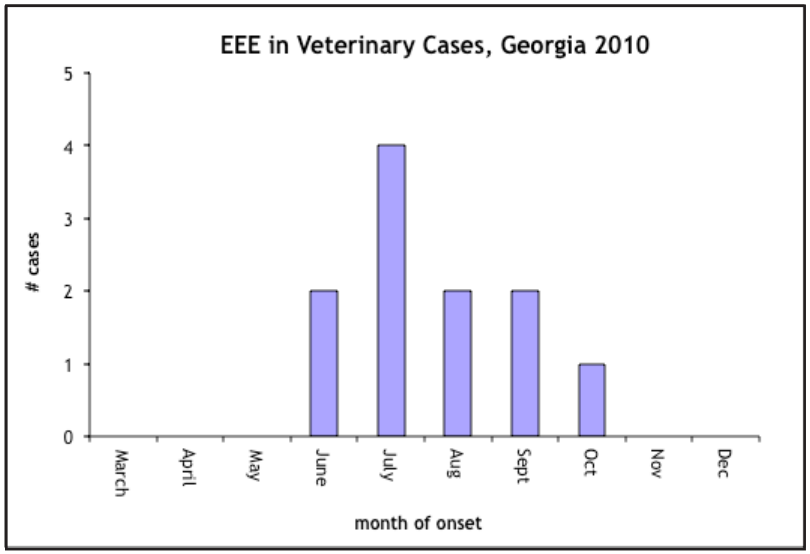
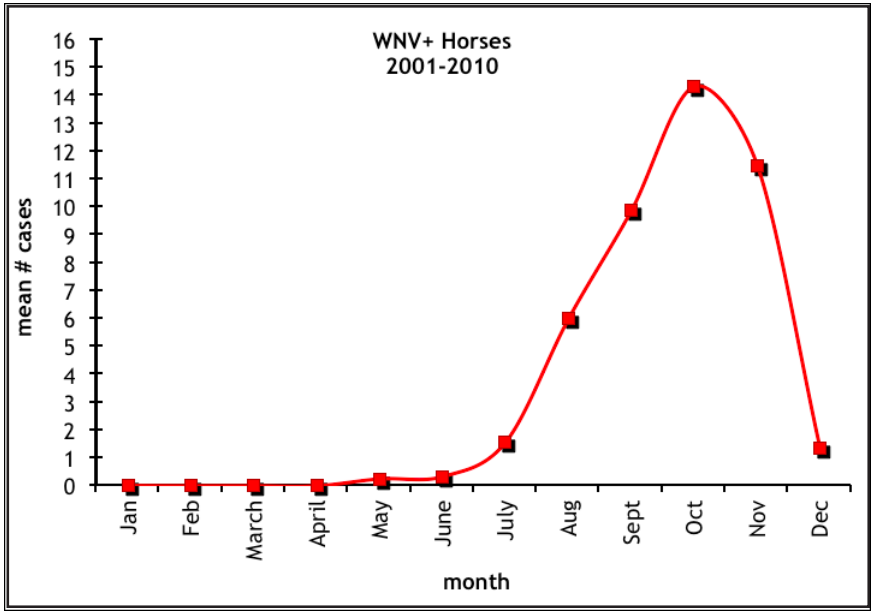
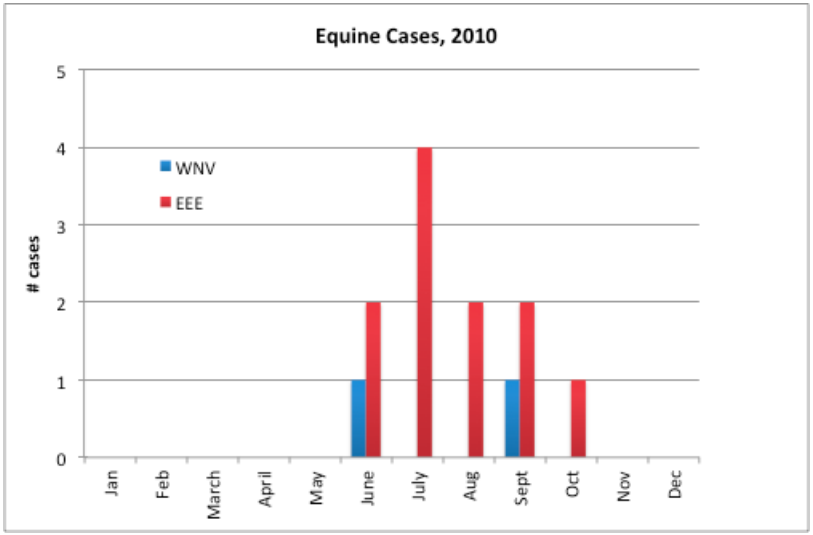
Veterinary Data

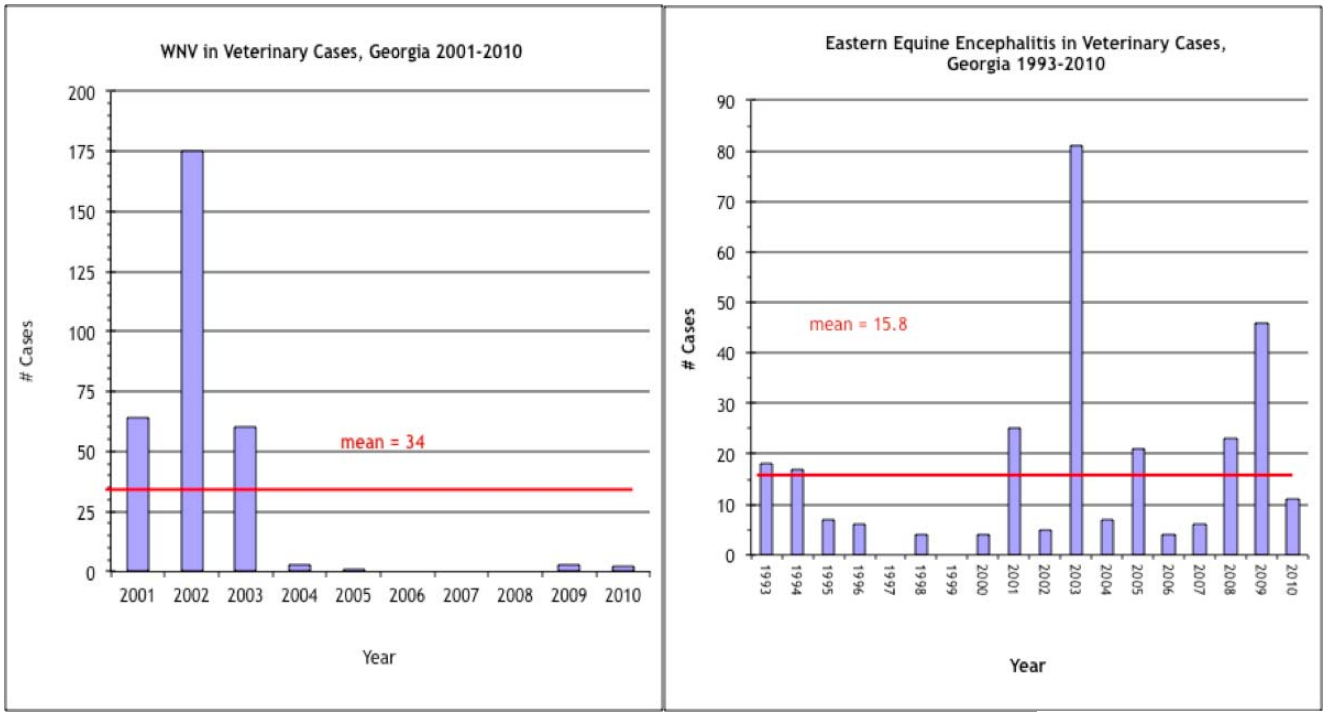
Two horse tested positive for WNV in 2010. The number of cases of WNV in horses has continued to decline since 2002, likely due to increased immunity, increased vaccination, and/or decreased testing.

Eleven horses tested positive for EEE in 2010. Eastern equine encephalitis is endemic in the Coastal and Coastal Plains areas of Georgia. During an average year, four or five EEE+ horses are reported from these areas. The true number of horse cases is probably higher due primarily to under-testing, although sub-clinical infections can occur with EEE.



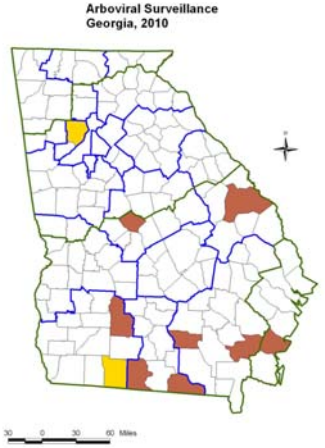






A horse with West Nile virus will display some of the following symptoms: -

- General loss of appetite
- Hind limb weakness
- Fever
- Impaired vision
- Walking in circles
- Inability to swallow
- Coma



However, sometimes a horse can be infected with West Nile virus and not show any symptoms.

DEAD BIRD SURVEILLANCE

A total of 9 birds were submitted for testing in 2010. The first birds were submitted for testing in June; WNV was detected in birds in August. A total of 4 birds tested positive for WNV. No other viruses were detected in birds.

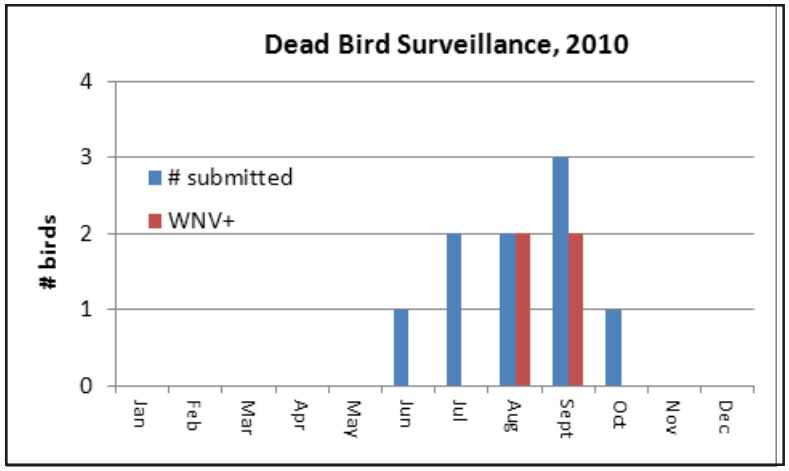
County	# Birds Submitted	WNV+
Bibb	2	
Cobb	3	2
DeKalb	4	2

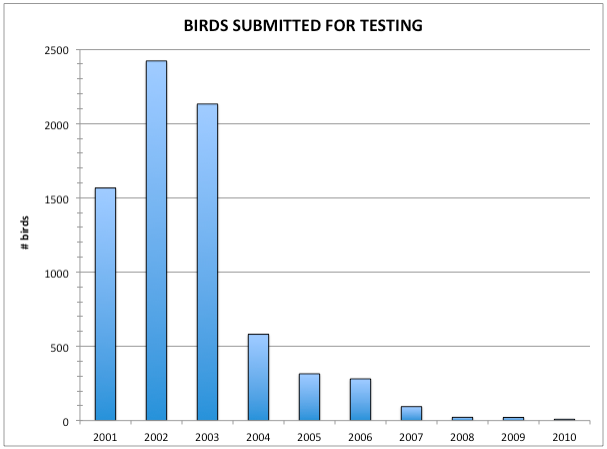
Dead bird surveillance continues to lose ground as a surveillance tool. Counties indicate that fewer birds are being reported by the public, and most counties do not have the resources to pick up and ship birds for testing in any case. Bird testing continues to have some utility where mosquito surveillance data are not available, and positive dead bird reports can be used to trigger public education messages reminding people to wear repellent and to dump out standing water.

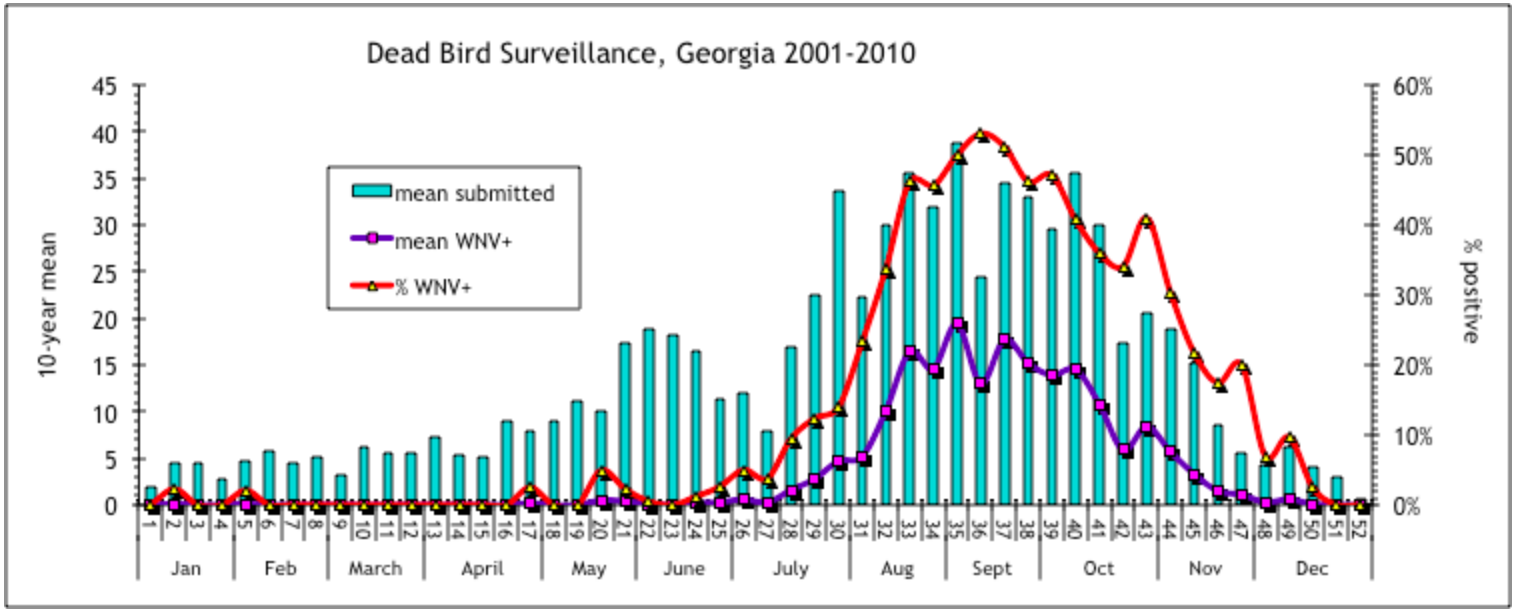
Species	NEG	WNV+	TOTAL	% total	% WNV+
American Crow	1	2	3	33.3%	66.7%
Blue Jay		2	2	22.2%	100.0%
Sparrow	1		1	11.1%	
Gray Catbird	1		1	11.1%	
House Finch	1		1	11.1%	
Northern Cardinal	1		1	11.1%	
TOTAL	5	4	9		

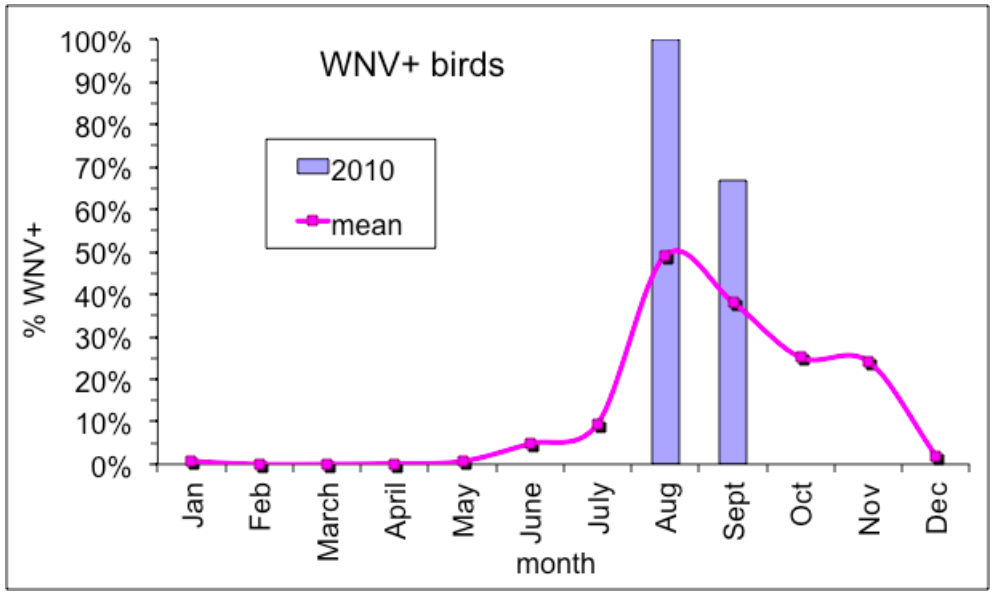
Dead bird surveillance may also help provide early detection of the next zoonotic arbovirus introduced into Georgia.

Six species of birds were submitted for testing in 2010. Two species, American crows and Blue Jays, tested positive for WNV.





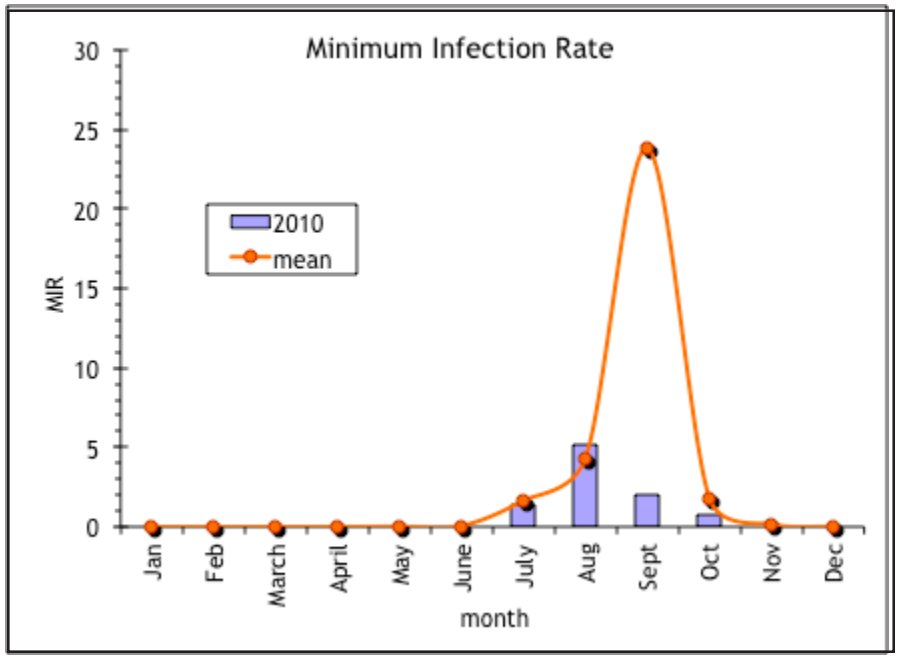

Dead Bird Surveillance, Georgia 2001-2010
10-year mean
% positive
mean submitted
mean WNV+
% WNV+
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec

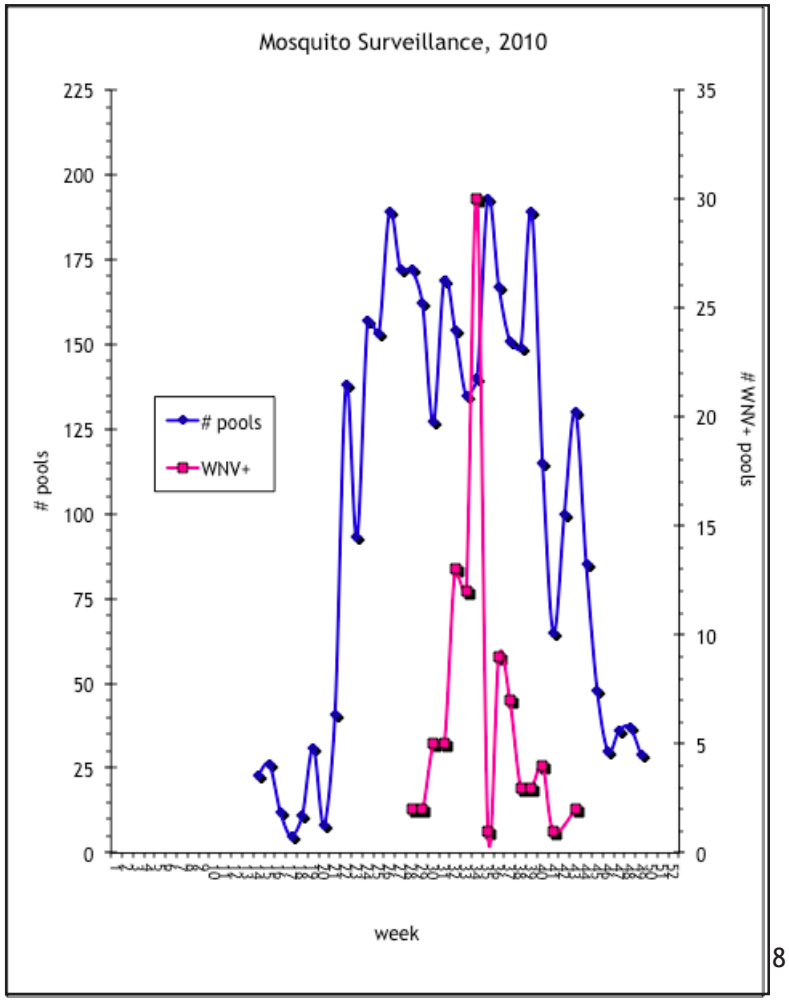

WNV+ birds
% WNV+
2010
mean
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
month

Mosquito Surveillance

In 2010, some level of mosquito surveillance was done in 24 counties. In addition, mosquito surveillance was conducted at Georgia military installations by the US Army Center for Health Promotion and Prventative Medicine (USA-CHPPM South), and results were shared with GDPH. WNV was detected in pools from 5 counties, with peak numbers of positive pools occuring in August and peak infection rate in September.

Because of funding cuts, testing of mosquitoes was limited to important vector species; 24 species of mosquitoes were tested. Mosquitoes found WNV+ were *Aedes albopictus, Culex quinquefasciatus* and *Cx restuans;* the mosquito species most commonly





found positive (96%) was *Cx quinquefasciatus*.

The first positive pool was detected in early July in DeKalb County. The last positive pools were collected in Fulton county in October. Ninety-nine percent of the 99 WNV+ pools were collected from gravid traps.

Research indicates that there may be an inverse relationship between the relative risk of human WNV and annual precipitation during the previous year. In other words, drought may predict higher numbers of human cases of WNV in the year following the drought. Of course, other factors, such as land use and urbanization, need also to be considered when predicting risk. All these factors, along with continued monitoring of *Cx quinquefasciatus* populations, will help to determine local risk of WNV. Basing control and education on these factors seems to be our best course of action for continuing to reduce the incidence of WNV in Georgia.

2001-2010	trap type			
	CDC	**Gravid**	**Other**	**Unknown**
POS-Cache Valley				6
POS-EEE	10	4		1
POS-Flanders	13	609		16
POS-Flanders (variant)	1	12		
POS-HJV	5	3		
POS-HP		1		
POS-Keystone	1			2
POS-LAC				1
POS-Orbivirus			1	
POS-Potosi	3			2
POS-South River virus				2
POS-TENV	1			
POS-UNK		1		
POS-WNV	18	505		227

Virus	**County**	**# mosquitoes**	**# pools**
POS-EEE	Glynn	7	1
	Lowndes	35	2
POS-Flanders	Chatham	1351	60
	Clayton	8	1
	Cobb	36	3
	DeKalb	419	29
	Fulton	298	13
	Lowndes	109	5
POS-Flanders (variant)	Fulton	25	1
	Lowndes	76	4
POS-TENV	Glynn	16	1
POS-UNK	Lowndes	22	1
POS-WNV	Clayton	32	2
	Cobb	43	2
	DeKalb	346	26
	Fulton	1407	67
	Lowndes	42	2

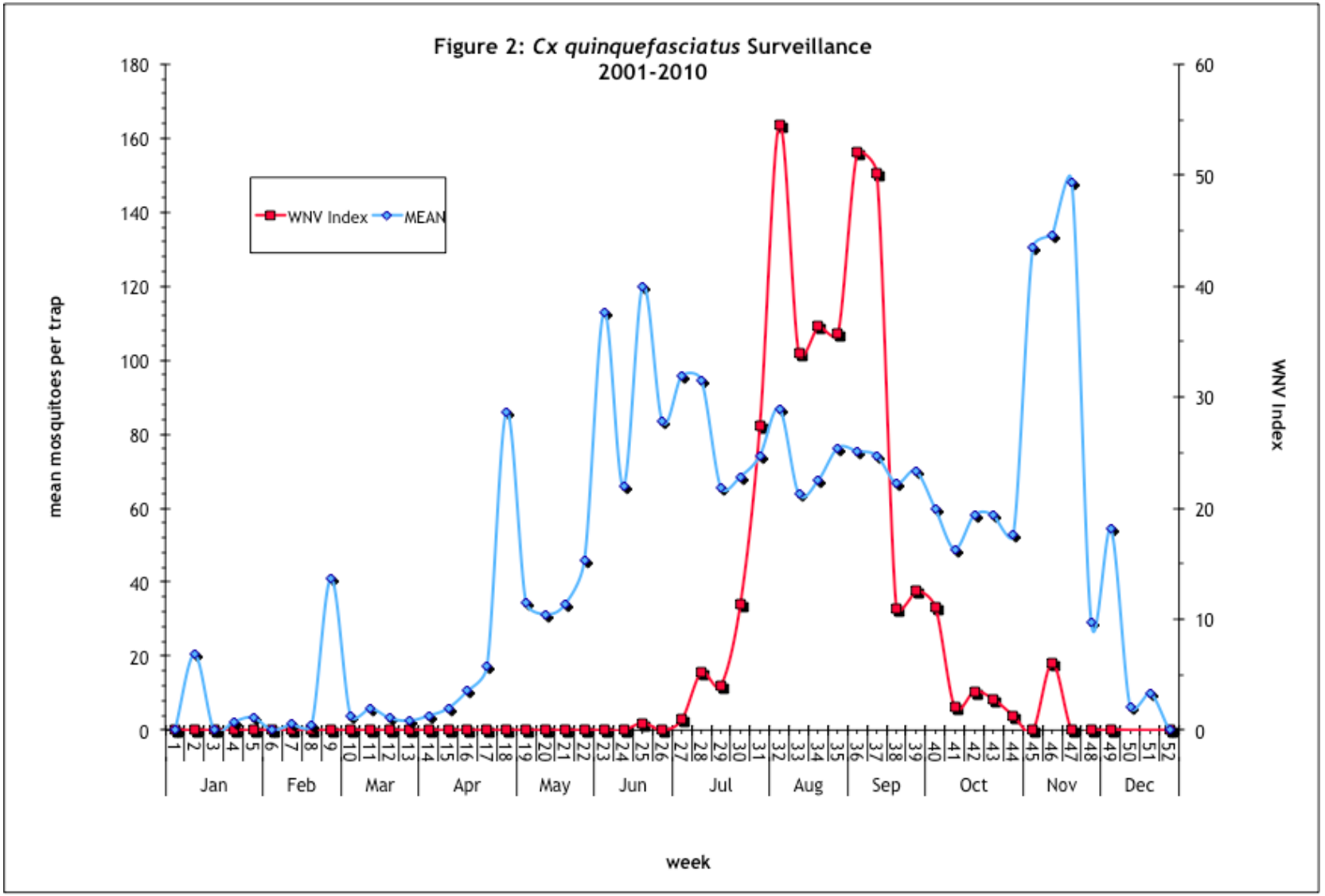
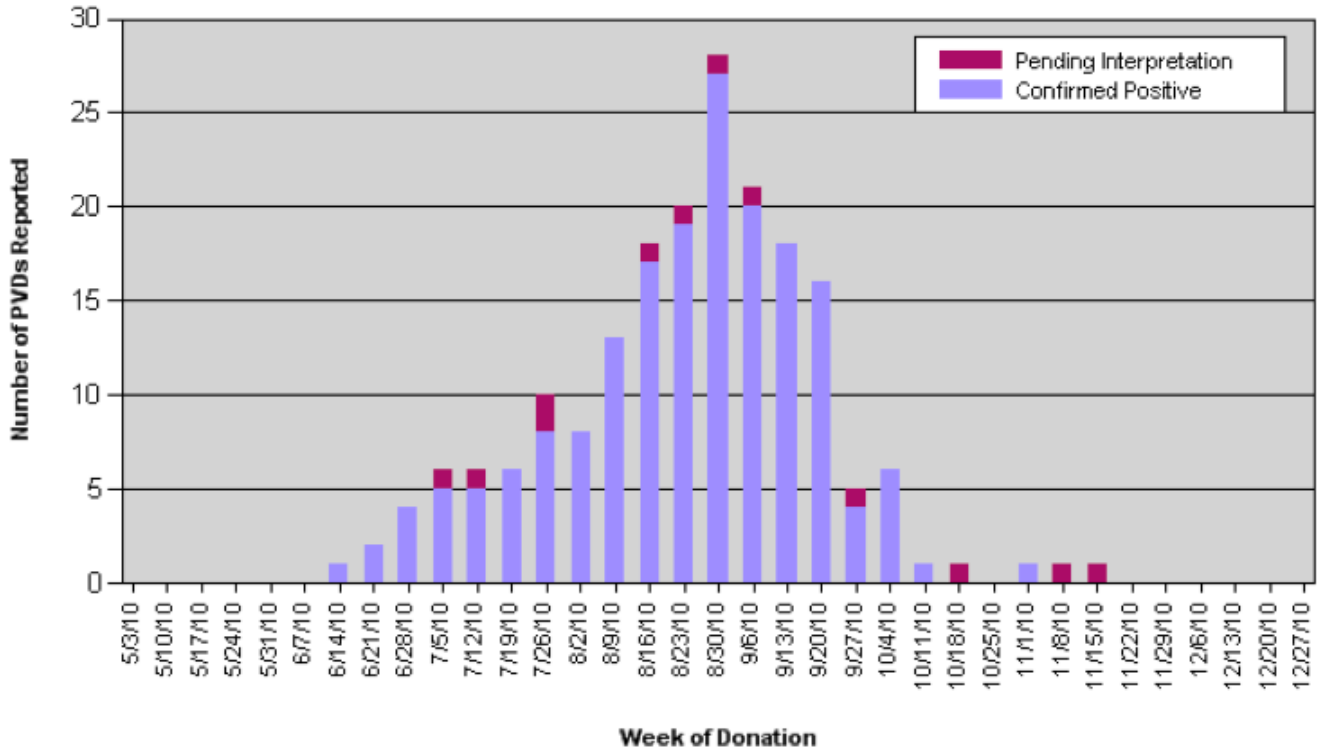


Figure 2: Cx quinquefasciatus Surveillance
2001-2010
WNV Index
MEAN
mean mosquitoes per trap
WNV Index
week
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

VIREMIC DONOR GRAPH

This bar graph identifies the total number of presumed viremic donations (PVDs) by week of donation as identified through NAT. PVDs are defined as: 1) a reactive sample that is repeatable by ID NAT, i.e., repeatable NAT reactivity using the same screening test, analogous to repeat reactivity in serology; or 2) reactivity in the Procleix assay that has a signal-to-cutoff ratio exceeding or equal to 17. PVDs are reported by facilities as they occur based on the test results.



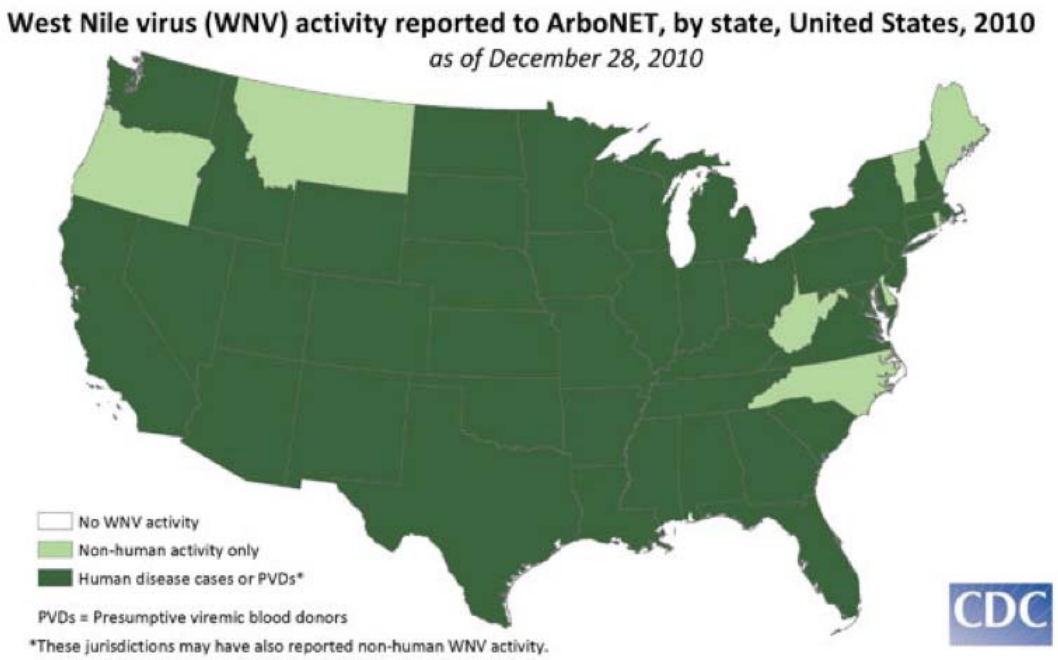
For more information on blood screening, go to: http://www.cdc.gov/ncidod/dvbid/westnile/qa/transfusion.htm

For a viremic blood donor map, go to http://www.aabb.org/programs/biovigilance/Pages/wnv.aspxv

WNV ACTIVITY MAP:

Avian, animal or mosquito WNV infections have been reported to CDC ArboNET from the following states in 2010: Arizona, Arkansas, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

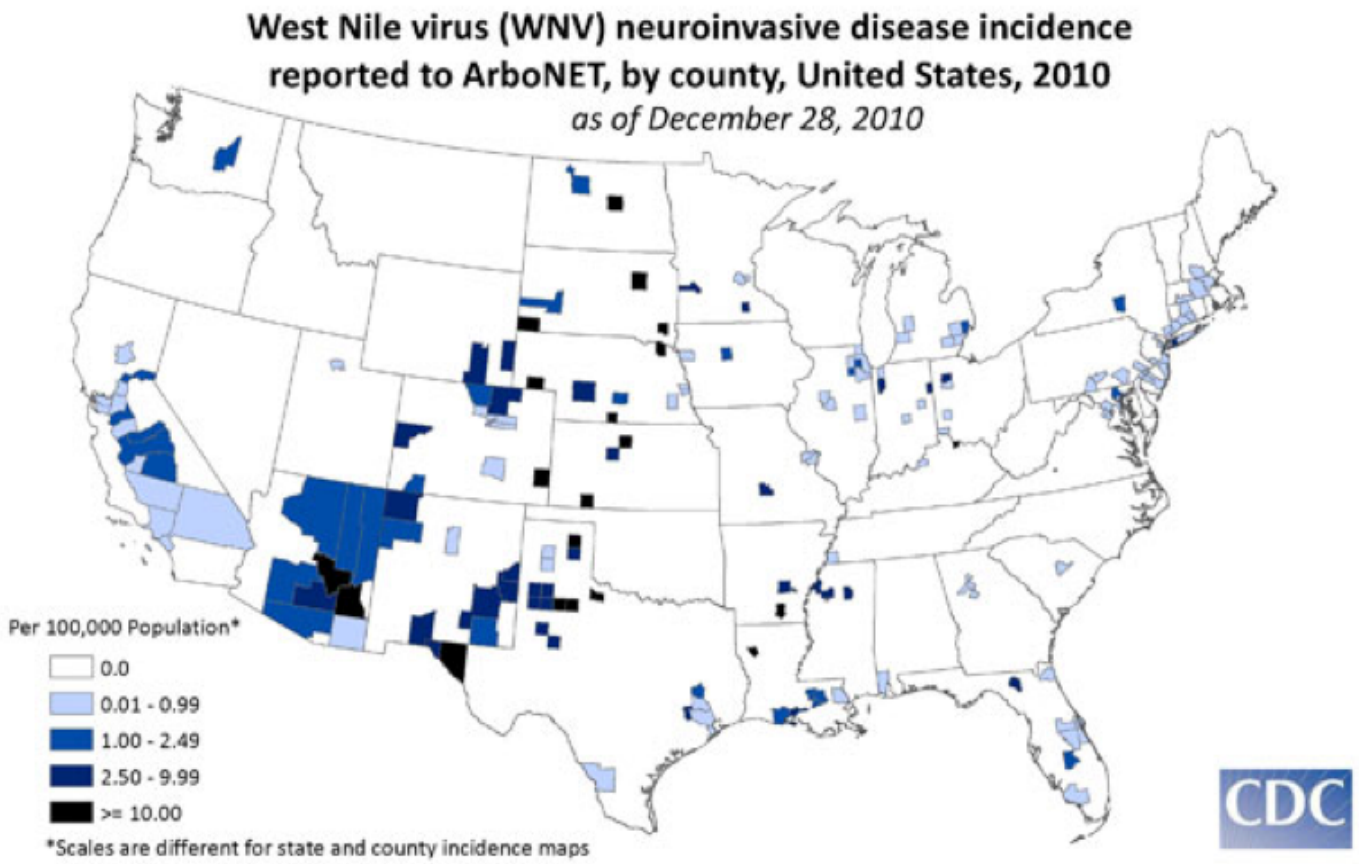
Human infections including PVDs have been reported in Alabama, Arizona, Arkansas, California, Colorado, Connecticut, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin, and Wyoming.



Of the 981 WNV cases, 601 (61%) were reported as a neuroinvasive disease cases, and 380 (39%) as nonneuroinvasive disease cases. One hundred and seventeen presumptive viremic donors have been reported at this time.

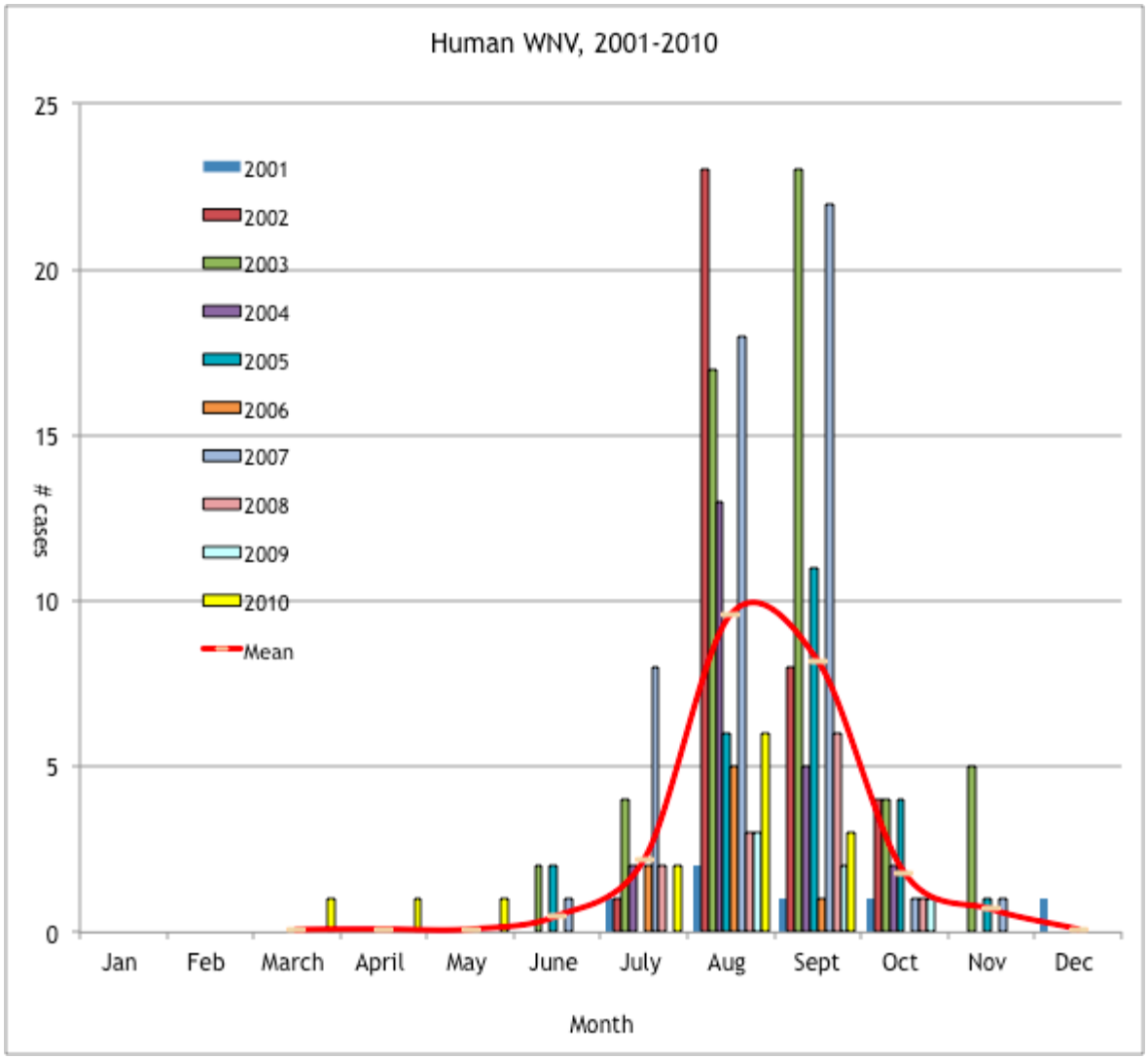
USGS: http://diseasemaps.usgs.gov/

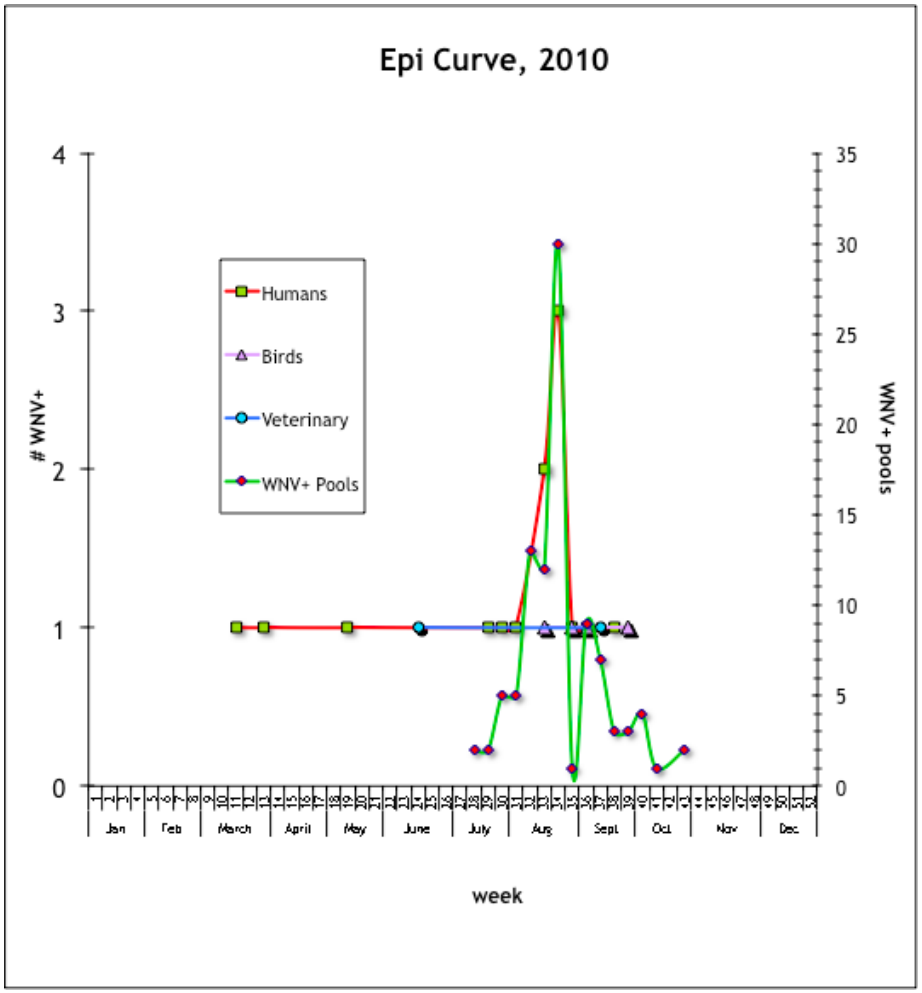
NEUROINVASIVE DISEASE MAP



Incidence by state map data description: West Nile virus neuroinvasive disease incidence maps reflect surveillance reports released by state and local health departments to CDC's ArboNET system for public distribution. Map shows the incidence of human neuroinvasive disease (encephalitis, and/or meningitis, and/or acute flaccid paralysis) by county with shading ranging from .01-.99, 1.0-2.49, 2.50-9.99, and greater than 10.0 per 100,000 population.

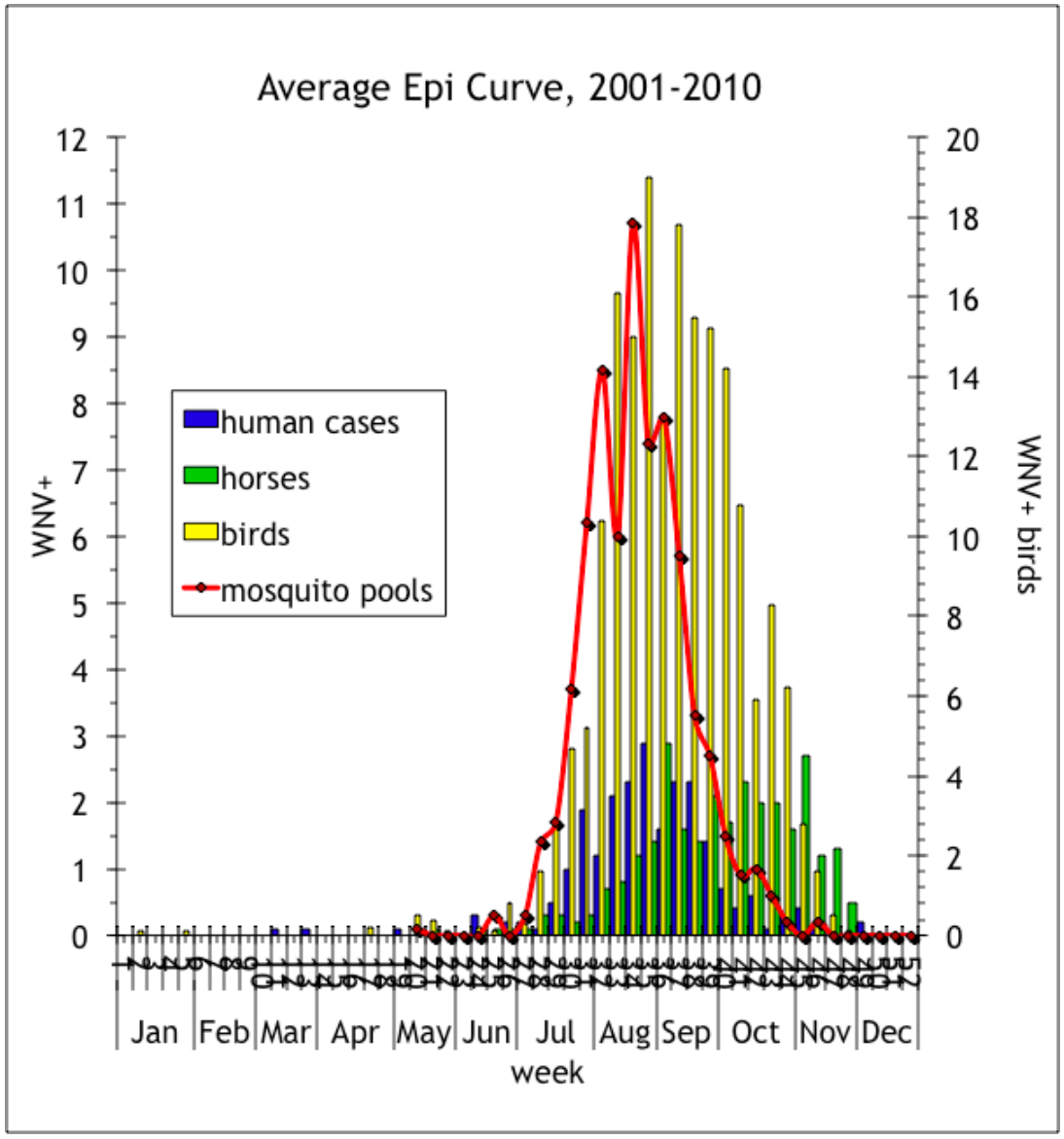
USGS: http://westnilemaps.usgs.gov/


Human WNV, 2001-2010
25
20
15
10
5
0
cases
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Mean
Jan
Feb
March
April
May
June
July
Aug
Sept
Oct
Nov
Dec
Month



Constructing epidemic curves is a common and very important practice in epidemiology. Epidemic curves are used to monitor disease occurrence, to detect outbreaks, to generate hypotheses about the cause of an outbreak, to monitor the impact of intervention efforts, and to predict the course of an epidemic.

2001-2010	human cases	veterinary case	mosquito pool	positive bird
total	247	751	307	1894
mean	24.7	75.1	30.7	189.4



THANK YOU to the district and county public and environmental health employees, mosquito control workers, veterinarians, and healthcare providers who collected much of the data summarized in this document.

The GDPH Vector-Borne & Zoonotic Diseases Team

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