



# **Arkansas Department of Health**

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Center for Health Protection

Zoonotic Disease Section

## **West Nile Virus and other Mosquito-borne Arboviral Disease Calendar Year 2013**

### **Activity Summary**

### **Public Release**

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## **Provisional Data**

This activity summary includes provisional data reported to the Arkansas Department of Health (ADH), and subsequently to the Centers for Disease Control and Prevention's (CDC) ArboNET for nationally notifiable arboviral diseases. Provisional data are provided to help track recent arboviral disease activity. However, these data may change substantially before they are finalized.

## **Data Limitations**

The data collected on arboviral diseases, is from a passive surveillance system. The data is dependent on clinicians considering the diagnosis of an arboviral disease, obtaining the appropriate diagnostic test, and reporting of laboratory confirmed cases to ADH. Diagnosis and reporting are incomplete, and the incidence of arboviral diseases is underestimated.

Reported neuroinvasive disease cases are considered the most accurate indicator of arboviral activity in humans because of the substantial associated morbidity. In contrast, reported cases of non-neuroinvasive arboviral disease are more likely to be affected by disease awareness and healthcare-seeking behavior in different communities and by the availability and specificity of laboratory tests performed. Surveillance data for non-neuroinvasive disease should be interpreted with caution.

## **Executive Summary**

ADH received 65 reports of arboviral disease in 2013, which met criteria to warrant an investigation. Of the 65 reports 22 were determined to be cases, including West Nile Virus (WNV), Eastern Equine Encephalitis (EEE), and imported cases of Malaria and Dengue. There were a total of 18 cases of WNV documented, including 16 cases of neuroinvasive (e.g., meningitis, encephalitis) disease (89%) with one associated death, and 2 cases of non-neuroinvasive disease (11%). Six presumptive viremic blood donors (PVBD) were identified by blood donor screening. One PVBD developed clinical illness and is included as a non-neuroinvasive disease case.

For reported cases of WNV in 2013, the incidence rate was 0.61 (per 100,000 populations, Table 1; neuro invasive and non-neuro invasive combined). There was a 66% decrease in reported cases from 2012 (which had the highest case count of any year since WNV has been reported in Arkansas), and 22% decrease from the 12 year median case count. There was an equal distribution of gender among the cases, race distribution was 78% White, 22% Black or African American, and ethnicity was predominately Non-Hispanic or Latino (94%). Ages ranged from 11 to 85 (median 53), with 17% of the cases less than age 20, and 39% over age 70. Geographic distribution, by public health region was; Central 28%, Northeast 6%, Northwest 44%, Southeast

17%, and Southwest 6%. All reportable clinical outcomes for WNV cases can be found in Table 3.

ADH also investigated one domestically acquired case of Eastern Equine Encephalitis virus (EEE), which is the first documented human EEE case in Arkansas. EEE is a rare illness in humans, and only a few cases are reported in the United States each year. Most cases occur in the Atlantic and Gulf Coast states. Severe cases of EEE (involving encephalitis) begin with the sudden onset of headache, high fever, chills, and vomiting. The illness may then progress into disorientation, seizures, or coma. EEE is one of the most severe mosquito-transmitted diseases in the United States with approximately 33% mortality and significant brain damage in most survivors. There is no specific treatment for EEE; care is based on symptoms. In 2013 there were six cases nationally (AR-1, FL-2, GA-1, MA-1, NC-1), and three deaths (AR, FL, MA).

In addition to WNV and EEE, ADH investigated five reports of Malaria, with two determined to be cases. About 1,500 cases of malaria are diagnosed in the United States each year, but the numbers are increasing. The vast majority of cases in the United States are in travelers and immigrants returning from countries where malaria transmission occurs, many from sub-Saharan Africa and South Asia. Of the species of mosquitoes found in the United States, the three species that were responsible for malaria transmission prior to elimination are still widely prevalent; thus there is a constant risk that malaria could be reintroduced in the United States. All febrile patients should have a travel history taken. The symptoms are non-specific and diagnosis can only be made with laboratory testing.

Lastly, three reports of Dengue (DENV) were investigated and two were determined to be cases. Clinicians in the United States should be aware that competent DENV vectors are present in most states, including Arkansas, and importation of DENV via travelers has resulted in recent dengue outbreaks in Florida, Hawaii, and Texas. All suspected dengue cases should be reported to state and local health departments.

Investigations for domestically acquired human arboviral disease were conducted in 25 counties and cases were documented in 15 counties which represent all five public health regions. Onset of illness for reported human arboviral disease was from July to November, peaking in November.

### **Veterinary Arboviral Disease**

There were 11 cases of veterinary WNV and eight case of veterinary EEE in 2013. All veterinary cases of arboviral disease were equine with the exception of one case of WNV, which was a captive black rhino (Information received from Arkansas Livestock and Poultry in a voluntary collaboration on zoonotic disease reports.) With the

exception of one horse with EEE, the black rhino, and four horses with WNV, the resulting illnesses resulted in death or euthanasia. Reported veterinary cases occurred July to October, peaking in October.

### **ArboNET**

ArboNET is a national arboviral surveillance system managed by CDC and state health departments. In addition to human disease, ArboNET maintains data on arboviral infections among presumptive viremic blood donors (PVBDs), veterinary disease cases, mosquitoes, dead birds, and sentinel animals.

### **Current National West Nile Virus Numbers**

1,256 counties in 48 states and the District of Columbia have reported WNV activity to ArboNET for 2013, including 46 states with reported WNV human infections (i.e., disease cases or viremic blood donors) and two additional states with reported WNV activity in non-human species only (i.e., veterinary cases, mosquito pools, dead birds, or sentinel animals). No WNV activity was reported to ArboNET for the period from 12/4/2013 to 12/31/2013.<sup>1</sup> Table 1 provides information on cases in Arkansas and surrounding states.

Nationally in 2013, 2,374 human cases of WNV disease were reported from 46 states. Of all WNV disease cases reported, 1,205 (51%) were classified as neuroinvasive disease (e.g., meningitis, encephalitis, acute flaccid paralysis) and 1,169 (49%) as non-neuroinvasive disease. Dates of illness onset for disease cases ranged from January–November.

### **Estimated National West Nile Virus Disease Cases**

Based on previous studies, for every reported case of WNV neuroinvasive disease, there are an estimated 30 to 70 non-neuroinvasive disease cases. Extrapolating from the 2,374 WNV neuroinvasive disease cases reported; an estimated 71,000 to 166,000 non-neuroinvasive disease cases might have occurred in 2013. However, only 2,374 were diagnosed and reported; 1% to 3% of non-neuroinvasive disease cases estimated to have occurred.<sup>1</sup>

### **Presumptive Viremic Blood Donors - National**

To date, 420 WNV presumptive viremic blood donors have been reported from 35 states. Of these, 68 (16%) developed clinical illness and are also included as disease cases. Blood collection facilities are encouraged to report all WNV presumptive viremic blood donors to AABB's West Nile Virus Biovigilance Network.

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<sup>1</sup> Arboviral Disease Branch, CDC. West Nile virus, and other arboviral activity – United States, 2013. Provisional data reported to ArboNet January 7, 2014.

**Table 1. West Nile Virus Disease Cases\*, and Presumptive Viremic Blood Donors (PVBD\*\*), Surrounding States 2013 - Provisional Data.**

State	WNV Neuro-invasive		WNV Non-neuro-invasive		WNV Deaths		Presumptive Viremic Blood Donors	
	Cases <sup>‡</sup>	Incidence (per 100,000 population)	Cases	Incidence (per 100,000 population)	Deaths	Deaths (per 100,000 population)	PVBD	Incidence (per 100,000 population)
Arkansas	16	0.54	2	0.07	1	0.03	6	0.20
Louisiana	34	0.74	20	0.43	4	0.09	5	0.11
Mississippi	27	0.9	18	0.60	5	0.17	5	0.17
Missouri	24	0.40	5	0.08	1	0.02	8	0.13
Oklahoma	59	1.53	26	0.68	7	0.18	18	0.47
Tennessee	17	0.26	7	0.11	2	0.03	0	0.00
Texas	105	0.40	67	0.25	13	0.05	39	0.15
<b>TOTAL</b>	<b>282</b>	<b>0.53</b>	<b>145</b>	<b>0.27</b>	<b>33</b>	<b>0.06</b>	<b>81</b>	<b>0.15</b>

\* Includes confirmed and probable cases

\*\* Presumptive viremic blood donors (PVBD) are people who had no symptoms at the time of donating blood through a blood collection agency, but whose blood tested positive when screened for the presence of West Nile virus. Some PVBDs develop symptoms after donation.

‡ Includes cases reported as meningitis, encephalitis, or acute flaccid paralysis.

### West Nile Virus Activity in Arkansas

Fifteen Arkansas counties reported WNV human infections (i.e., confirmed or probable disease cases) in 2013. Nine counties reported equine arboviral activity, all horses with the exception of one probable WNV in Pulaski County, which was a captive Black Rhino. There were eight cases of equine EEE, and eleven cases of equine WNV. Two horses in Little River County had dual diagnosis of EEE and WNV.

For reported cases of WNV in 2013, the incidence rate was 0.61 (per 100,000 populations, Table 1; neuro invasive and non-neuro invasive combined). There was a 66% decrease in reported cases from 2012 (which had the highest case count of any year since WNV has been reported in Arkansas), and 22% decrease from the 12 year median case count. There was an equal distribution of gender among the cases, race distribution was 78% White, 22% Black or African American, and ethnicity was predominately Non-Hispanic or Latino (94%). Ages ranged from 11 to 85 (median 53), with 17% of the cases less than age 20, and 39% over age 70. Geographic distribution, by public health region was; Central 28%, Northeast 6%, Northwest 44%, Southeast 17%, and Southwest 6% (Figure 3). Veterinary Arboviral disease showed a stronger presence in the Central and Southwest public health regions (Figure 4), with 64% of cases were reported collectively. All reportable clinical outcomes for WNV cases can be found in Table 3.

Dates of illness onset for disease cases ranged from June 2013 to November 2013, peaking in November (Figure 1). Additional demographic and clinical characteristics of reported cases are provided in Table 2.

### Presumptive Viremic Blood Donors (PVBD) in Arkansas

A total of six WNV PVBDs were reported in Arkansas in 2013 (Table 1). One (17%) PVBD developed clinical illness and is included as a non-neuroinvasive case. Positive presumptive viremic blood does not enter blood supply.

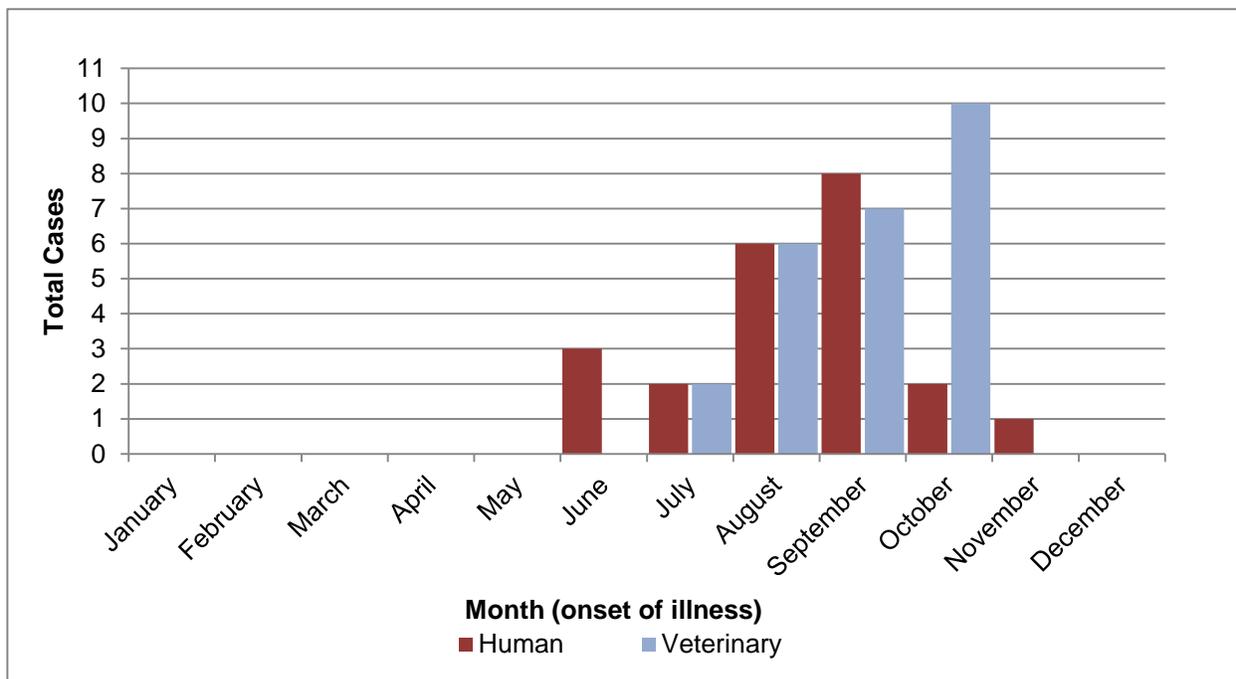
### West Nile Virus Related Pregnancies, or Breast Feeding

There was no indication of females positive for West Nile Virus (WNV) being pregnant or breastfeeding during this timeframe.

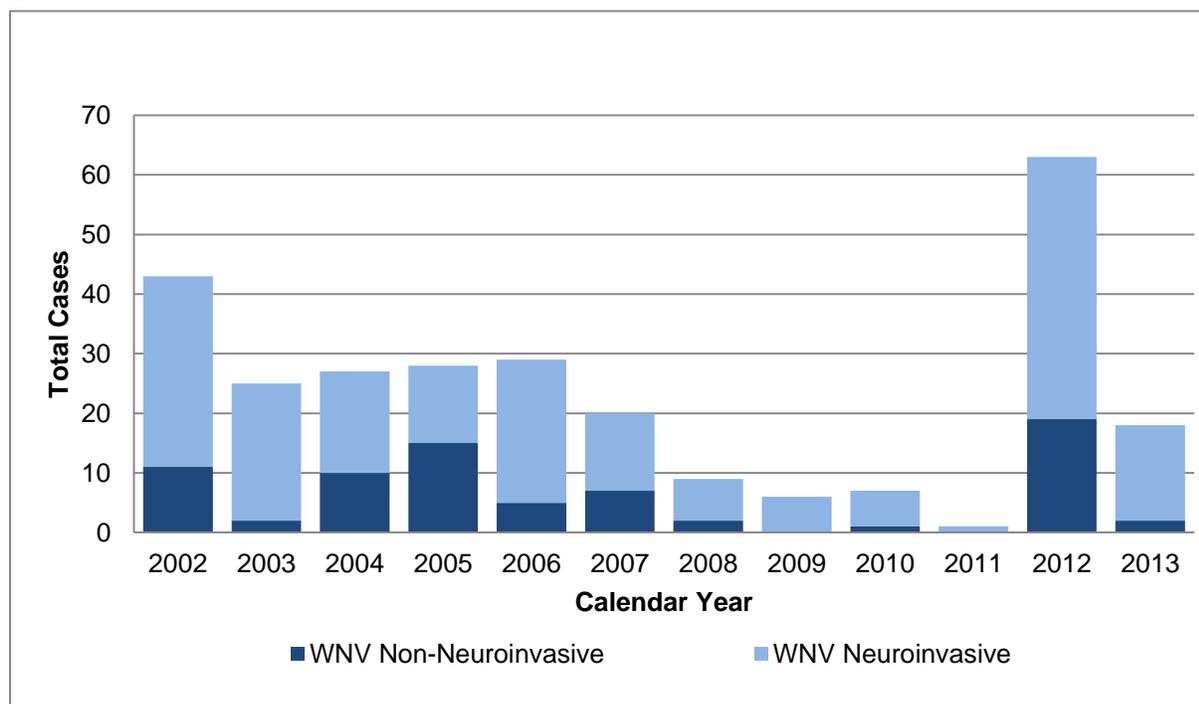
### Comparison to Previous Years

From 2002–2013, an average of 23 cases of human WNV disease (range: 1- 64) was reported through the calendar year, this included an average of 17 neuroinvasive disease cases, six non-neuroinvasive disease cases (Figure 2), and two deaths per year. For reported cases of WNV in 2013, the incidence rate was 0.61 (per 100,000 population, Table 1), with a 66% decrease in reported cases from 2012 (which had the highest case count of any year since WNV has been reported in Arkansas), and 22% decrease from the 12 year median case count.

**Figure 1. WNV and EEE Activity by Month, Arkansas 2013 - Provisional Data**



**Figure 2. Historical Human West Nile Virus in Arkansas 2002-2013 - Provisional Data**



### Eastern Equine Encephalitis Virus Activity in Arkansas

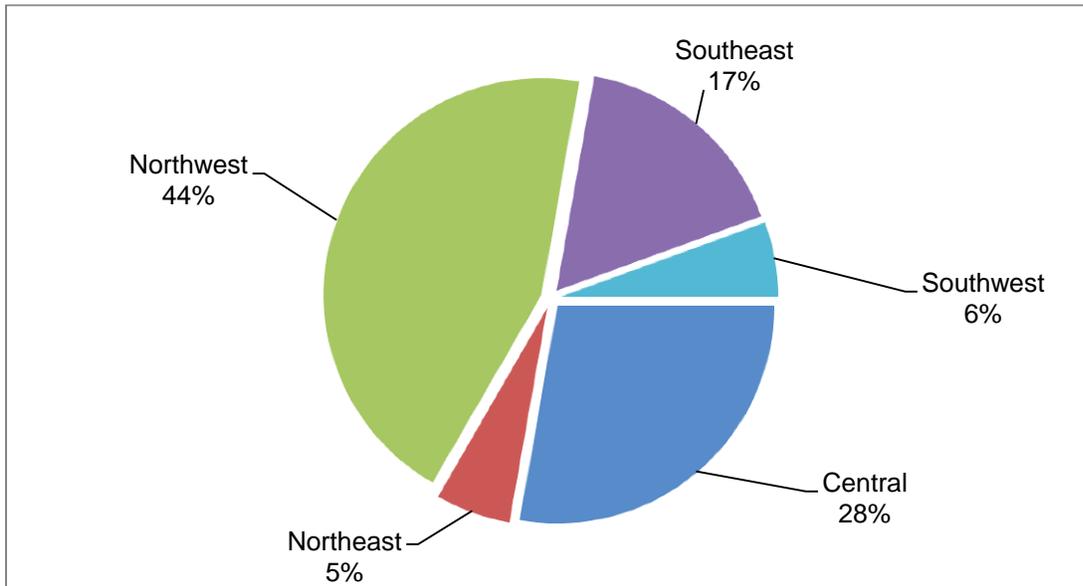
ADH investigated one domestically acquired case of Eastern Equine Encephalitis virus (EEE), which is the first documented human EEE case in Arkansas. EEE is a rare illness in humans, and only a few cases are reported in the United States each year. Most cases occur in the Atlantic and Gulf Coast states. Severe cases of EEE (involving encephalitis) begin with the sudden onset of headache, high fever, chills, and vomiting. The illness may then progress into disorientation, seizures, or coma. EEE is one of the most severe mosquito-transmitted diseases in the United States with approximately 33% mortality and significant brain damage in most survivors. There is no specific treatment for EEE; care is based on symptoms. In 2013 there were six cases nationally (AR-1, FL-2, GA-1, MA-1, NC-1), and three deaths (AR, FL, MA).

There were eight cases of equine EEE reported in 2013. Two horses in Little River County had dual diagnosis of EEE and WNV.

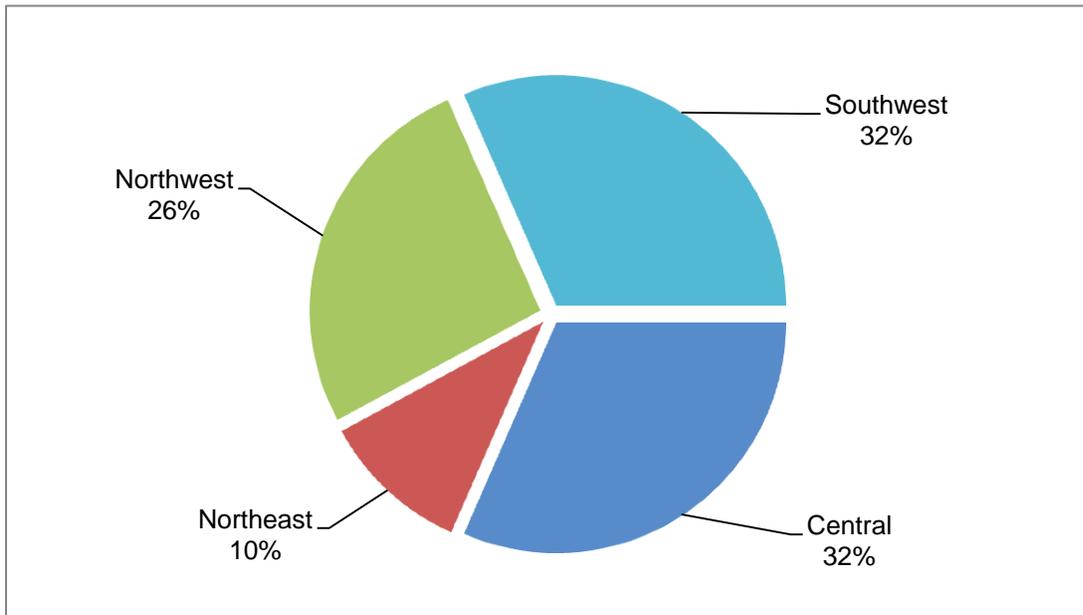
### Arboviral Related Deaths in Arkansas

Two human deaths (WNV-1, EEE-1) resulted from Arboviral disease in Arkansas.

**Figure 3. Human WNV Cases by Public Health Region, Arkansas 2013  
Provisional Data.**



**Figure 4. Veterinary Arboviral Cases by Public Health Region, Arkansas 2013  
Provisional Data.**



**Table 2. Characteristics of Reported West Nile Virus Cases, Arkansas 2013  
Provisional Data.**

Case Status	Frequency	Percent	Incidence (per 100,000 population)
Confirmed	14	78	0.47
Probable	4	22	0.14
<b>Total Cases</b>	<b>18</b>	<b>100</b>	<b>0.61</b>
<b>Neuroinvasive</b>	<b>16</b>	<b>89</b>	<b>0.54</b>
<b>Non-Neuroinvasive</b>	<b>2</b>	<b>11</b>	<b>0.07</b>

Age	Frequency	Percent	Male	Female
1 to 10	0	0	0	0
11 to 20	3	17	2	1
21 to 30	0	0	0	0
31 to 40	1	6	0	1
41 to 50	2	11	1	1
51 to 60	5	28	2	3
61 to 70	1	6	0	1
71 to 80	4	22	3	1
81 to 85	2	11	1	1
<b>Total</b>	<b>18</b>	<b>100</b>	<b>9</b>	<b>9</b>

Gender	Frequency	Percent
Male	9	50
Female	9	50
<b>Total</b>	<b>18</b>	<b>100</b>

Race	Frequency	Percent
Black or African American	4	22
White	14	78
<b>Total</b>	<b>18</b>	<b>100</b>

Ethnicity	Frequency	Percent
Hispanic or Latino	1	6
Not Hispanic or Latino	17	94
<b>Total</b>	<b>18</b>	<b>100</b>

Public Health Region	Frequency	Percent	Deceased	Percent
Central	5	28	1	100
Northeast	1	6	0	0
Northwest	8	44	0	0
Southeast	3	17	0	0
Southwest	1	6	0	0
<b>Total</b>	<b>18</b>	<b>100</b>	<b>1</b>	<b>100</b>

**Table 3. Clinical Criteria as reported to CDC, via ArboNet\*, Arkansas 2013**

Outcome/Clinical Symptoms	Frequency	Incidence
Acute Flaccid Paralysis	0	0
Altered Mental Status	13	72
Arthralgia/Arthritis	7	39
Blood Donor**	1	6
Blood Product Recipient	2	11
Breast Fed	0	0
Diarrhea	2	11
Fatality	1	6
Fever	18	100
Headache	11	61
Hospitalized	17	94
ID by Blood Donation	1	6
Infected in Utero	0	0
Lab Acquired	0	0
Myalgia	6	33
Nausea	7	39
Organ Donor	0	0
Organ Transplant Recipient	1	6
Paresis Paralysis	9	50
Rash	2	11
Seizures	2	11
Stiff Neck	6	33

\*Required reporting, criteria established by CDC.

\*\* Positive presumptive viremic blood does not enter blood supply.

**Additional resources**

CDC’s Division of Vector-Borne Diseases:

<http://www.cdc.gov/ncezid/dvbd/index.html>

National Notifiable Diseases Surveillance System:

[http://www.cdc.gov/osels/ph\\_surveillance/nndss/phs/infdis2011.htm](http://www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis2011.htm)

U.S. Geological Survey (USGS):

<http://diseasemaps.usgs.gov/>

AABB (American Association of Blood Banks):

<http://www.aabb.org/advocacy/regulatorygovernment/donoreligibility/wnv/Pages/default.aspx>