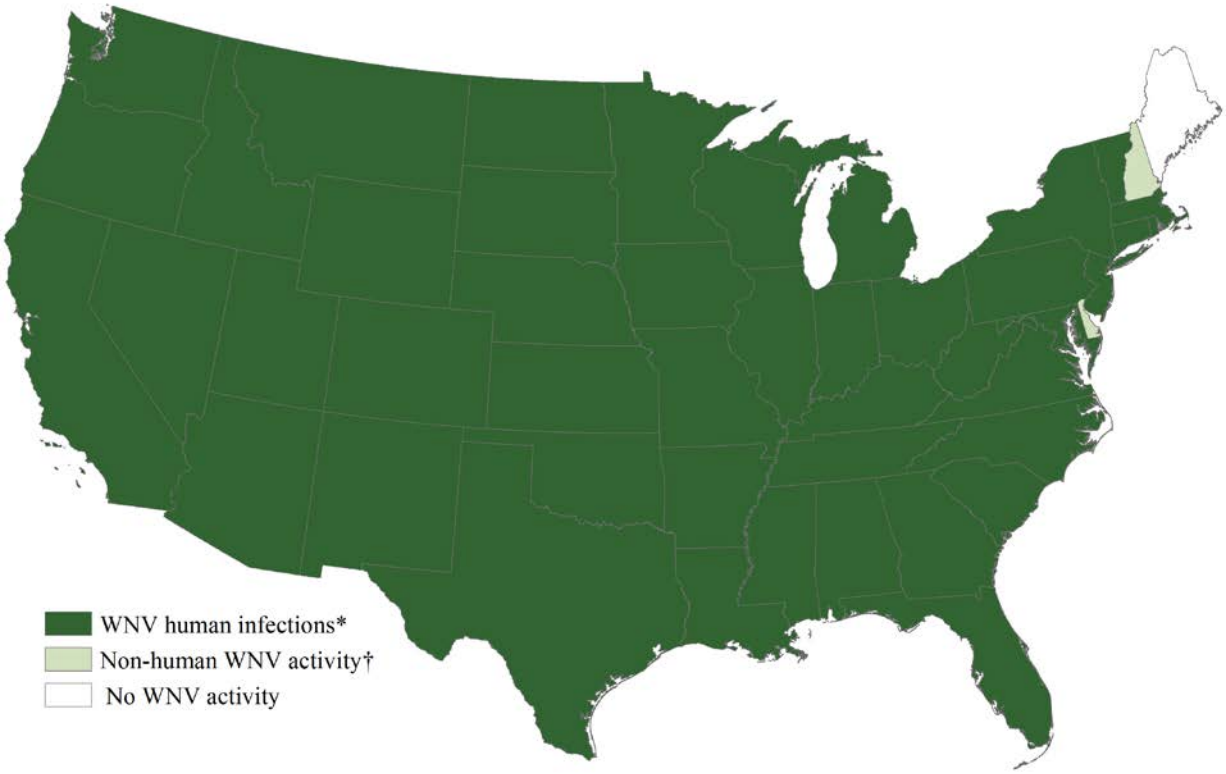
West Nile virus and other arboviral activity -- United States, 2016
Provisional data reported to ArboNET
Tuesday, November 22, 2016

This update from the CDC Arboviral Disease Branch includes provisional data reported to ArboNET for **January 1 – November 22, 2016** for nationally notifiable arboviruses other than dengue and chikungunya viruses. Additional resources for ArboNET and arboviral diseases are provided on page 10.

West Nile virus (WNV) activity in 2016

As of November 22nd, 990 counties from 47 states and the District of Columbia have reported WNV activity to ArboNET for 2016, including 45 states and the District of Columbia 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) **[Figure 1]**.

Figure 1. West Nile virus (WNV) activity reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)



*WNV human disease cases or presumptive viremic blood donors. Presumptive viremic blood donors have a positive screening test which has not necessarily been confirmed.

†WNV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

Reported WNV disease cases

To date, 1,617 human WNV disease cases have been reported from 525 counties in 45 states and the District of Columbia **[Table 1]**. Dates of illness onset for cases ranged from January–November **[Figure 2]**.

Of these, 855 (53%) were classified as neuroinvasive disease (such as meningitis or encephalitis) and 762 (47%) were classified as non-neuroinvasive disease **[Figure 3]**. Additional demographic and clinical characteristics of reported cases are provided [**Table 7]**.

Presumptive viremic donors (PVDs)

Overall, 233 WNV PVDs have been reported from 30 states **[Table 1]**. Of these, 27 (12%) developed clinical illness.

Figure 2. WNV disease cases reported to ArboNET, by week of onset — United States, 2016

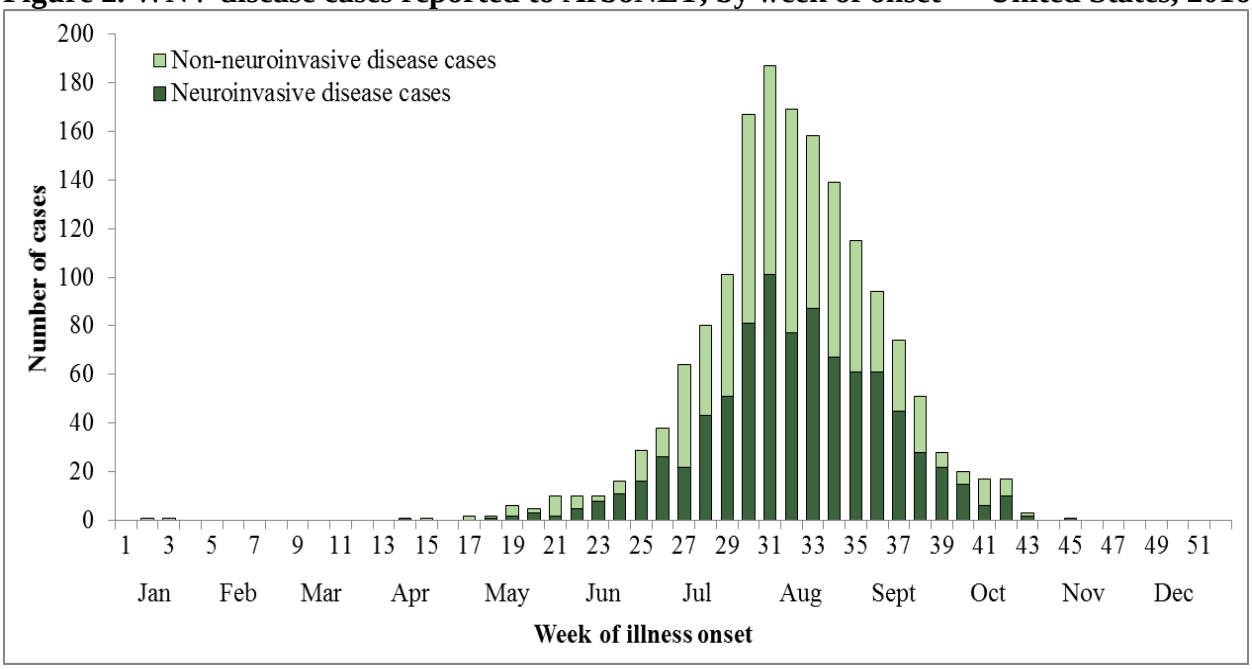
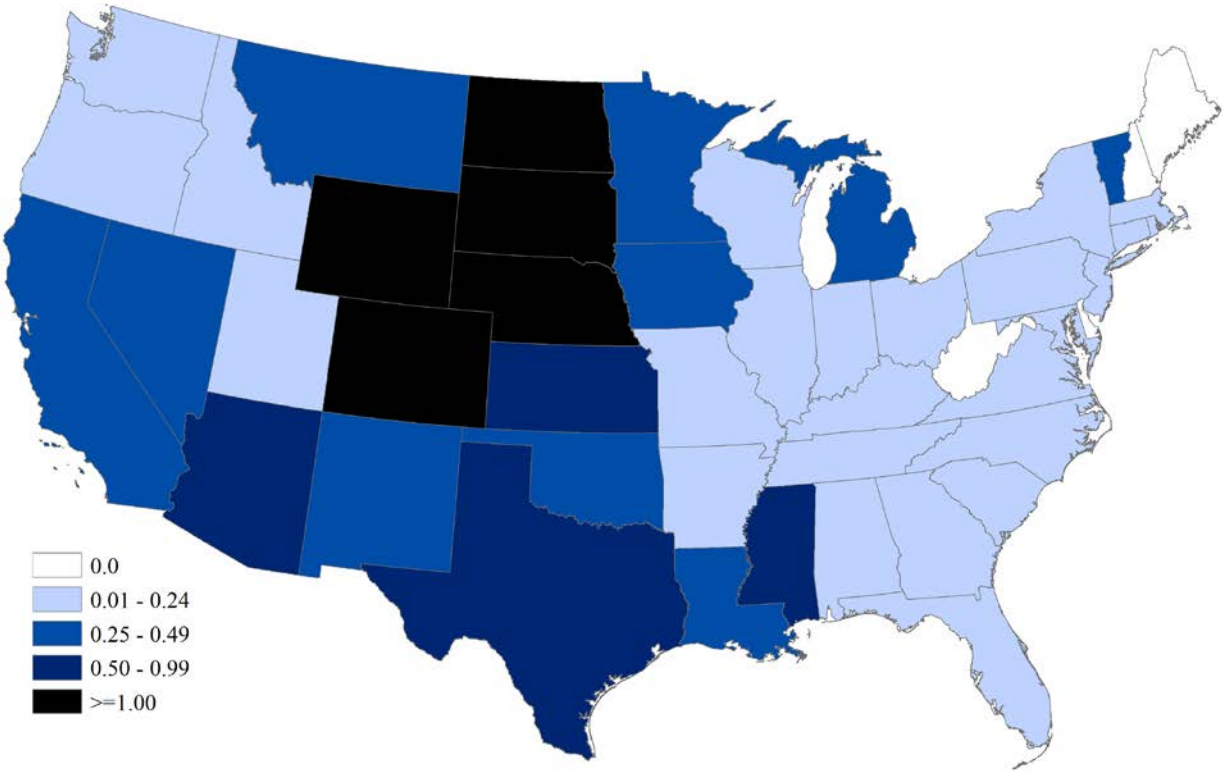


Table 1. West Nile virus infections in humans reported to ArboNET, 2016

State	Human disease cases reported to CDC*				Presumptive viremic blood donors
	Neuroinvasive	Non-neuroinvasive	Total	Deaths	
Alabama	6	4	10	0	1
Arizona	54	19	73	4	11
Arkansas	5	1	6	1	0
California	124	44	168	18	27
Colorado	56	85	141	7	9
Connecticut	1	0	1	0	0
District of Columbia	1	0	1	0	0
Florida	5	1	6	0	2
Georgia	2	0	2	0	3
Idaho	2	4	6	0	1
Illinois	26	120	146	5	9
Indiana	13	3	16	2	4
Iowa	14	23	37	1	5
Kansas	15	14	29	4	6
Kentucky	5	0	5	1	1
Louisiana	18	13	31	1	6
Massachusetts	9	5	14	0	0
Maryland	6	0	6	0	0
Michigan	40	1	41	2	5
Minnesota	21	26	47	1	15
Mississippi	25	14	39	1	12
Missouri	8	1	9	0	0
Montana	3	3	6	1	2
Nebraska	34	59	93	0	30
Nevada	13	3	16	0	1
New Jersey	10	0	10	1	2
New Mexico	6	0	6	1	0
New York	6	14	20	1	0
North Carolina	2	0	2	0	0
North Dakota	14	54	68	2	0
Ohio	10	5	15	4	5
Oklahoma	14	11	25	0	7
Oregon	2	1	3	0	1
Pennsylvania	11	5	16	2	2
Rhode Island	2	0	2	0	0
South Carolina	3	2	5	0	3
South Dakota	35	113	148	5	16
Tennessee	3	3	6	1	0
Texas	196	95	291	13	42
Utah	7	6	13	1	0
Vermont	2	1	3	0	0
Virginia	5	2	7	0	2
Washington	8	1	9	1	2
West Virginia	0	1	1	0	0
Wisconsin	6	3	9	0	1
Wyoming	7	2	9	0	0
Totals	**855**	**762**	**1,617**	**81**	**233**

*Includes confirmed and probable cases

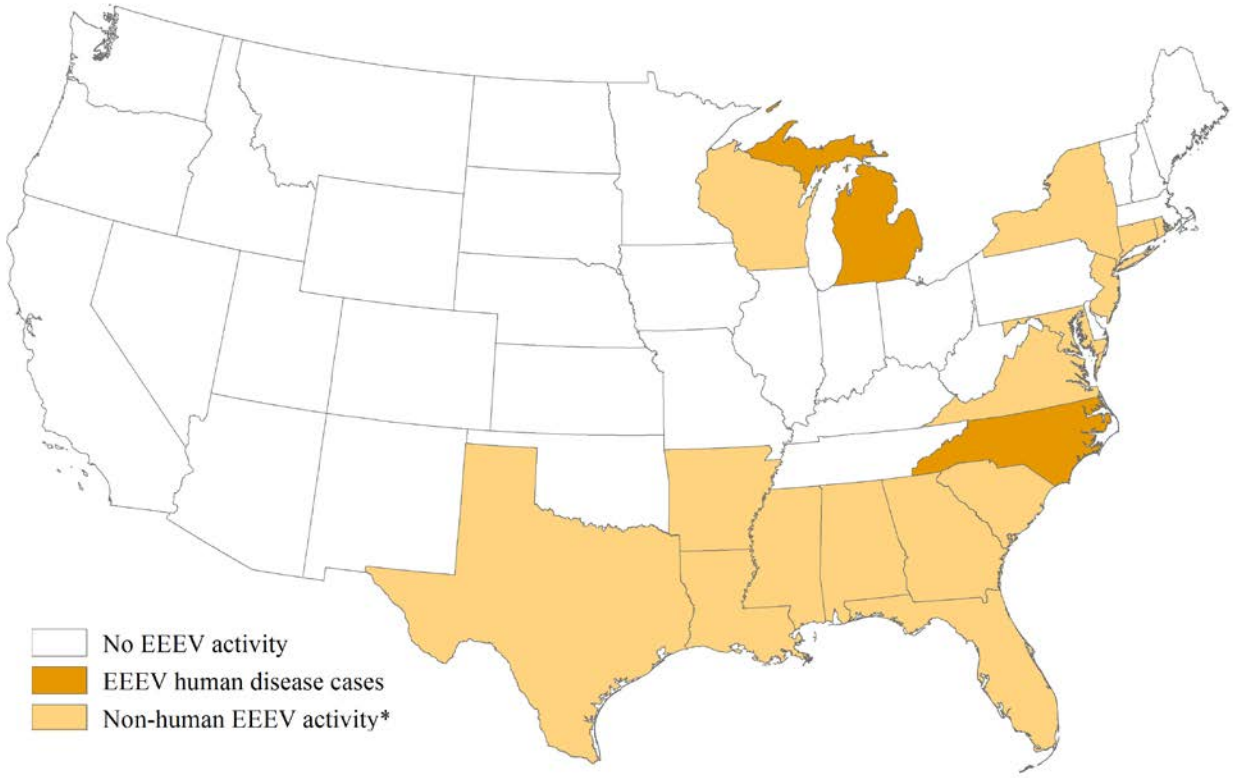
Figure 3. West Nile virus (WNV) neuroinvasive disease incidence reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)



Eastern equine encephalitis virus (EEEV) activity in 2016

As of November 22nd, three counties in two states (Michigan and North Carolina) reported human cases of EEEV disease to ArboNET for 2016 **[Figure 4 and Table 2]**. Ninety seven additional counties in 17 states have reported EEEV activity in non-human species only.

Figure 4. Eastern equine encephalitis virus (EEEV) activity reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)



*EEEV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

Table 2. Eastern equine encephalitis virus human disease cases reported to ArboNET, United States, 2016

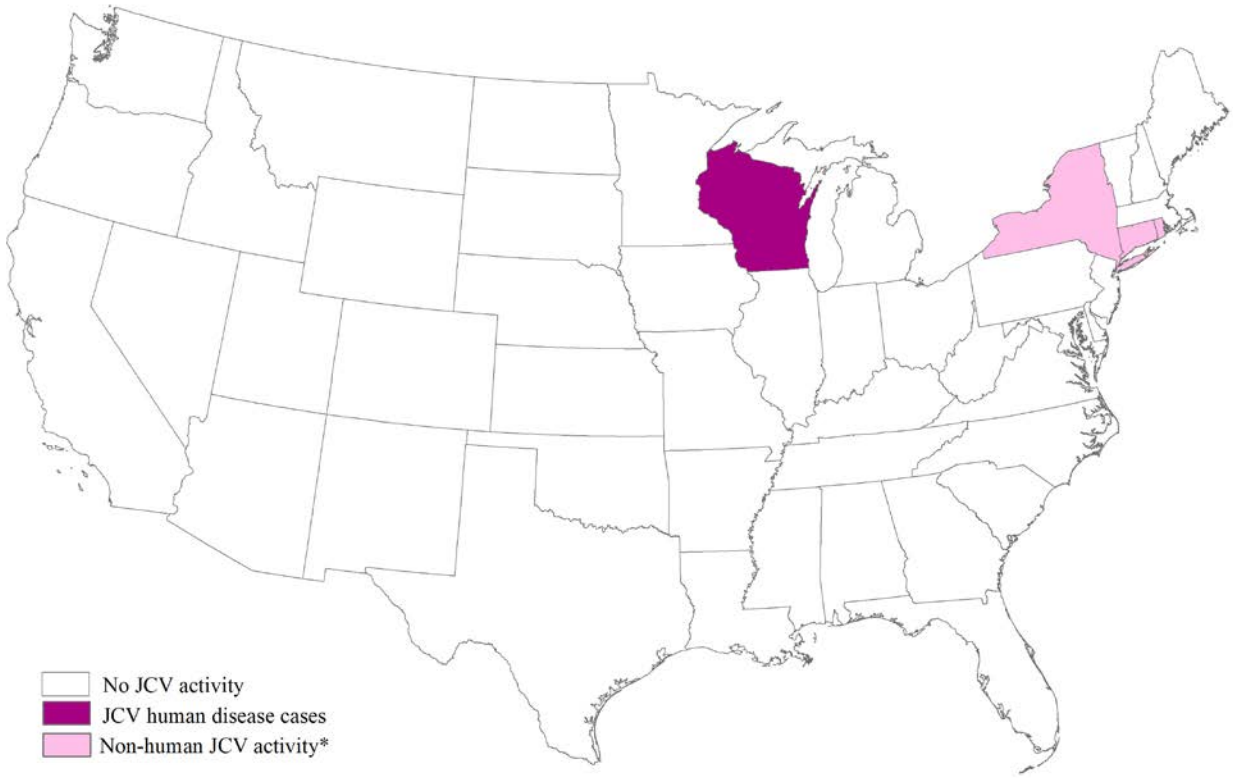
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Michigan	2	0	2	0
North Carolina	1	0	1	0
Totals	**3**	**0**	**3**	**0**

*Includes confirmed and probable cases.

Jamestown Canyon virus (JCV) activity in 2016

As of November 22nd, two counties in Wisconsin reported human cases of JCV disease to ArboNET for 2016 **[Figure 5 and Table 3]**. Eight additional counties in three states have reported JCV activity in non-human species only.

Figure 5. Jamestown Canyon virus (JCV) activity reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)



*JCV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

Table 3. Jamestown Canyon virus human disease cases reported to ArboNET, United States, 2016

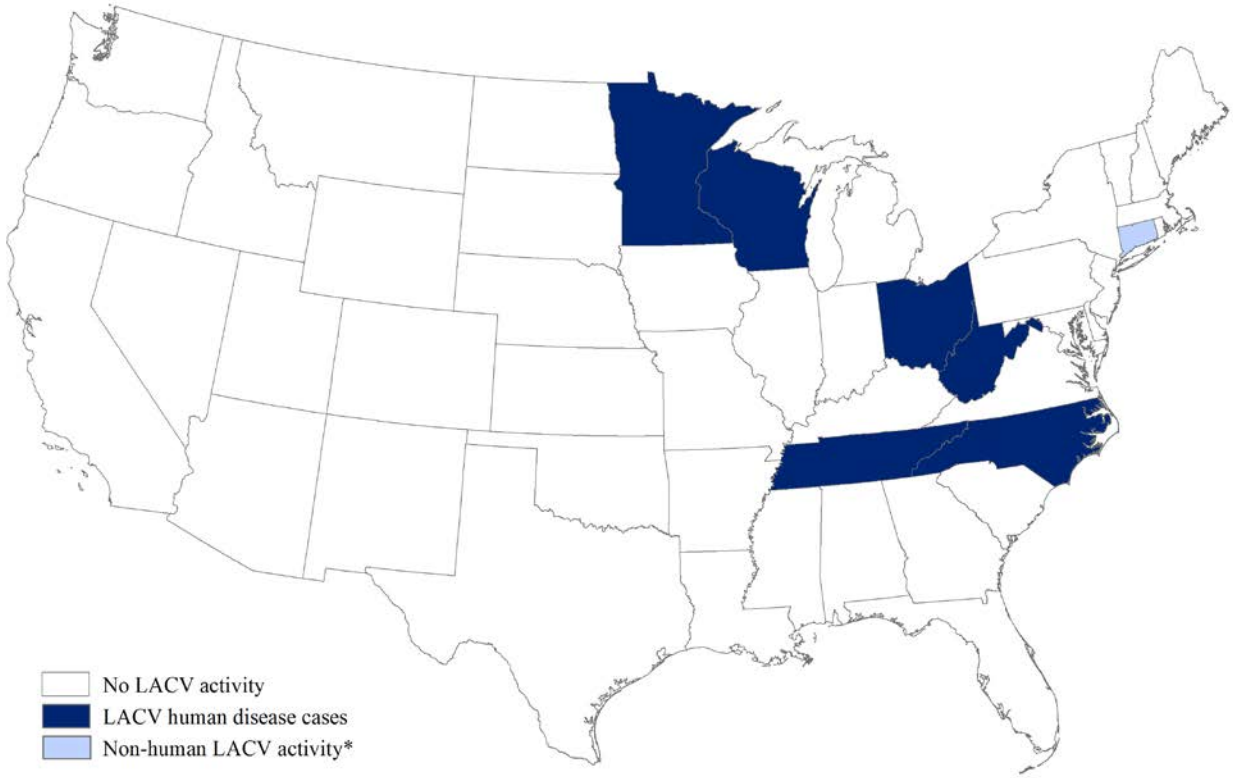
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Wisconsin	1	1	2	0
Totals	**1**	**1**	**2**	**0**

*Includes confirmed and probable cases.

La Crosse encephalitis virus (LACV) activity in 2016

As of November 22nd, 25 counties in six states have reported human cases of LACV disease to ArboNET for 2016 **[Figure 6 and Table 4]**. One additional county in Connecticut has reported LACV activity in non-human species only. Additional demographic and clinical characteristics of reported cases are provided [**Table 7]**.

Figure 6. La Crosse encephalitis virus (LACV) activity reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)



*LACV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

Table 4. La Crosse encephalitis virus human disease cases reported to ArboNET, United States, 2016

	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Minnesota	2	0	2	0
North Carolina	8	0	8	0
Ohio	7	0	7	0
Tennessee	3	0	3	0
West Virginia	5	3	8	0
Wisconsin	0	2	2	1
Totals	**25**	**5**	**30**	**1**

*Includes confirmed and probable cases.

Powassan virus (POWV) activity in 2016

As of November 22nd, seven counties in four states have reported human cases of POWV disease to ArboNET for 2016 **[Figure 7 and Table 5].** Additional demographic and clinical characteristics of reported cases are provided [**Table 7]**.

Figure 7. Powassan virus (POWV) activity reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)

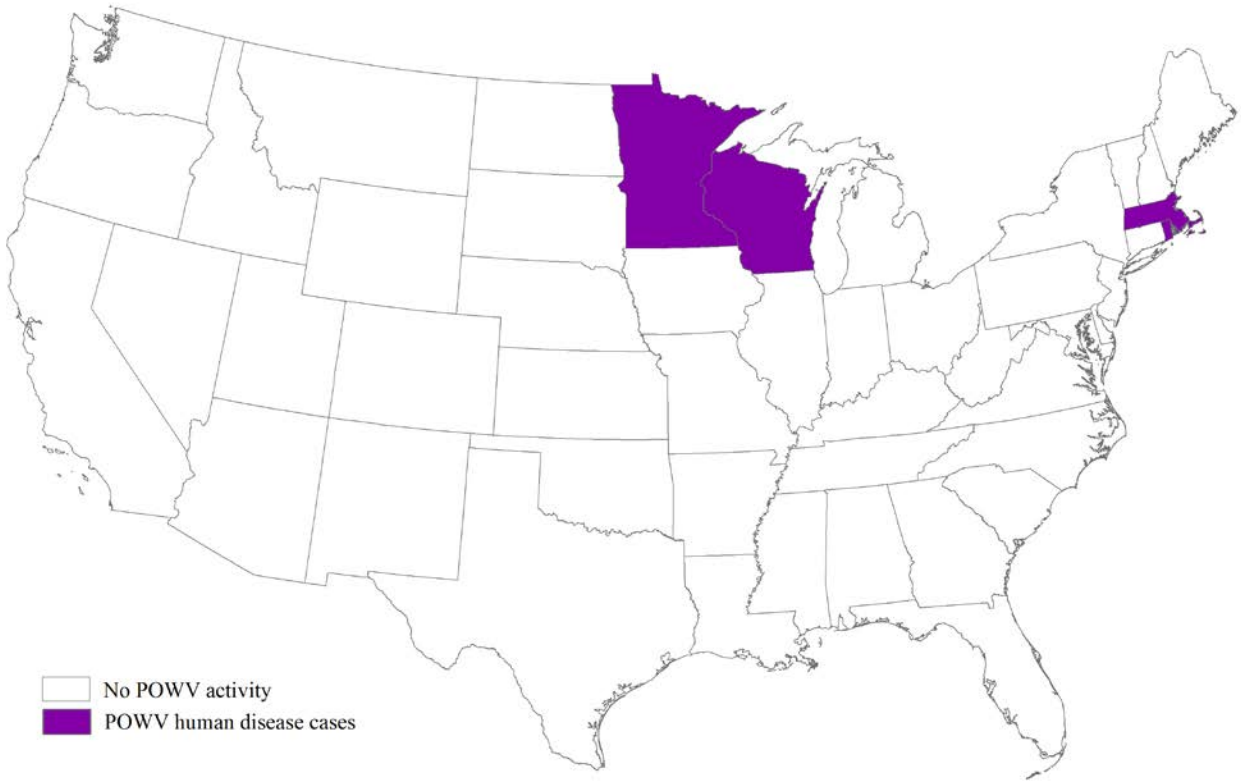


Table 5. Powassan virus human disease cases reported to ArboNET, United States, 2016

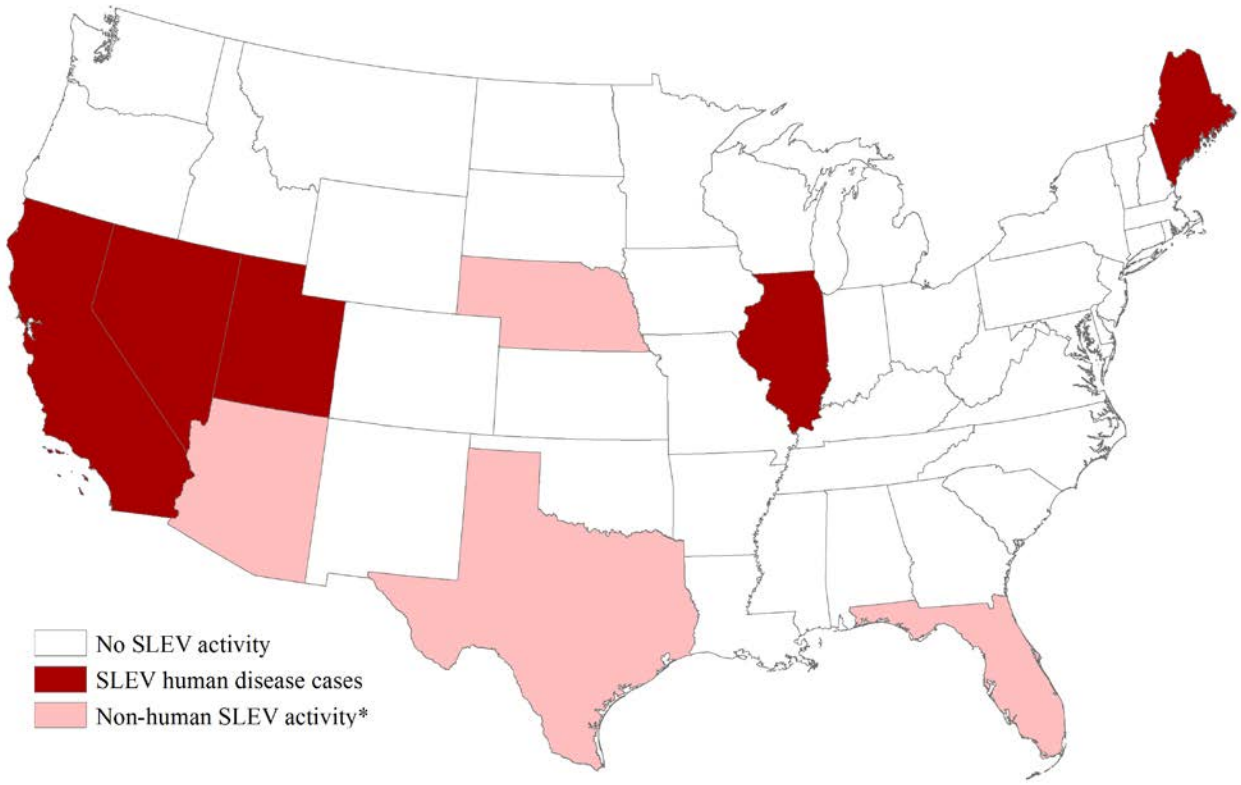
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Massachusetts	2	0	2	1
Minnesota	1	1	2	0
Rhode Island	1	0	1	0
Wisconsin	2	0	2	0
Totals	**6**	**1**	**7**	**1**

*Includes confirmed and probable cases.

St. Louis encephalitis virus (SLEV) activity in 2016

As of November 22nd, seven counties in five states have reported human cases of SLEV disease to ArboNET for 2016 **[Figure 8 and Table 6]**. Nineteen additional counties in six states have reported SLEV activity in non-human species only. Additional demographic and clinical characteristics of reported cases are provided [**Table 7]**.

Figure 8. St. Louis encephalitis virus (SLEV) activity reported to ArboNET, by state — United States, 2016 (as of November 22, 2016)



*SLEV veterinary disease cases, or infections in mosquitoes, birds, or sentinel animals

Table 6. St. Louis encephalitis virus human disease cases reported to ArboNET, United States, 2016

	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
California	3	0	3	1
Illinois	1	0	1	0
Maine	1	0	1	0
Nevada	2	1	3	0
Utah	1	0	1	1
Totals	**8**	**1**	**9**	**2**

*Includes confirmed and probable cases.

Table 7. Characteristics of reported cases of arboviral disease, United States, 2016

	LAC (N=30)		POW (N=7)		SLE (N=9)		WNV (N=1,617)	
	No.	**(%)**	**No.**	**(%)**	**No.**	**(%)**	**No.**	**(%)**
Age group								
<20 years	22	(73)	0	(0)	0	(0)	64	(4)
20-39 years	4	(13)	0	(0)	1	(11)	274	(17)
40-49 years	0	(0)	0	(0)	0	(0)	235	(15)
50-59 years	2	(7)	0	(0)	4	(44)	350	(22)
≥60 years	2	(7)	7	(100)	4	(44)	694	(43)
Male sex	22	(73)	6	(86)	5	(56)	983	(61)
Onset of illness								
January	0	(0)	0	(0)	0	(0)	2	(<1)
February	0	(0)	0	(0)	0	(0)	0	(0)
March	0	(0)	0	(0)	0	(0)	0	(0)
April	0	(0)	2	(29)	0	(0)	2	(<1)
May	1	(3)	2	(29)	0	(0)	17	(1)
June	3	(10)	1	(14)	1	(11)	62	(4)
July	5	(17)	1	(14)	5	(56)	307	(19)
August	11	(37)	0	(0)	1	(11)	747	(46)
September	7	(23)	1	(14)	2	(22)	385	(24)
October	3	(10)	0	(0)	0	(0)	92	(6)
November	0	(0)	0	(0)	0	(0)	3	(<1)
Clinical syndrome*								
Nonneuroinvasive	5	(17)	1	(14)	1	(11)	762	(47)
Neuroinvasive								
Encephalitis	20	(67)	5	(71)	6	(67)	448	(28)
Meningitis	5	(17)	1	(14)	0	(0)	334	(21)
Acute flaccid paralysis	0	(0)	0	(0)	1	(11)	66	(4)
Guillain-Barre	0	(0)	0	(0)	0	(0)	3	(<1)
Other neuroinvasive	0	(0)	0	(0)	1	(11)	39	(2)
Outcome								
Hospitalization	28	(93)	7	(100)	9	(100)	1,058	(65)
Death	1	(3)	1	(14)	2	(22)	81	(5)

* 35 cases have reported multiple clinical syndromes

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.

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/
- National Notifiable Diseases Surveillance System:
  http://wwwn.cdc.gov/nndss/conditions/arboviral-diseases-neuroinvasive-and-non-neuroinvasive/case-definition/2015/
- U.S. Geological Survey (USGS):
  http://diseasemaps.usgs.gov/mapviewer/
- AABB (American Association of Blood Banks):
  www.aabb.org/programs/biovigilance/Pages/wnv.aspx