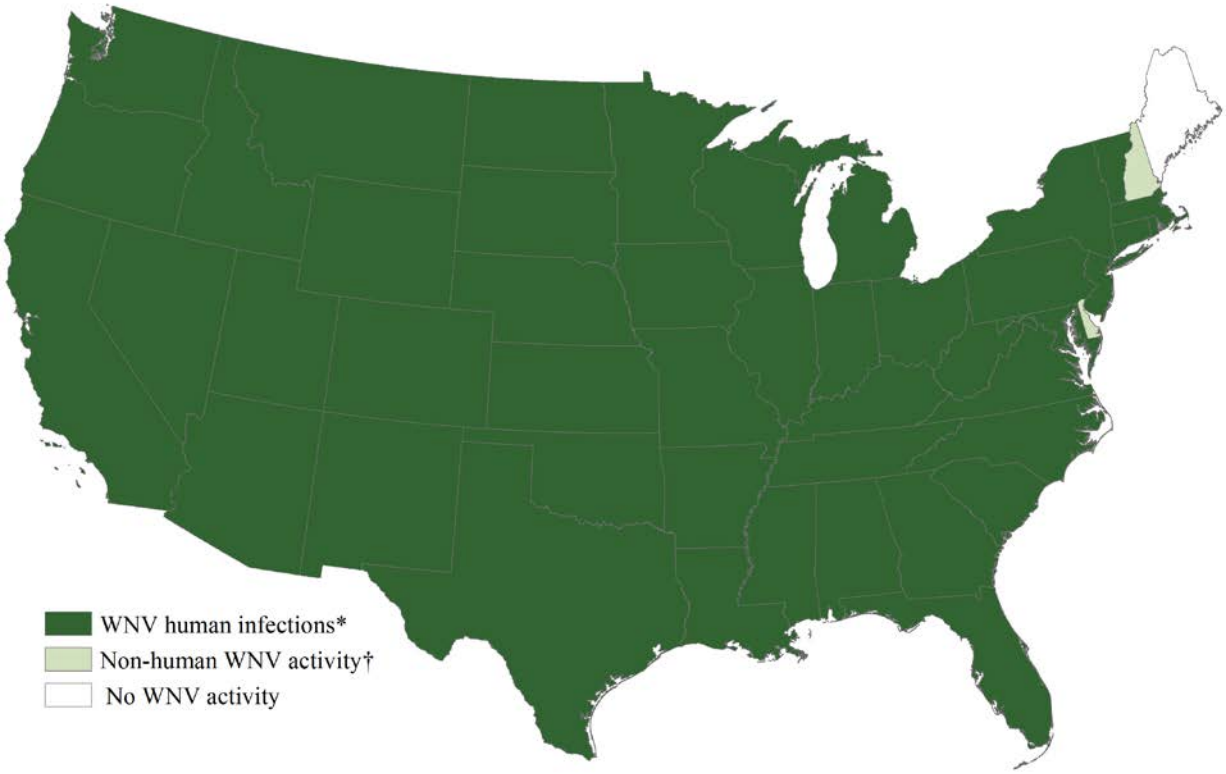
West Nile virus and other arboviral activity -- United States, 2016
Provisional data reported to ArboNET
Tuesday, January 17, 2017

This update from the CDC Arboviral Disease Branch includes provisional data reported to ArboNET for **January 1 – December 31, 2016** for nationally notifiable arboviruses other than dengue and chikungunya viruses. Additional resources for ArboNET and arboviral diseases are provided on page 11.

West Nile virus (WNV) activity in 2016

As of January 17th, 1,056 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 January 17, 2017)



*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, 2,038 human WNV disease cases have been reported from 579 counties in 45 states and the District of Columbia **[Table 1]**. Dates of illness onset for cases ranged from January–December **[Figure 2]**.

Of these, 1,140 (56%) were classified as neuroinvasive disease (such as meningitis or encephalitis) and 898 (44%) 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, 275 WNV PVDs have been reported from 31 states **[Table 1]**. Of these, 36 (13%) developed clinical illness.

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

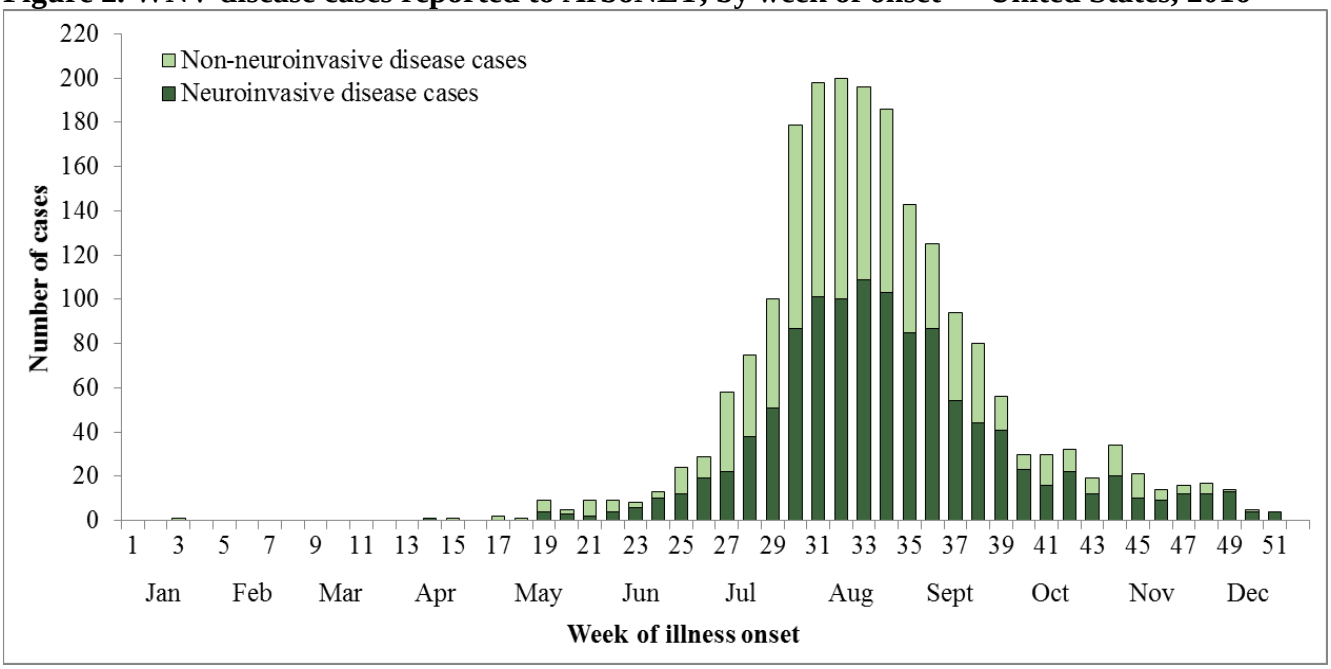
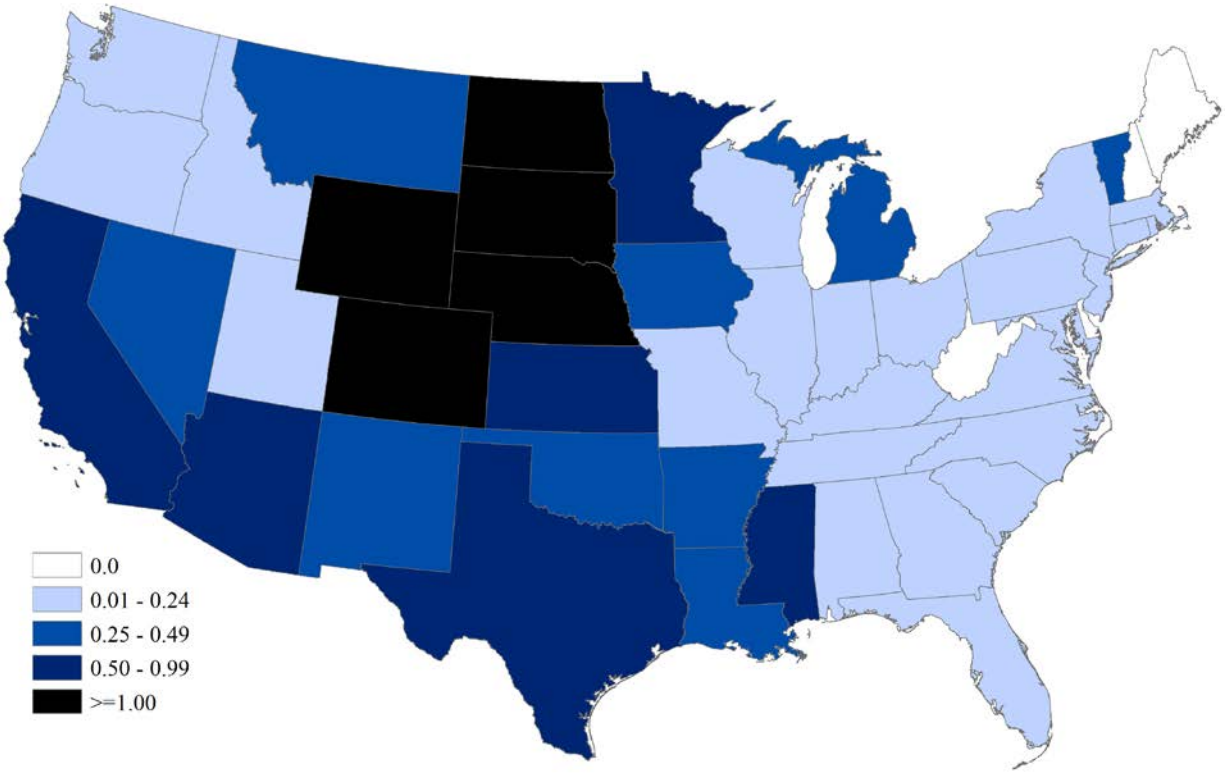


Table 1. West Nile virus infections in humans reported to ArboNET, 2016

State	Human disease cases reported to CDC*				Presumptive viremic blood donors
	Neuroinvasive	Non-neuroinvasive	Total	Deaths	
Alabama	8	7	15	0	3
Arizona	57	21	78	5	11
Arkansas	8	1	9	1	1
California	315	109	424	19	47
Colorado	59	90	149	8	9
Connecticut	1	0	1	0	0
District of Columbia	1	0	1	0	0
Florida	5	1	6	0	2
Georgia	5	1	6	0	6
Idaho	3	6	9	0	1
Illinois	28	125	153	5	9
Indiana	15	3	18	2	5
Iowa	14	23	37	1	5
Kansas	17	19	36	4	7
Kentucky	5	3	8	1	1
Louisiana	20	20	40	1	6
Massachusetts	10	6	16	0	0
Maryland	6	0	6	0	0
Michigan	41	1	42	3	5
Minnesota	31	35	66	5	16
Mississippi	27	16	43	1	13
Missouri	8	2	10	0	0
Montana	3	3	6	1	2
Nebraska	34	60	94	0	30
Nevada	13	3	16	0	1
New Jersey	11	0	11	1	2
New Mexico	6	0	6	1	0
New York	6	13	19	1	0
North Carolina	2	0	2	0	0
North Dakota	14	54	68	2	0
Ohio	13	5	18	4	5
Oklahoma	17	12	29	0	7
Oregon	2	1	3	0	1
Pennsylvania	11	5	16	2	3
Rhode Island	2	0	2	0	0
South Carolina	6	3	9	0	4
South Dakota	35	116	151	6	16
Tennessee	3	3	6	1	1
Texas	240	113	353	16	44
Utah	7	6	13	1	0
Vermont	2	1	3	0	0
Virginia	6	2	8	0	2
Washington	8	1	9	1	2
West Virginia	0	1	1	0	0
Wisconsin	8	4	12	1	7
Wyoming	7	3	10	0	1
Totals	**1,140**	**898**	**2,038**	**94**	**275**

*Includes confirmed and probable cases

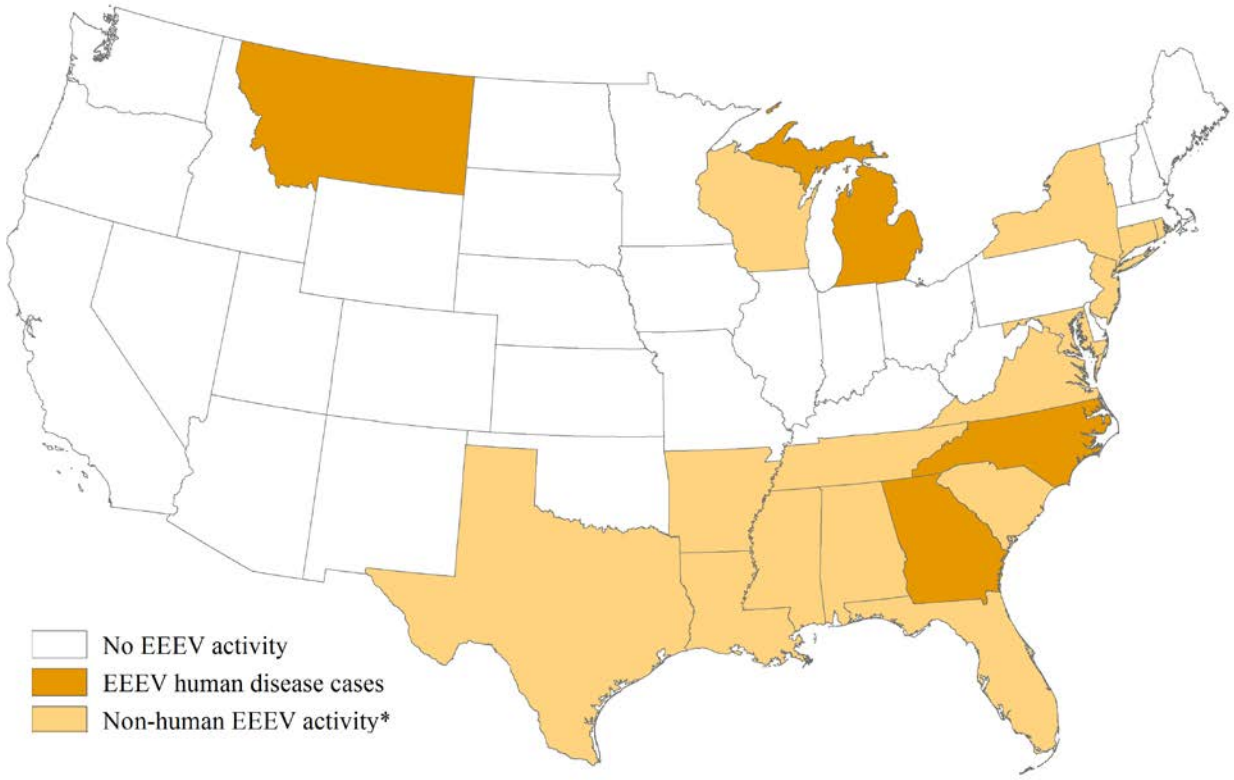
Figure 3. West Nile virus (WNV) neuroinvasive disease incidence reported to ArboNET, by state — United States, 2016 (as of January 17, 2017)



Eastern equine encephalitis virus (EEEV) activity in 2016

As of January 17th, six counties in four states reported human cases of EEEV disease to ArboNET for 2016 **[Figure 4 and Table 2]**. One hundred additional counties in 18 states have reported EEEV activity in non-human species only. Additional demographic and clinical characteristics of reported cases are provided [**Table 7]**.

Figure 4. Eastern equine encephalitis virus (EEEV) activity reported to ArboNET, by state — United States, 2016 (as of January 17, 2017)



*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

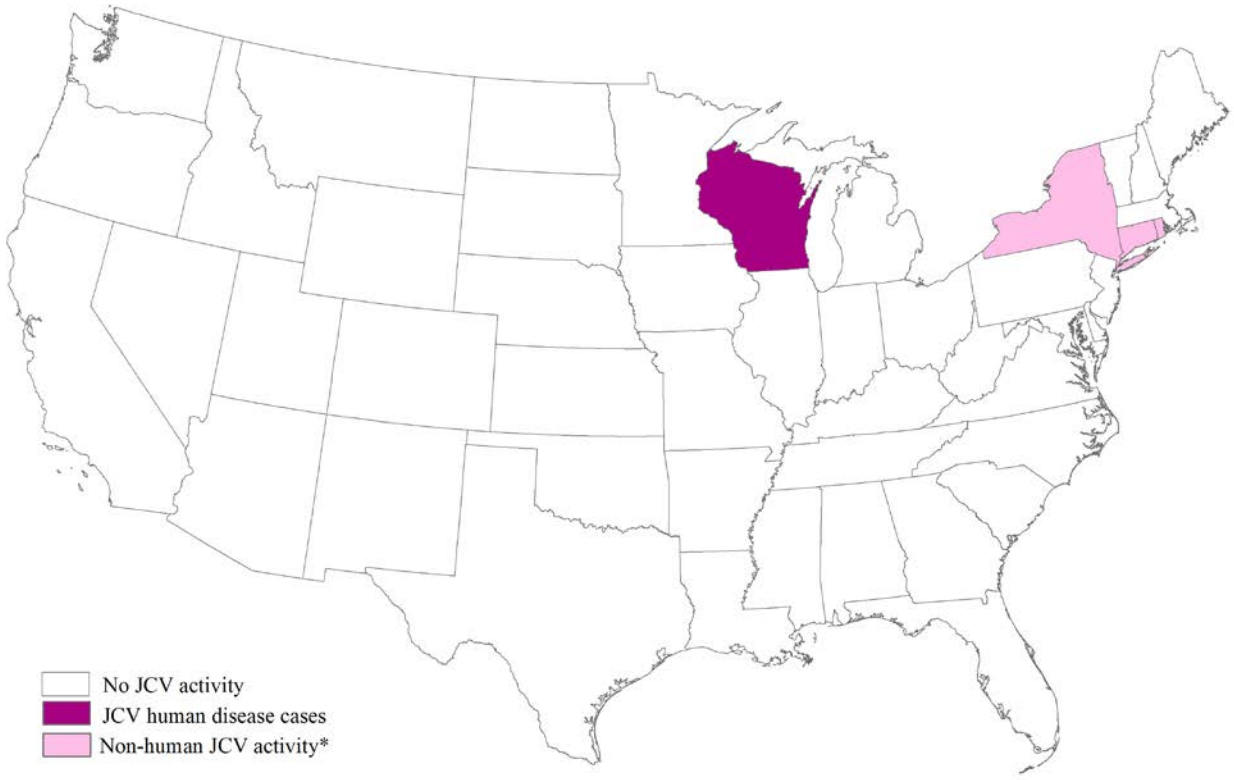
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Georgia	1	0	1	0
Michigan	2	0	2	0
Montana	1	0	1	1
North Carolina	2	0	2	1
Totals	**6**	**0**	**6**	**2**

*Includes confirmed and probable cases.

Jamestown Canyon virus (JCV) activity in 2016

As of January 17th, four 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 January 17, 2017)



*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

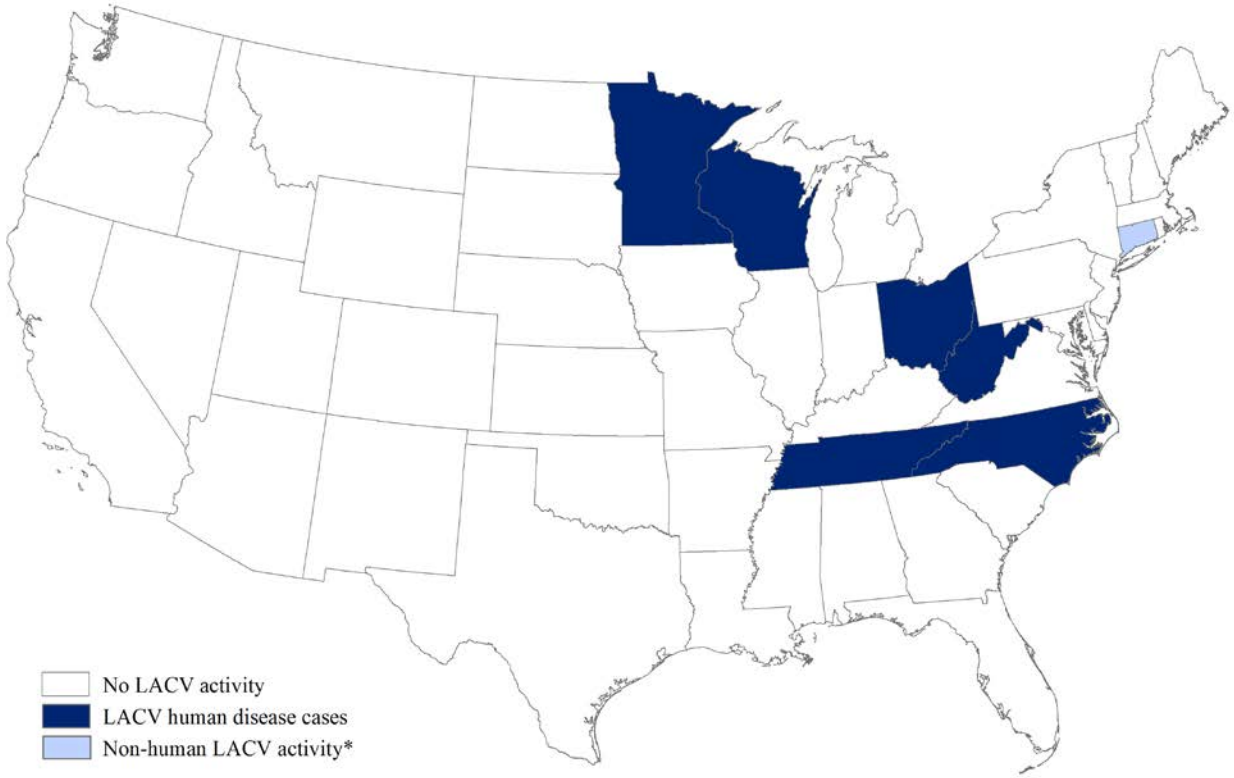
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Wisconsin	2	2	4	0
Totals	**2**	**2**	**4**	**0**

*Includes confirmed and probable cases.

La Crosse encephalitis virus (LACV) activity in 2016

As of January 17th, 29 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 January 17, 2017)



*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	3	0	3	0
North Carolina	9	0	9	0
Ohio	9	0	9	0
Tennessee	3	0	3	0
West Virginia	5	3	8	0
Wisconsin	1	1	2	0
Totals	**30**	**4**	**34**	**0**

*Includes confirmed and probable cases.

Powassan virus (POWV) activity in 2016

As of January 17th, 13 counties in six 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 January 17, 2017)

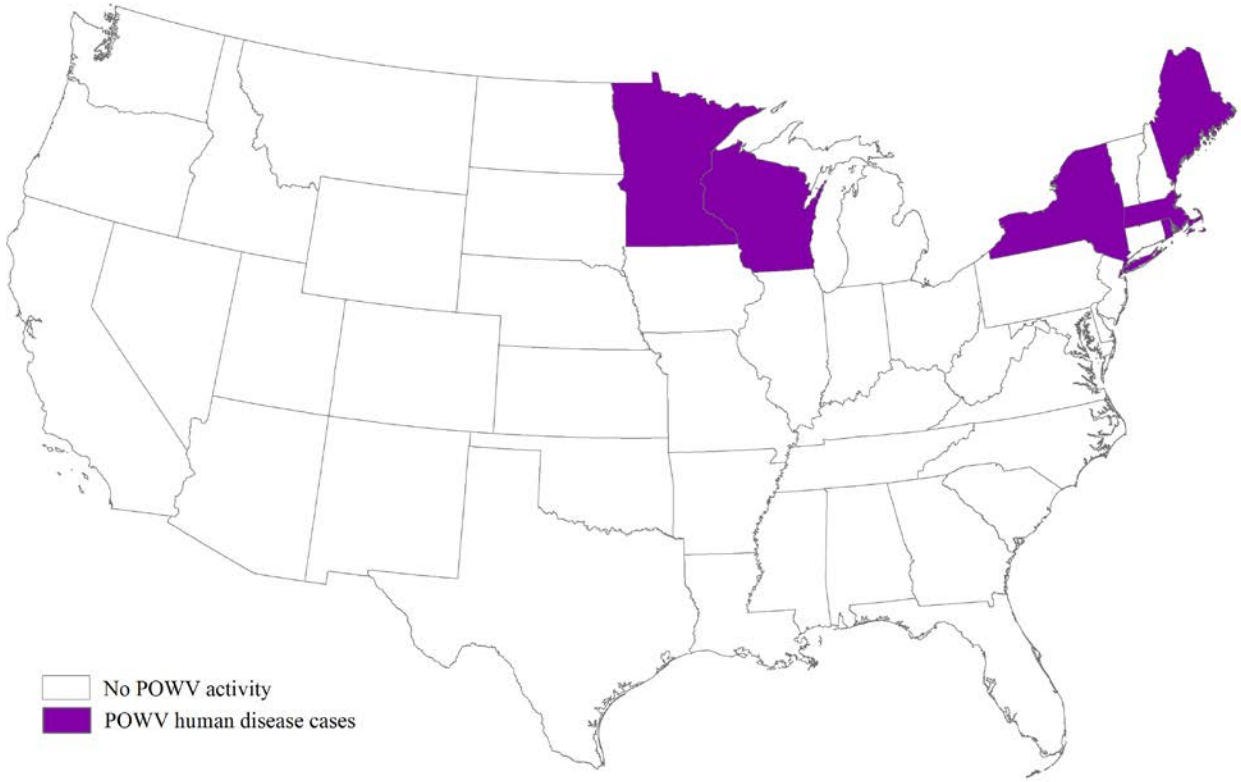


Table 5. Powassan virus human disease cases reported to ArboNET, United States, 2016

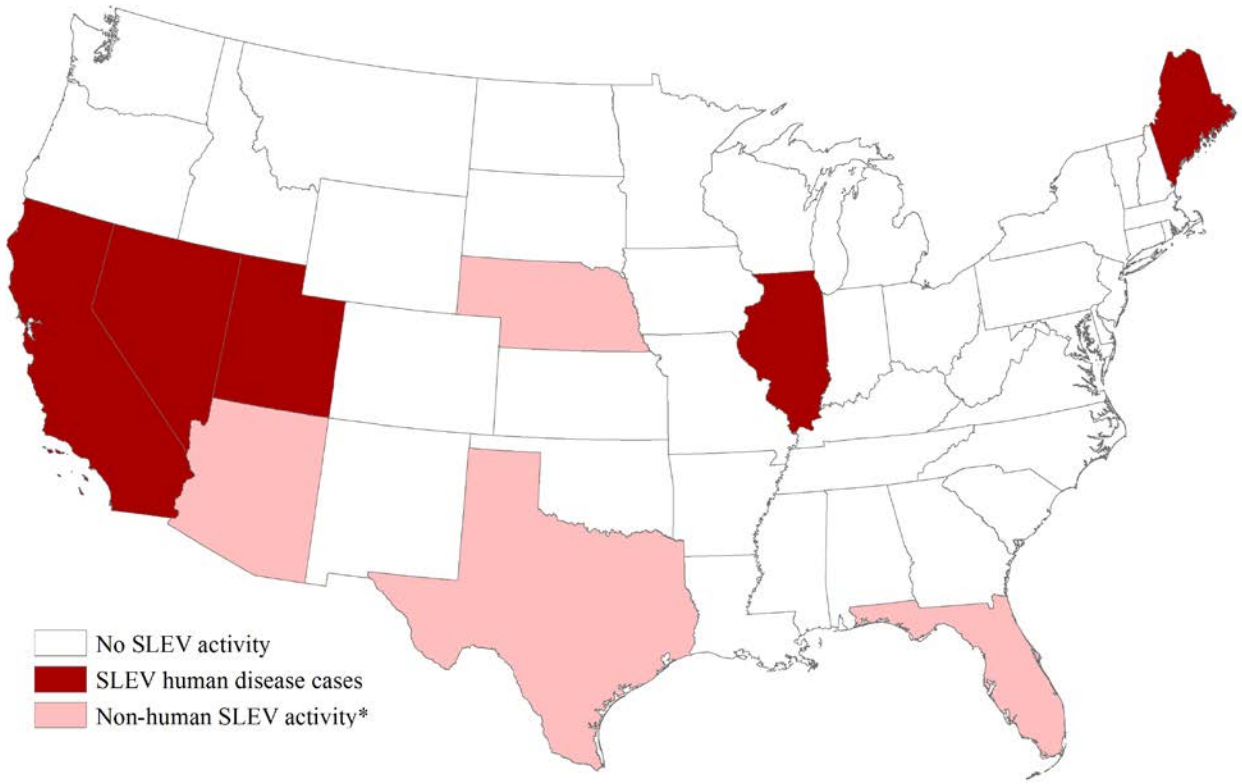
	Neuroinvasive disease cases	Nonneuroinvasive disease cases	Total cases*	Deaths
Maine	1	0	1	0
Massachusetts	3	0	3	1
Minnesota	1	1	2	0
New York	0	2	2	0
Rhode Island	1	0	1	0
Wisconsin	3	1	4	0
Totals	**9**	**4**	**13**	**1**

*Includes confirmed and probable cases.

St. Louis encephalitis virus (SLEV) activity in 2016

As of January 17th, seven counties in five states have reported human cases of SLEV disease to ArboNET for 2016 **[Figure 8 and Table 6]**. Twenty 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 January 17, 2017)



*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

	EEE (N=6)		LAC (N=34)		POW (N=13)		SLE (N=9)		WNV (N=2,038)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Age group										
<20 years	1	(17)	27	(79)	0	(0)	0	(0)	75	(4)
20-39 years	1	(17)	4	(12)	0	(0)	1	(11)	339	(17)
40-49 years	0	(0)	0	(0)	0	(0)	0	(0)	284	(14)
50-59 years	0	(0)	2	(6)	1	(8)	4	(44)	458	(22)
≥60 years	4	(67)	1	(3)	12	(92)	4	(44)	882	(43)
Male sex	5	(83)	24	(71)	8	(62)	5	(56)	1,247	(61)
Onset of illness										
January	0	(0)	0	(0)	0	(0)	0	(0)	2	(<1)
February	0	(0)	0	(0)	1	(8)	0	(0)	0	(0)
March	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
April	0	(0)	0	(0)	3	(23)	0	(0)	2	(<1)
May	0	(0)	1	(3)	2	(15)	0	(0)	18	(1)
June	0	(0)	3	(9)	1	(8)	1	(11)	65	(3)
July	3	(50)	5	(15)	1	(8)	5	(56)	325	(16)
August	0	(0)	12	(35)	0	(0)	1	(11)	892	(44)
September	2	(33)	7	(21)	1	(8)	2	(22)	504	(25)
October	1	(17)	6	(18)	3	(23)	0	(0)	155	(8)
November	0	(0)	0	(0)	1	(8)	0	(0)	60	(3)
December	0	(0)	0	(0)	0	(0)	0	(0)	15	(1)
Clinical syndrome*										
Nonneuroinvasive	0	(0)	4	(12)	4	(31)	1	(11)	898	(44)
Neuroinvasive										
Encephalitis	5	(83)	25	(74)	8	(62)	6	(67)	609	(30)
Meningitis	0	(0)	5	(15)	1	(8)	0	(0)	472	(23)
Acute flaccid paralysis	0	(0)	0	(0)	0	(0)	1	(11)	97	(5)
Guillain-Barre	0	(0)	0	(0)	0	(0)	0	(0)	3	(<1)
Other neuroinvasive	1	(17)	0	(0)	0	(0)	1	(11)	55	(3)
Outcome										
Hospitalization	6	(100)	31	(91)	11	(85)	9	(100)	1,383	(68)
Death	2	(33)	0	(0)	1	(8)	2	(22)	94	(5)

* 96 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