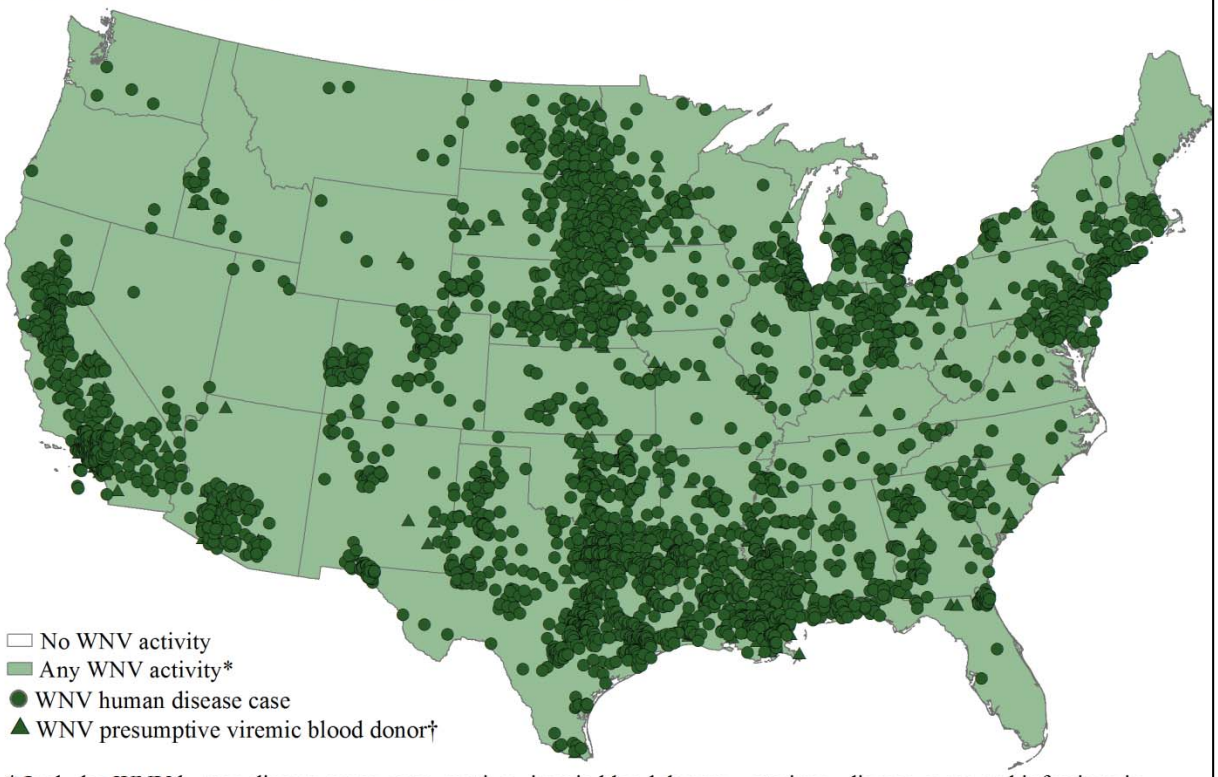
West Nile virus and other arboviral activity -- United States, 2012
Provisional data reported to ArboNET
Tuesday, December 11, 2012

This update includes provisional data reported to ArboNET for **January 1–December 11, 2012** for nationally notifiable arboviral diseases caused by West Nile, Eastern equine encephalitis, La Crosse, Powassan, and St. Louis encephalitis viruses. Dengue cases are reported in a separate update available from the CDC Dengue Branch. For additional information about ArboNET and arboviral disease resources, see page 11.

West Nile virus (WNV) activity in 2012

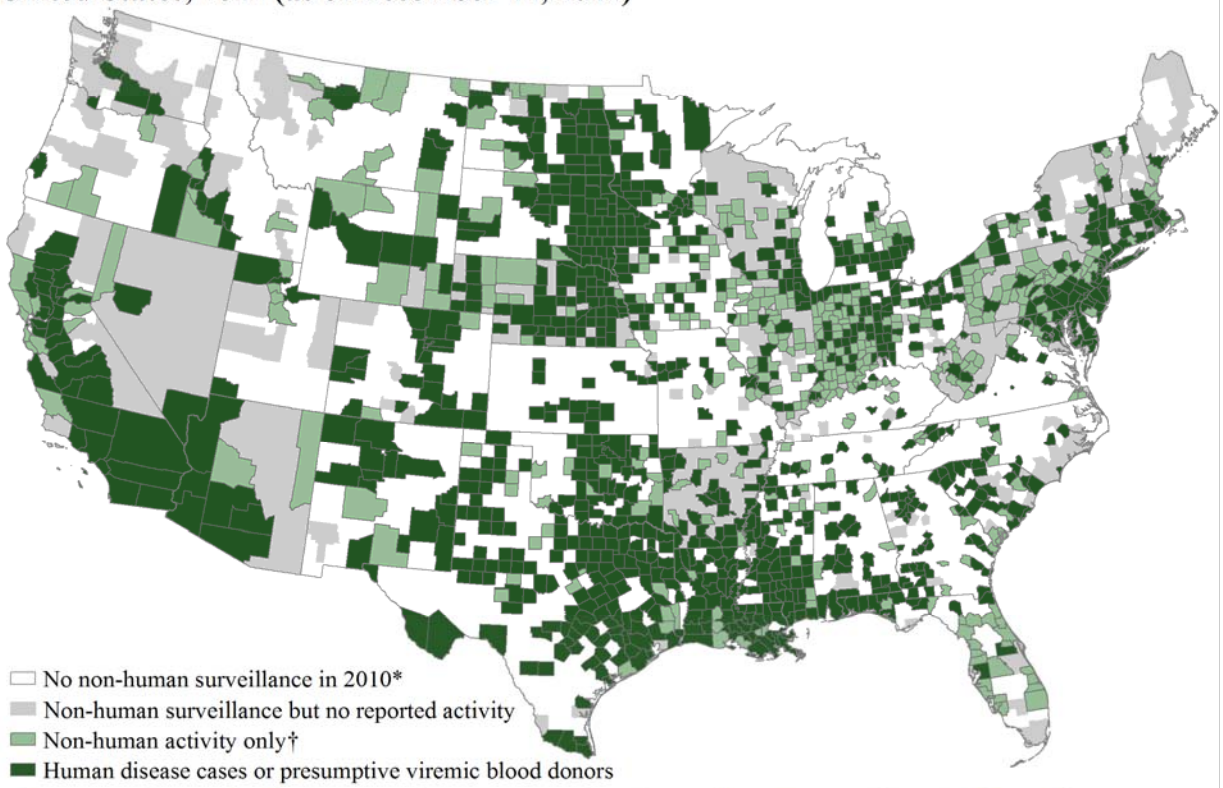
As of December 11th, 1,377 counties from 48 states have reported WNV activity to ArboNET for 2012; these 48 states have reported WNV human infections (i.e., disease cases or presumptive viremic blood donors) **[Figures 1 and 2]**.

Figure 1. West Nile virus (WNV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)



* Includes WNV human disease cases, presumptive viremic blood donors, veterinary disease cases and infections in mosquitoes, birds, and sentinel animals.
† Presumptive viremic blood donors have a positive screening test which has not necessarily been confirmed.

Figure 2. West Nile virus (WNV) activity reported to ArboNET, by county, United States, 2012 (as of December 11, 2012)

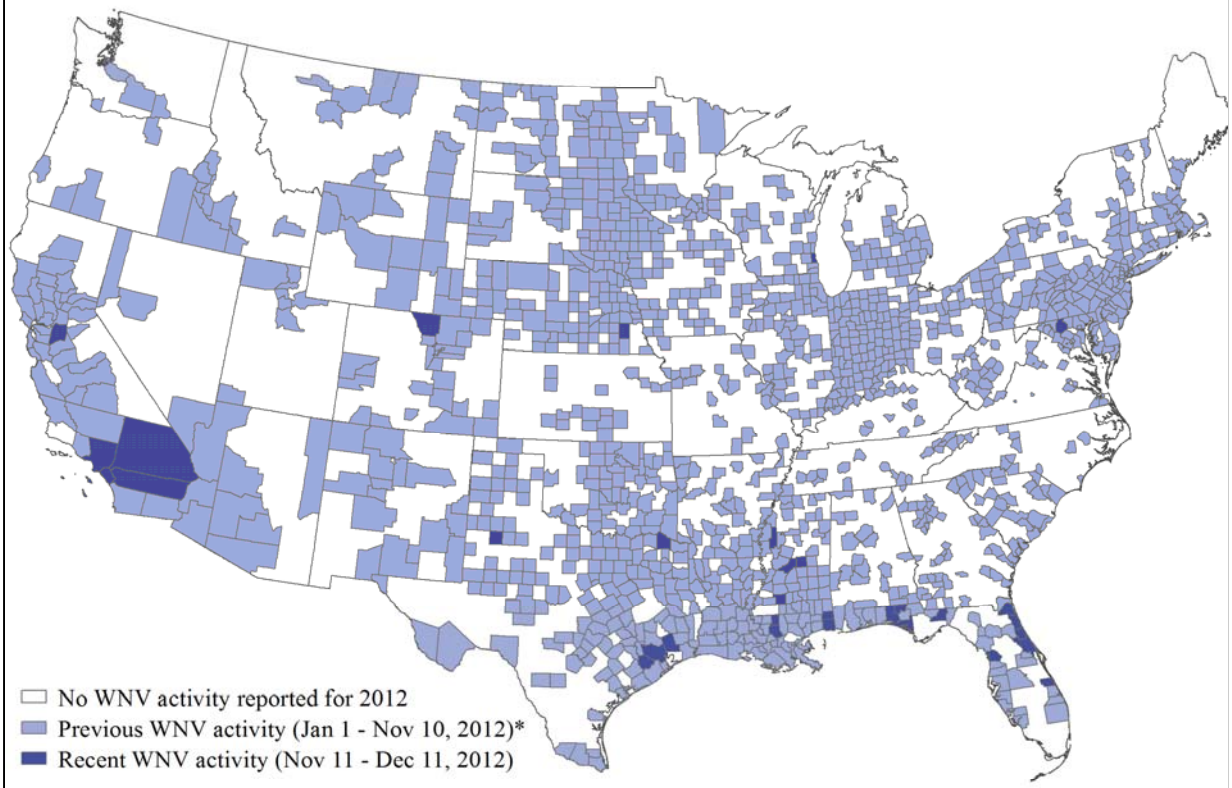


* As reported by state health departments in a survey conducted in October 2010. Surveillance for human disease and presumptive viremic blood donors is performed in all counties.
† Includes WNV veterinary disease cases and WNV infections in mosquitoes, birds, and sentinel animals.

Recent WNV activity in 2012

During the past month (November 11 – December 11), WNV activity has been reported from 32 counties in nine states **[Figure 3]**.

Figure 3. West Nile virus (WNV) activity reported to ArboNET, by time period and county, United States, 2012 (as of December 11, 2012)



* Includes WNV human disease cases, presumptive viremic blood donors, veterinary disease cases, and infections in mosquitoes, birds, and sentinel animals

WNV human infections reported for 2012

Reported WNV disease cases

To date, a total of 5,387 human cases of WNV disease have been reported from 931 counties in 48 states and the District of Columbia (DC) **[Table 1]**. Of all WNV disease cases reported, 2,734 (51%) were classified as neuroinvasive disease (e.g., meningitis, encephalitis, acute flaccid paralysis) and 2,653 (49%) as non-neuroinvasive disease. Dates of illness onset for disease cases ranged from March–November **[Figure 4]**. Additional demographic and clinical characteristics of reported cases are provided on page 10 **[Table 6]**.

Estimated WNV disease cases

Based on previous studies, for every reported case of WNV neuroinvasive disease, there are an estimated 30–70 non-neuroinvasive disease cases. Extrapolating from the 2,734 WNV neuroinvasive disease cases reported, an estimated 82,000–191,300 nonneuroinvasive disease cases might have occurred in 2012. However, only 2,653 were diagnosed and reported; 1%–3% of non-neuroinvasive disease cases estimated to have occurred.

Presumptive viremic blood donors

A total of 597 WNV presumptive viremic blood donors have been reported from 35 states **[Table 1]**. Of these, eight (1%) developed neuroinvasive disease and 86 (14%) developed non-neuroinvasive disease; these are included in **Table 1** as both presumptive viremic blood donors and human disease cases and in **Figure 1** as human disease cases.

Comparison to last 10 years (as of the second week in December)

From 2002–2011, an average of 2,845 cases of human WNV disease (Range: 663-8,621 cases) was reported through the second week in December. This included an average of 1,165 neuroinvasive disease cases and 1,680 non-neuroinvasive disease cases. From 2004-2011, when data are available, an average of 221 presumptive viremic blood donors (Range 109-395 donors) was reported. The 5,387 human disease cases reported thus far in 2012 is the highest number of cases reported through the second week of December since 2003.

Figure 4. West Nile virus (WNV) human disease cases reported to ArboNET by week of onset, United States, 2012 (as of 12/11/2012)

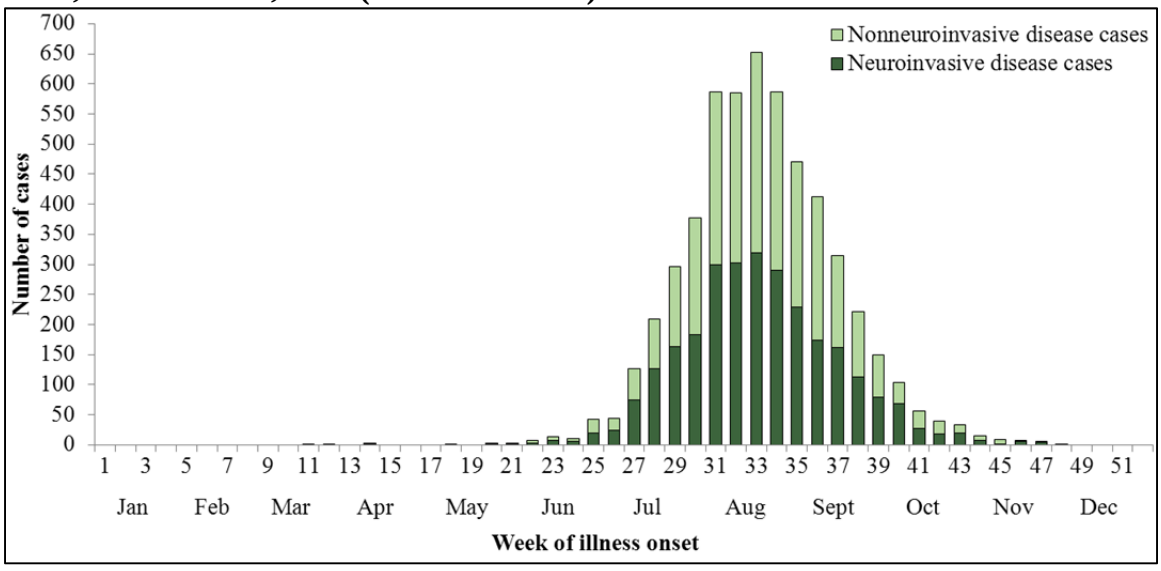


Table 1. Human West Nile virus (WNV) infections reported to ArboNET, 2012 (as of 12/11/2012)

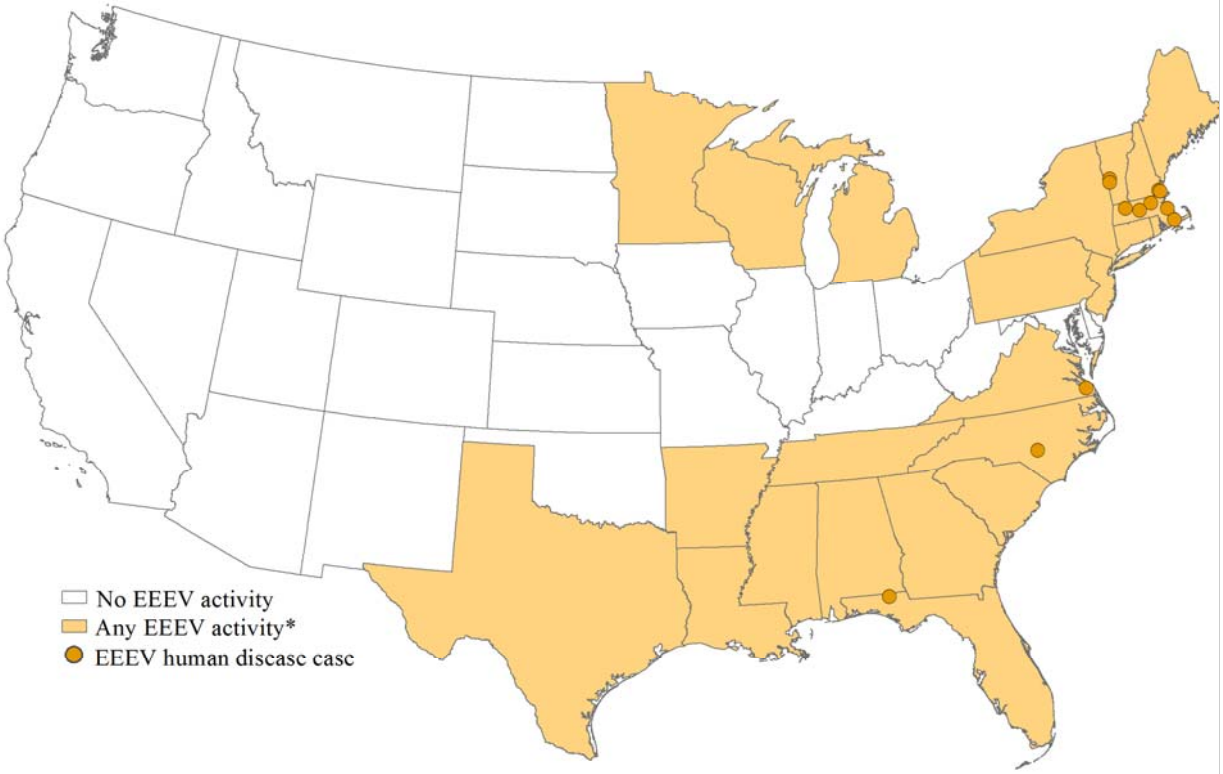
State	Reported human disease cases				Presumptive viremic blood donors†
	Neuroinvasive disease cases	Non-neuroinvasive disease cases	Total cases*	Deaths	
Alabama	33	18	51	2	--¶
Arizona	82	43	125	4	28
Arkansas	44	19	63	7	4
California	278	173	451	16	61
Colorado	62	69	131	4	--
Connecticut	12	9	21	--	1
Delaware	2	7	9	1	--
District of Columbia	6	2	8	1	--
Florida	46	19	65	3	6
Georgia	42	36	78	6	17
Idaho	5	12	17	--	3
Illinois	184	98	282	10	29
Indiana	45	30	75	7	17
Iowa	11	20	31	--	6
Kansas	19	26	45	3	--
Kentucky	4	2	6	--	3
Louisiana	155	180	335	16	34
Maine	1	--	1	--	--
Maryland	24	22	46	4	13
Massachusetts	23	7	30	1	2
Michigan	138	64	202	14	38
Minnesota	34	36	70	1	35
Mississippi	103	146	249	5	21
Missouri	16	4	20	3	8
Montana	1	5	6	1	--
Nebraska	40	146	186	4	36
Nevada	5	3	8	1	1
New Hampshire	1	--	1	--	--
New Jersey	22	24	46	5	4
New Mexico	24	22	46	1	6
New York	60	47	107	7	15
North Carolina	6	--	6	2	2
North Dakota	39	50	89	--	17
Ohio	76	45	121	7	18
Oklahoma	101	86	187	12	38
Oregon	--	3	3	--	--
Pennsylvania	28	22	50	4	4
Rhode Island	2	2	4	--	--
South Carolina	20	9	29	3	12
South Dakota	62	141	203	3	42
Tennessee	18	14	32	1	1
Texas	785	954	1739	76	58
Utah	3	2	5	1	--
Vermont	1	2	3	--	--
Virginia	20	9	29	3	3
Washington	4	--	4	--	--
West Virginia	5	4	9	--	--
Wisconsin	39	17	56	4	13
Wyoming	3	4	7	--	1
Totals	**2,734**	**2,653**	**5,387**	**243**	**597**

*Includes confirmed and probable cases; †Of the 597 presumptive viremic blood donors, 94 (16%) developed clinical illness and are also included as "Reported human disease cases"; ¶None reported.

Eastern equine encephalitis virus (EEEV) activity in 2012

As of December 11th, 161 counties in 23 states have reported EEEV activity to ArboNET for 2012, including five states with human cases of EEEV disease and 18 additional states with EEEV activity in non-human species only **[Figure 5 and Table 2]**. Demographic and clinical characteristics of reported cases are described on page 10 **[Table 6].** During the past month (November 11 – December 11), EEEV activity has been reported in two states (Florida and Mississippi).

Figure 5. Eastern equine encephalitis virus (EEEV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)



* Includes EEEV human disease cases, veterinary disease cases, and infections in mosquitoes, birds, and sentinel animals.

Table 2. Eastern equine encephalitis virus (EEEV) human disease cases reported to ArboNET, United States, 2012

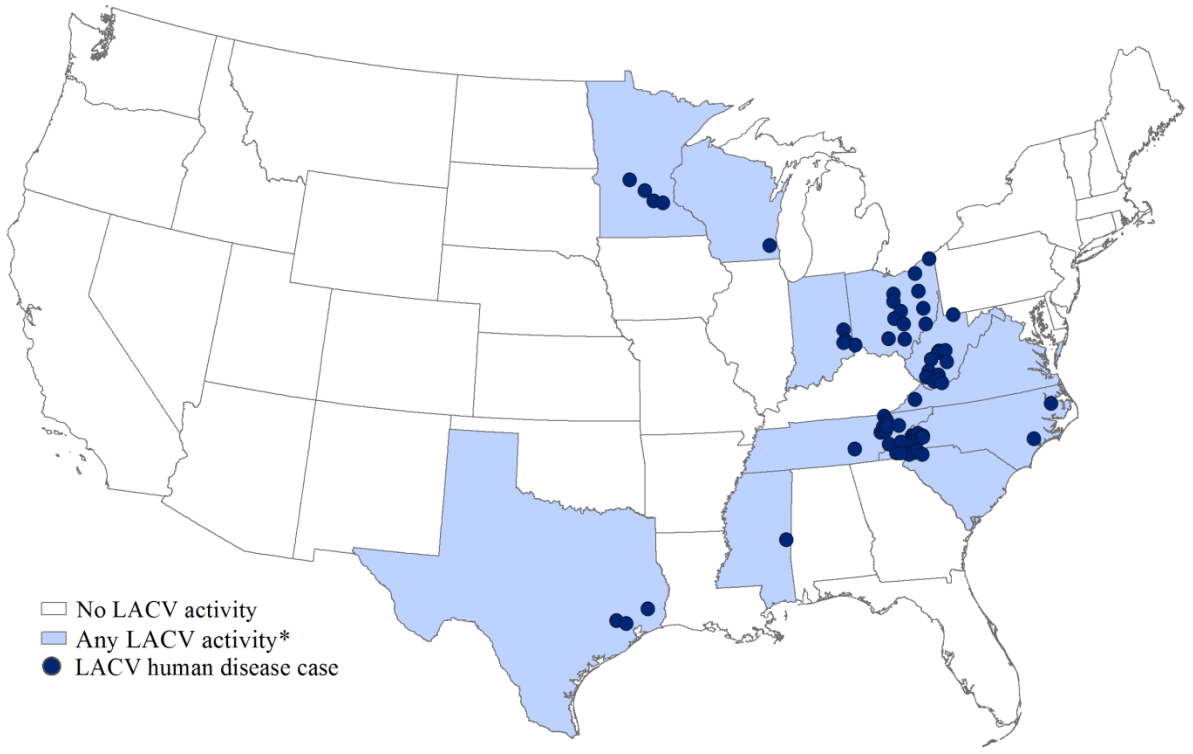
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Florida	1	--¶	1	--
Massachusetts	7	--	7	3
North Carolina	1	--	1	--
Vermont	2	--	2	2
Virginia	1	--	1	--
Totals	**12**	**--**	**12**	**5**

*Includes confirmed and probable cases.
¶None reported.

La Crosse virus (LACV) activity in 2012

As of December 11th, 47 counties in 11 states have reported LACV activity to ArboNET for 2012; these 11 states have reported human cases of LACV disease **[Figure 6 and Table 3]**. Demographic and clinical characteristics of reported cases are described on page 10 **[Table 6].** During the past month (November 11 – December 11), LACV activity has not been reported.

Figure 6. La Crosse virus (LACV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)



* Includes LACV human disease cases, veterinary disease cases, and infections in mosquitoes, birds, and sentinel animals

Table 3. La Crosse virus (LACV) human disease cases reported to ArboNET, United States, 2012

	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Indiana	2	1	3	--¶
Minnesota	4	--	4	--
Mississippi	1	--	1	--
North Carolina	22	--	22	--
Ohio	12	1	13	--
South Carolina	1	--	1	--
Tennessee	9	--	9	1
Texas	3	--	3	--
Virginia	2	--	2	--
West Virginia	9	4	13	--
Wisconsin	1	--	1	--
Totals	**66**	**6**	**72**	**1**

*Includes confirmed and probable cases.
¶None reported.

Powassan virus (POWV) activity in 2012

As of December 11th, six counties in three states reported human cases of POWV disease in 2012 **[Figure 7 and Table 4]**. Demographic and clinical characteristics of reported cases are described on page 10 **[Table 6].** During the past month (November 11 – December 11), POWV activity has not been reported.

Figure 7. Powassan virus (POWV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)

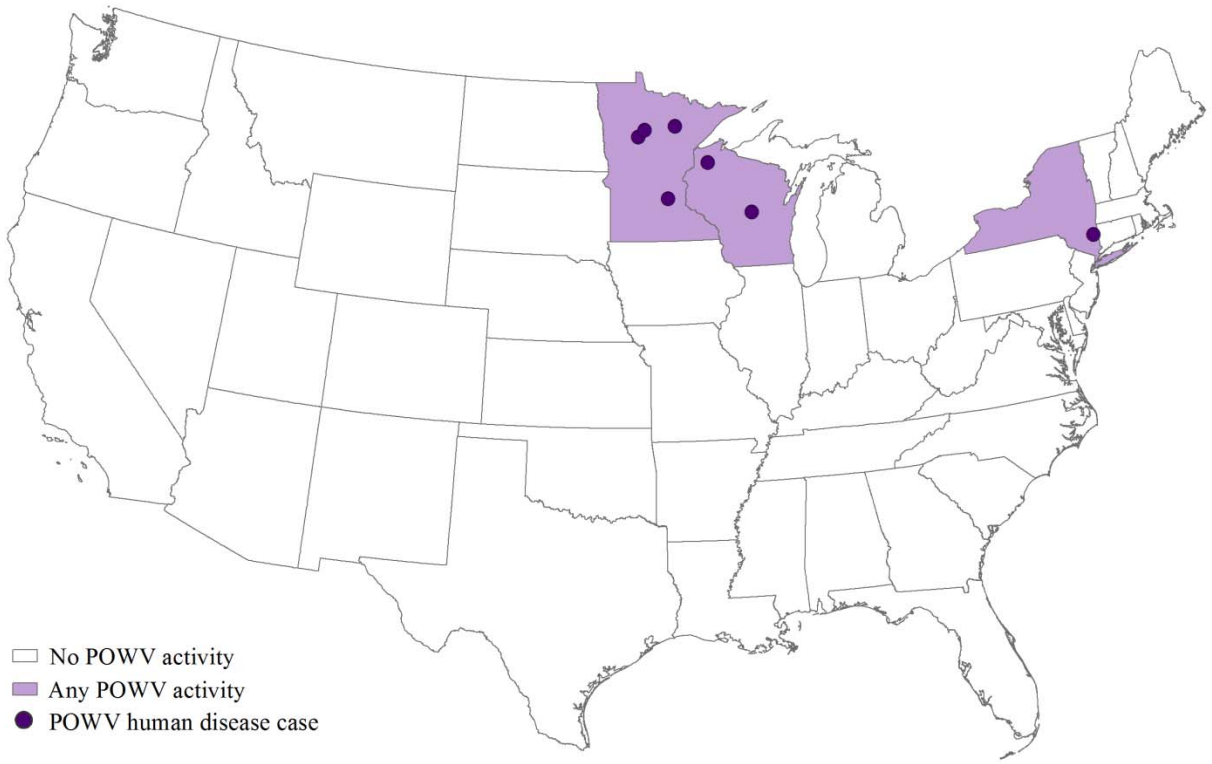


Table 4. Powassan virus (POWV) human disease cases reported to ArboNET, United States, 2012

	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Minnesota	4	--¶	4	--
New York	1	--	1	--
Wisconsin	2	--	2	--
Totals	**7**	--	**7**	--

*Includes confirmed and probable cases.
¶None reported.

St. Louis encephalitis virus (SLEV) activity in 2012

As of December 11th, 15 counties in two states have reported SLEV activity to ArboNET for 2012, including one state with human cases of SLEV disease and one additional state with SLEV activity in non-human species only **[Figure 8 and Table 5]**. During the past month (November 11 – December 11), SLEV activity has been reported in Florida.

Figure 8. St. Louis encephalitis virus (SLEV) activity reported to ArboNET, by state, United States, 2012 (as of December 11, 2012)

* Includes SLEV human disease cases, veterinary disease cases, and infections in mosquitoes, birds, and sentinel animals.

Table 5. St. Louis encephalitis virus (SLEV) human disease cases reported to ArboNET, United States, 2012

	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Oklahoma†	1	1	2	--¶
Totals	**1**	**1**	**2**	**--**

*Includes confirmed and probable cases.
† Jurisdiction reporting their first SLEV human disease cases for 2012; onset of illness in July.
¶None reported.

Table 6. Characteristics of reported cases of arboviral disease, United States, 2012 (as of 12/11/2012)

	WNV N=5,387		LACV N=72		EEEV N=12		POWV N=7	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Age group								
<20 years	255	(5)	62	(86)	4	(34)	0	(0)
20-39 years	889	(17)	4	(6)	1	(8)	2	(29)
40-49 years	875	(16)	2	(3)	1	(8)	1	(14)
50-59 years	1,152	(21)	3	(4)	0	(0)	1	(14)
≥60 years	2,216	(41)	1	(1)	6	(50)	3	(43)
Male sex	3,016	(56)	40	(56)	10	(83)	4	(57)
Onset of illness								
January	0	(0)	0	(0)	0	(0)	0	(0)
February	0	(0)	0	(0)	0	(0)	0	(0)
March	2	(<1)	0	(0)	0	(0)	0	(0)
April	2	(<1)	0	(0)	0	(0)	0	(0)
May	11	(<1)	2	(3)	0	(0)	3	(43)
June	112	(2)	11	(15)	1	(8)	4	(57)
July	1,240	(23)	25	(35)	2	(17)	0	(0)
August	2,558	(48)	18	(25)	5	(42)	0	(0)
September	1,201	(22)	13	(18)	4	(33)	0	(0)
October	230	(4)	3	(4)	0	(0)	0	(0)
November	31	(<1)	0	(0)	0	(0)	0	(0)
Clinical syndrome								
Nonneuroinvasive	2,653	(49)	6	(8)	0	(0)	0	(0)
Neuroinvasive								
Encephalitis	1,514	(28)	51	(71)	10	(83)	4	(57)
Meningitis	1,007	(19)	14	(19)	2	(17)	3	(43)
Acute flaccid paralysis†	213	(4)	1	(1)	0	(0)	0	(0)
Outcome								
Hospitalization	3,303	(61)	71	(99)	11	(92)	6	(86)
Death	243	(5)	1	(1)	5	(42)	0	(0)

WNV=West Nile virus; LACV=La Crosse virus; EEEV=Eastern Equine virus; POWV=Powassan virus

†One hundred and seventy six WNV disease cases classified as acute flaccid paralysis also had encephalitis or meningitis. The LACV disease case with acute flaccid paralysis also had encephalitis.

About 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 (PVDs), veterinary disease cases, mosquitoes, dead birds, and sentinel animals. As with other national surveillance data, ArboNET data has several limitations that should be considered in analysis, interpretation, and reporting **[Box]**.

Box: Limitations of ArboNET data

The following should be considered in the analysis, interpretation, and reporting of ArboNET data:

1. ArboNET is a passive surveillance system. It is dependent on clinicians considering the diagnosis of an arboviral disease and obtaining the appropriate diagnostic test, and reporting of laboratory-confirmed cases to public health authorities. Diagnosis and reporting are incomplete, and the incidence of arboviral diseases is underestimated.
2. 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 nonneuroinvasive 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 nonneuroinvasive disease should be interpreted with caution and generally should not be used to make comparisons between geographic areas or over time.
3. Provisional ArboNET data are provided to help track recent arboviral disease activity. However, these data may change substantially before they are finalized. Provisional data from the current year should not be combined with or compared to final data from previous years.

Additional resources

For additional arboviral disease information and data, please visit the following websites:

- 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
- U.S. Geological Survey (USGS):
  http://diseasemaps.usgs.gov/
- AABB (American Association of Blood Banks):
  www.aabb.org/programs/biovigilance/Pages/wnv.aspx