Vector-borne Surveillance Report

2019 Season Ending Report (March 2020)

Contents:

1. Human Testing

New Jersey Administrative Code (N.J.A.C.) Title 8 Chapter 57 mandates public health reporting of specified vector-borne diseases to prevent further disease spread.

Table 1.1 Human Cases [a]

Mosquito-borne diseases			Tickborne Diseases		
	2019 [b]	2018		**2019** [b]	2018
Chikungunya	**15**	16	Anaplasmosis	**142**	118
Dengue	**73**	20	Babesiosis	**236**	249
Eastern equine encephalitis	**4**	-	*Borrelia miyamotoi*	**16**	8
Jamestown Canyon	**-**	-	Ehrlichiosis	**142**	94
Malaria	**102**	93	Lyme disease	**3587**	4000
West Nile	**8**	61	Powassan	**4**	1
Zika	**12**	10	Spotted fever group rickettsioses	**208**	147

[a] Data for 2019 reflect confirmed and probable cases that have been approved by NJDOH. This does not include cases under investigation. All 2019 numbers are preliminary and are subject to change. 2018 numbers represent total number of cases for the year.

[b] Cumulative through week 52 (week ending December 28, 2019).

2019 Eastern Equine Encephalitis Virus Cases

- In 2019, 4 human cases of Eastern equine encephalitis virus (EEE) were reported from Atlantic, Middlesex, Somerset and Union counties (Figure 1.1). Prior to 2019, NJ had last reported 4 EEE cases, 3 cases in 2003 (Atlantic, Cumberland, and Ocean County) and 1 case in 2016 (Passaic County).
- All 4 (100%) confirmed cases were diagnosed with encephalitis (including meningoencephalitis) and classified as having neuroinvasive disease meaning the patient presented with meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction.
- All cases were hospitalized for an average of 24 days; with 3 of the 4 cases requiring additional medical care after hospitalization in a long-term care/rehabilitation facility.
- The median age of cases was 69 years (range, 42 to 71 years) and 50% were male.
- Dates of symptom onset of the EEE cases ranged from July 26 to August 29 (CDC weeks 30-35).

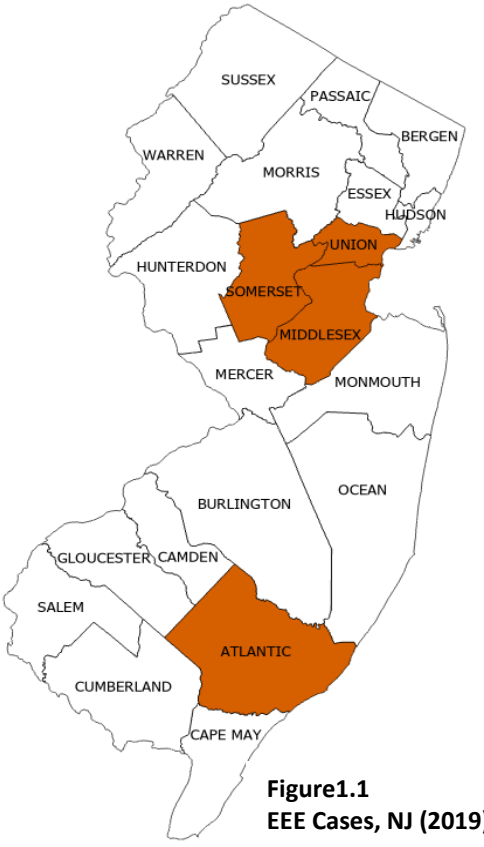
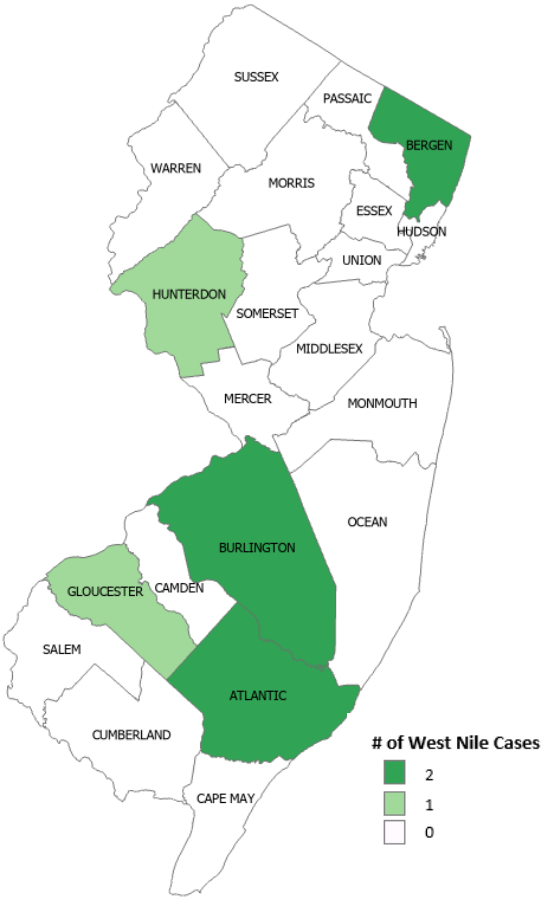


Figure1.1
EEE Cases, NJ (2019)

2019 West Nile Virus Cases

- In 2019, a total of 8 West Nile virus cases were identified from 5 NJ counties. In 2018, a total of 61 cases were reported.
- Three of the 5 counties had 2 cases each (Atlantic, Bergen and Burlington). One case was reported from Gloucester and Hunterdon (Figure 1.2).
- 6 of the 8 cases (75%) were classified as neuroinvasive disease meaning the patient presented with meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction.
- 7 cases (88%) were hospitalized for an average of 10 days. One case required additional medical care after hospitalization.
- 7 of the 8 cases (88%) were male, and the median age was 63 (range, 40 to 72 years).

Figure 1.2 West Nile Cases, NJ (2019)



2019 Dengue Virus Cases

- In 2019, 73 cases of dengue were reported from 14 counties; 13 cases were classified as confirmed and 60 were probable.
- Bergen, Middlesex and Passaic counties reported the most cases accounting for 45% (*n=33*) of the total cases (Figure 1.3).
- 44 of the 73 cases (60%) were male, and the median age was 37 (range, 6 to 83 years). 17 of the 73 cases (23%) were reported in children ≤ 18 years.
- All cases were travel related and no locally acquired cases were reported (Figure 1.4). 64% of cases had recent travel to India (*n=25*) or the Dominican Republic (*n=22*).
- 40 of the 73 cases (55%) had illness onset during the summer months (July-September), with 92% of cases having onset a few days prior to return or within 7 days of arrival in New Jersey.
- 42 of the 73 cases (58%) were hospitalized for an average of 3 days.
- 3 of the 73 cases (<1%) were classified as severe dengue meaning the patient presented with severe plasma leakage evidenced by extravascular fluid accumulation, severe organ involvement (myocarditis and cholecystitis) or severe bleeding from the gastrointestinal tract.

Figure 1.3 Dengue Cases, NJ (2019)

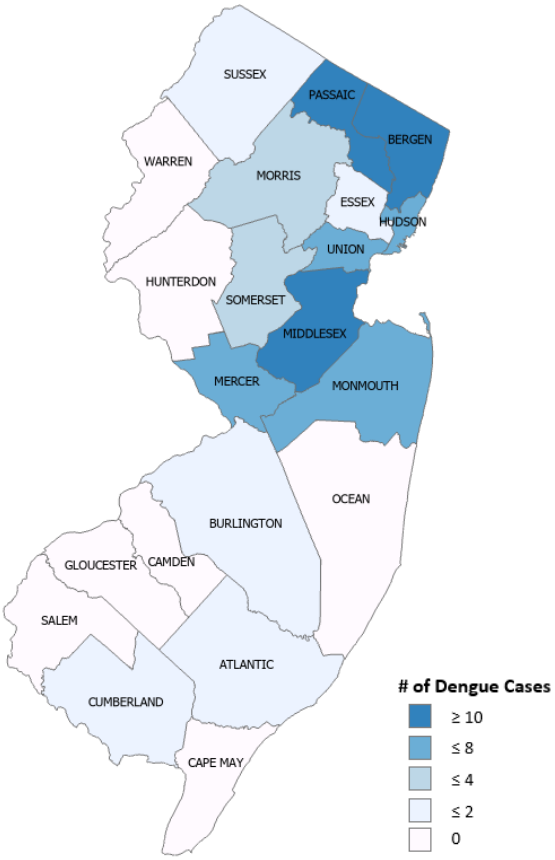
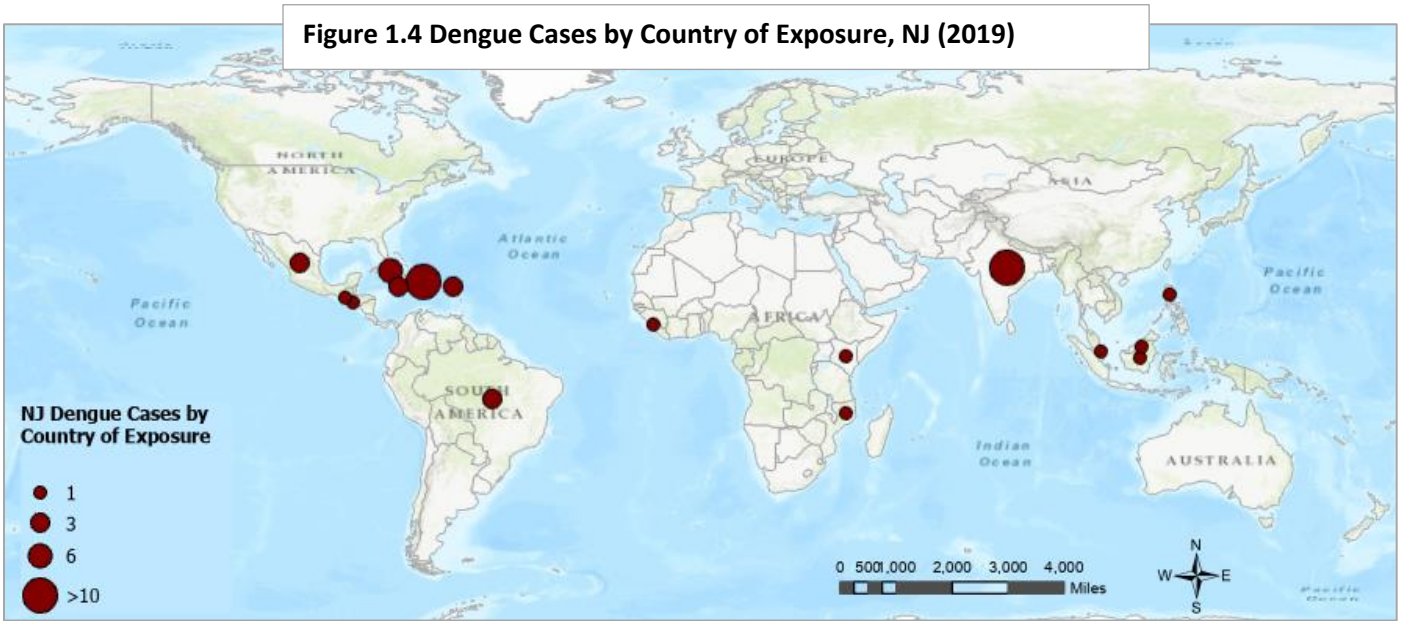


Figure 1.4 Dengue Cases by Country of Exposure, NJ (2019)



2. Mosquito Testing

The New Jersey Department of Health Public Health and Environmental Laboratories (PHEL) and the Cape May County Department of Mosquito Control Bio-safety Level 3 Laboratory (CMBSL3) perform arboviral testing on mosquito pools collected by county mosquito control agencies throughout New Jersey.

In 2019, PHEL and CMBSL3 brought on the capacity to test viruses as an expanded panel and added the proficiency to test for Jamestown Canyon virus. Mosquito pools submitted for testing were tested for West Nile (WNV), Eastern equine encephalitis virus (EEE), Jamestown Canyon virus (JCV) and Saint Louis encephalitis virus (SLE). Mosquito pools were also tested upon request for La Crosse encephalitis virus (LAC), Chikungunya virus (CHIKV), Dengue virus (DENV) and Zika Virus (ZIKV).

Eastern Equine Encephalitis Virus (EEE)

- In 2019, a total of 10,749 mosquito pools (203,146 mosquitoes) were tested for EEE. 73 mosquito pools from 13 counties were positive for EEE (Table 2.1). This is the highest number of pools reported in the past 7 years (Figure 2.1) and exceeds the total number of EEE positive mosquito pools in 2018 and the 5-year average (*n*=19).
- The first positive pool was detected in week 27 (Monmouth county); the highest number of positive pools reported in a single week occurred in week 34 with 18 positive EEE pools (Figure 2.2).
- EEE was detected in mosquitoes from 5 northern counties (Morris, Hunterdon, Sussex, Union and Warren). These were the first EEE positive pools detected in the northern part of the state in at least 7 years.
- The highest number of EEE positive pools was reported in Sussex County (*n=11*).
- 74% (*n*=54) of the positive pools were *Culiseta melanura. Culiseta melanura* species was detected in 10 counties reporting positives.
- Other positive species detected were *Aedes albopictus* (Atlantic and Ocean), *Aedes canadensis* (Morris and Sussex), *Aedes triseriatus* (Morris) and *Culex* spp (Atlantic, Camden, Hunterdon, Morris, Ocean, Sussex, Union and Warren).

Table 2.1 EEE Positive Mosquito Pools

	Cumulative Total	
County	**2019**	2018
Sussex	11	
Atlantic	10	1
Morris	10	
Burlington	9	5
Camden	8	4
Monmouth	8	1
Gloucester	6	
Hunterdon	2	
Ocean	3	
Salem	3	2
Cape May	1	
Union	1	
Warren	1	
Bergen		
Cumberland		1
Essex		
Hudson		
Mercer		
Middlesex		
Passaic		
Somerset		
Total	**73**	14

Figure 2.1 EEE Positve Mosquito Pools in NJ, 2012-2019

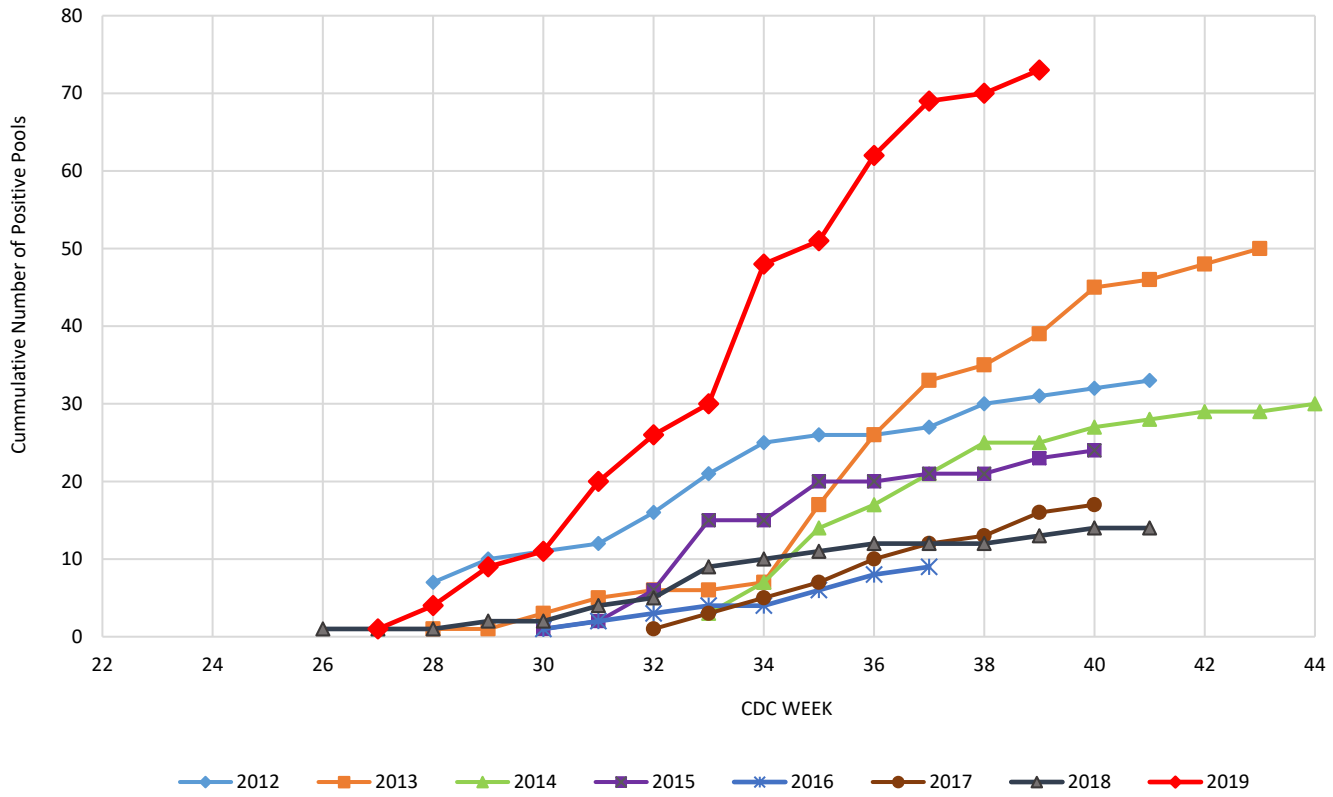
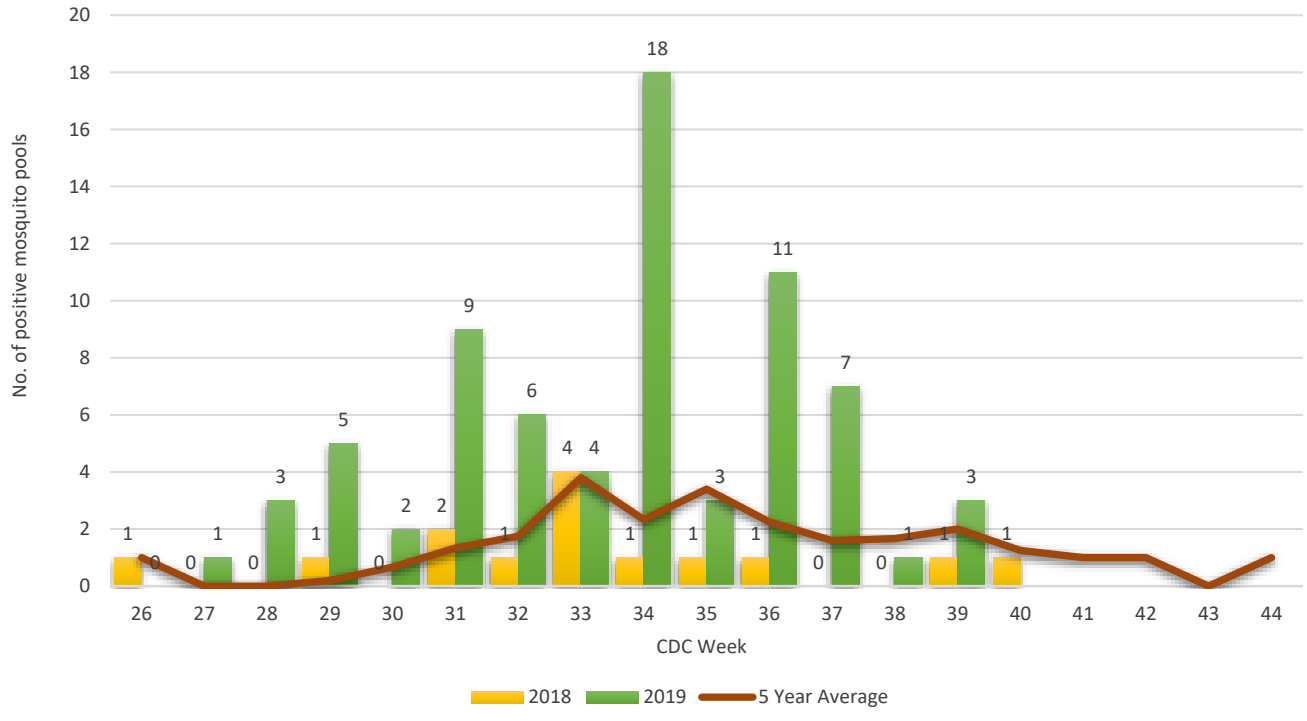


Figure 2.2 EEE Virus Positive Mosquito Pools, NJ (2018-2019)



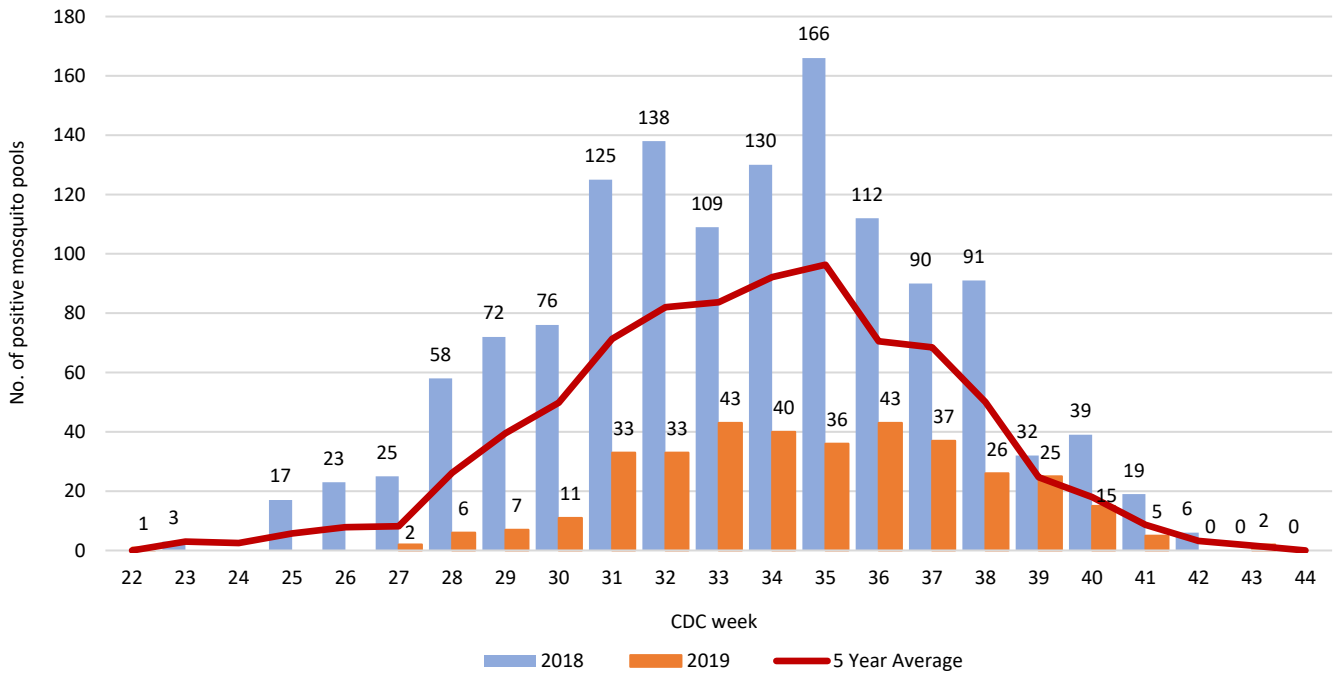
West Nile virus (WNV)

- In 2019, a total of 11,359 mosquito pools (206,323 mosquitoes) were tested for WNV. 365 mosquito pools were positive for WNV with the highest numbers reported from Bergen and Burlington counties (Table 2.2).
- The total number of positive mosquito pools detected this season is significantly lower than historical averages (Figure 2.2). The number of positive pools peaked this season in August (weeks 33-36).
- The first positive pool was detected in week 22 (Passaic county). In 2018 the first WNV positive mosquito pool was identified in week 23.
- 10 mosquito species tested positive for WNV in 2019 compared with 18 species in 2018.
- The positive species detected were *Aedes albopictus, Aedes cantator, Aedes japonicus, Aedes triseriatus, Anopheles punctipennis, Coquillettidia perturbans, Culex erraticus, Culex pipiens, Culex* spp and *Culiseta melanura* species.
- 88% (*n=320*) of the positive pools were *Culex spp.*
- Only one county (Burlington) reported increased WNV activity in 2019 compared with the previous 7 years (see NJ County summaries on Page 5).

Table 2.2 WNV Positive Mosquito Pools

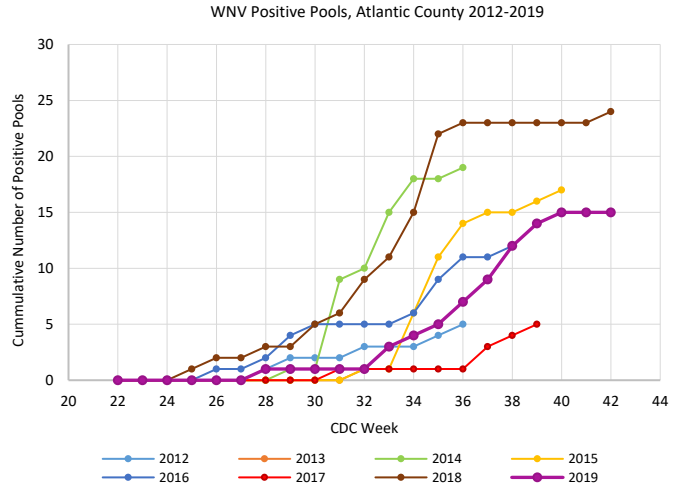
	Cumulative Total	
County	**2019**	2018
Bergen	83	161
Burlington	58	35
Hudson	41	68
Union	34	78
Hunterdon	20	159
Monmouth	18	63
Somerset	17	84
Atlantic	15	23
Gloucester	14	117
Ocean	11	26
Middlesex	9	56
Morris	9	166
Camden	8	40
Mercer	8	43
Cape May	5	20
Passaic	4	16
Salem	3	9
Sussex	3	55
Warren	3	82
Cumberland	1	10
Essex	1	14
Total	**365**	1325

Figure 2.2. West Nile Virus Positive Mosquito Pools, NJ (2018 - 2019)

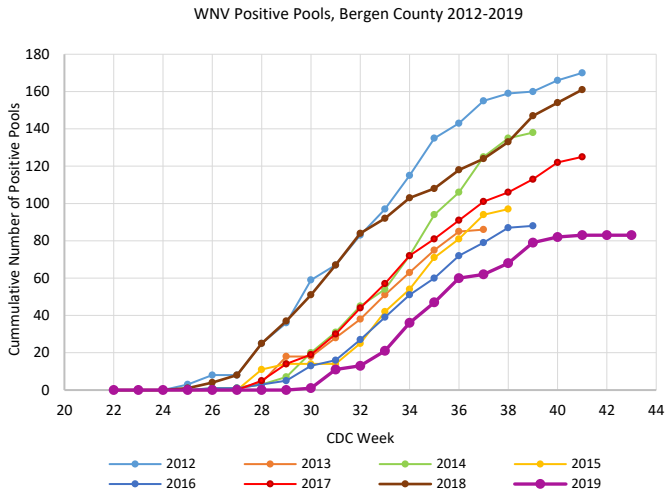


WNV Positive Mosquito Pools by NJ County 2012-2019

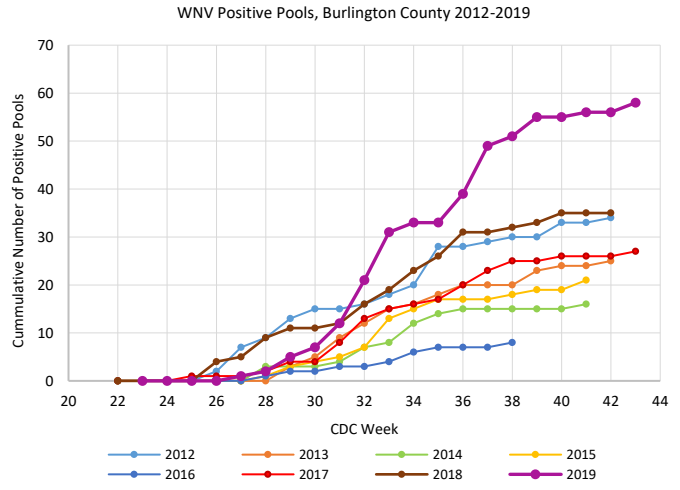
Atlantic County



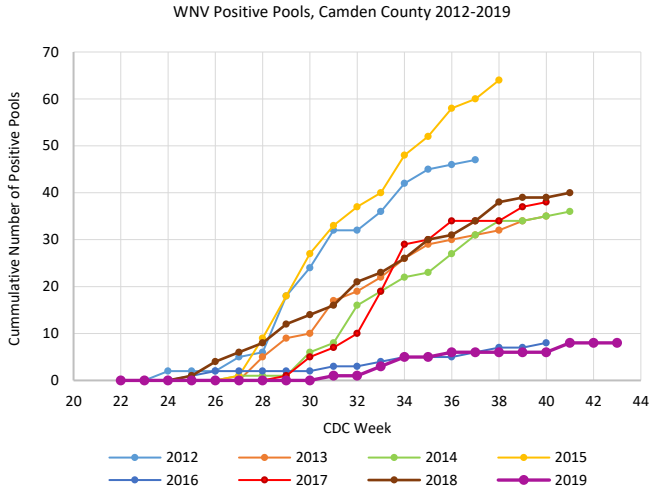
Bergen County



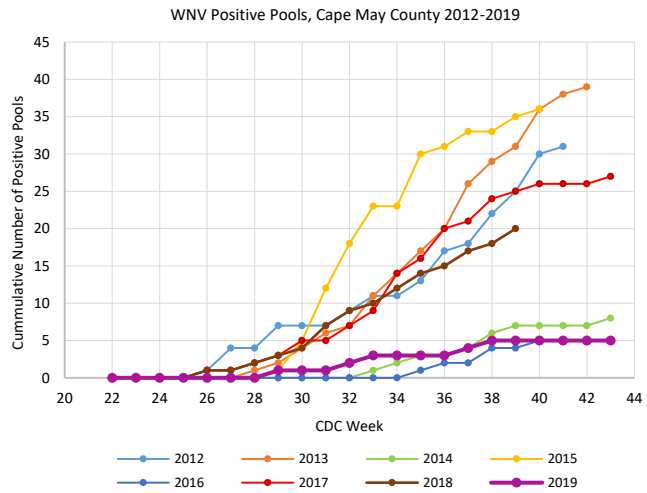
Burlington County



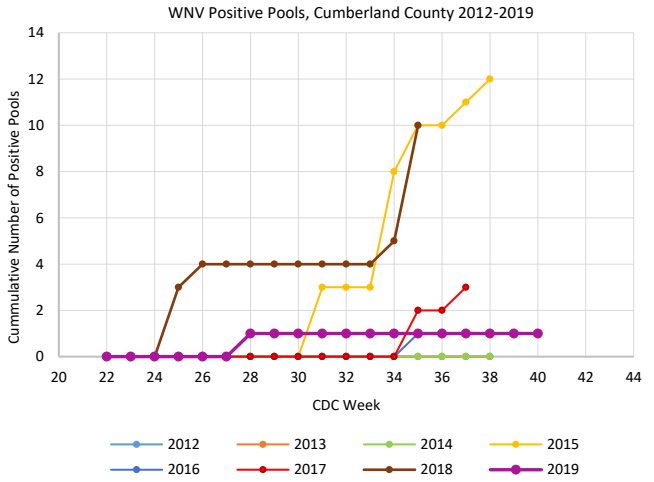
Camden County



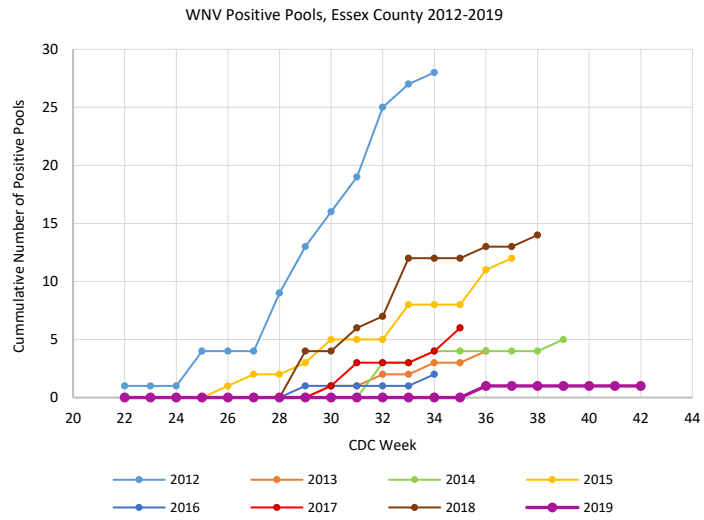
Cape May County



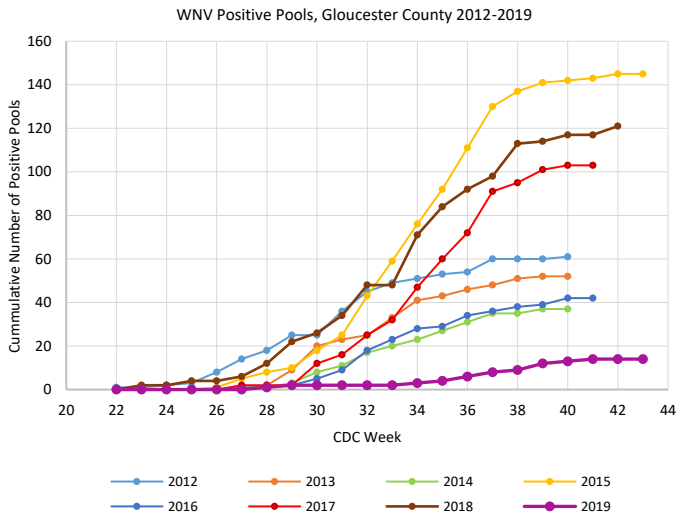
Cumberland County



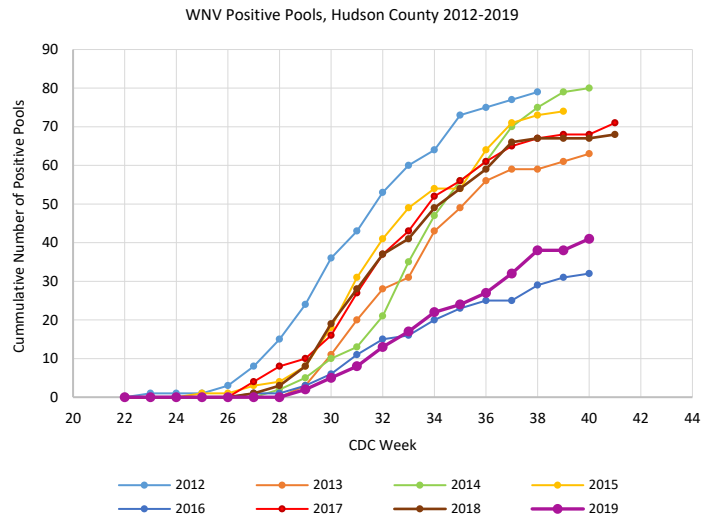
Essex County



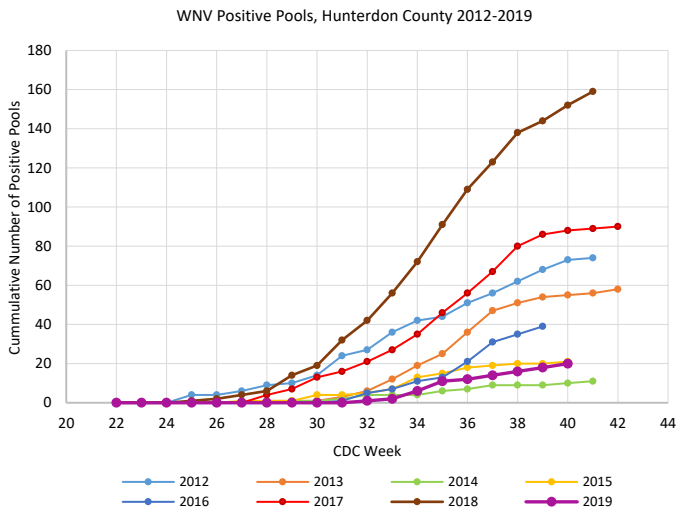
Gloucester County



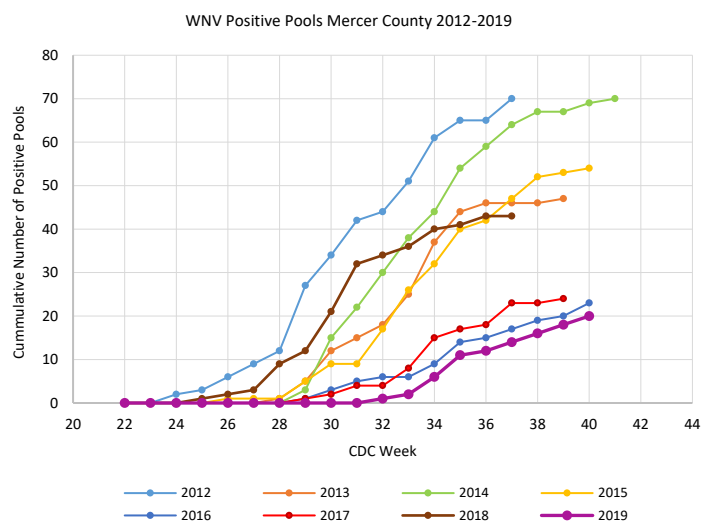
Hudson County



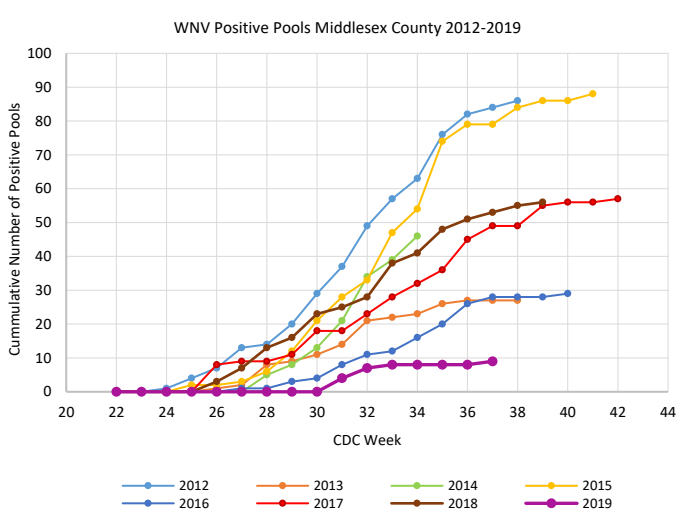
Hunterdon County



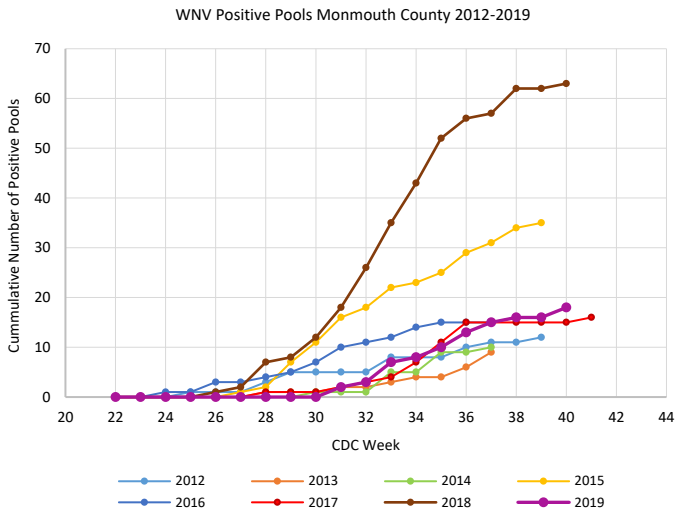
Mercer County



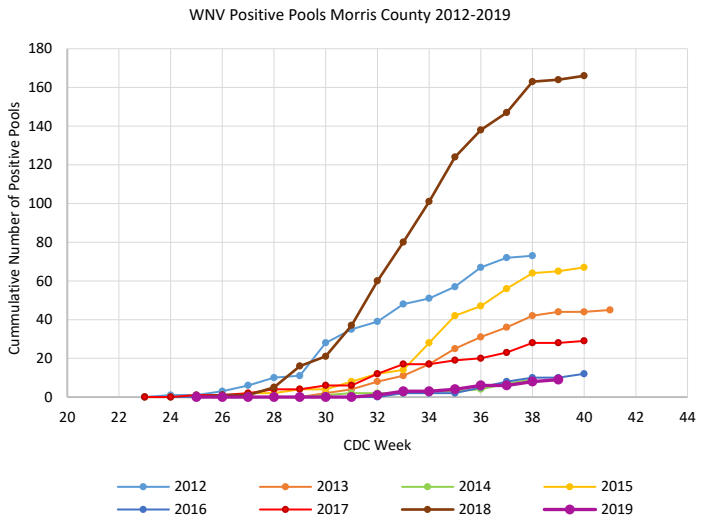
Middlesex County



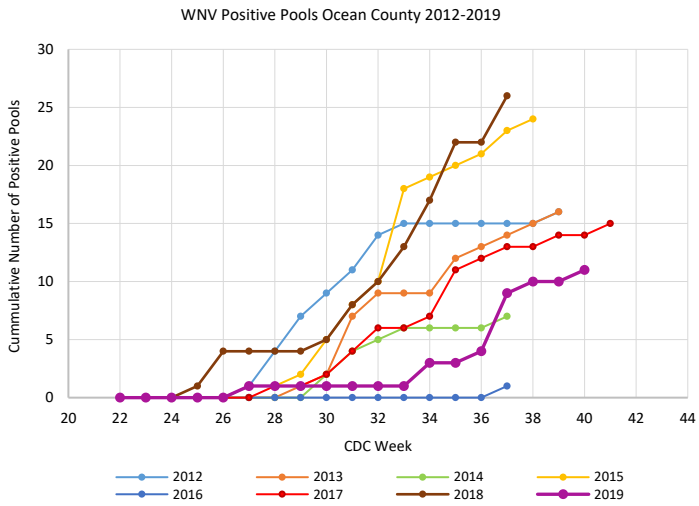
Monmouth County



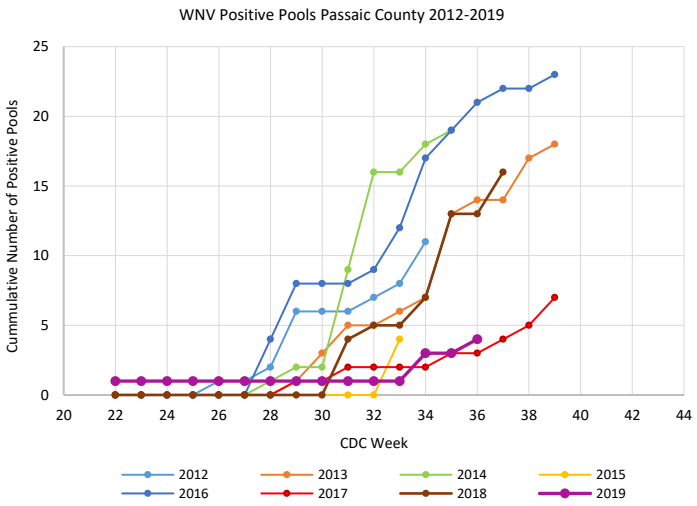
Morris County



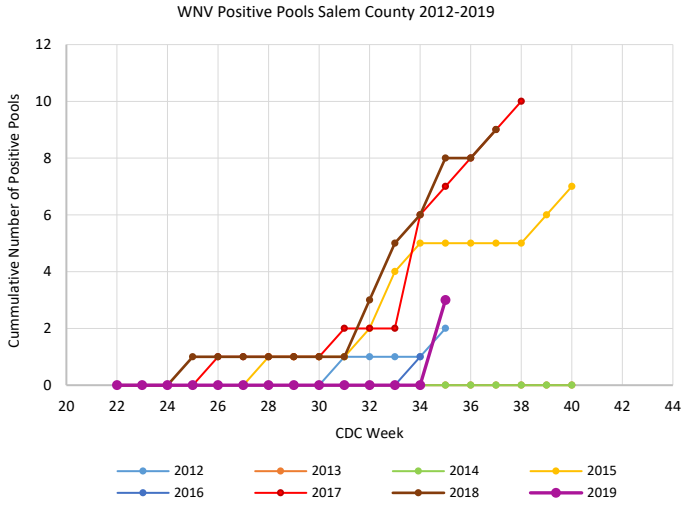
Ocean County



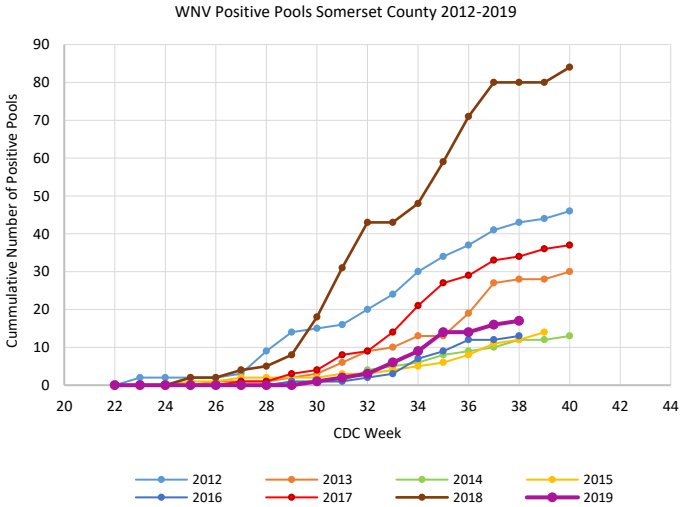
Passaic County



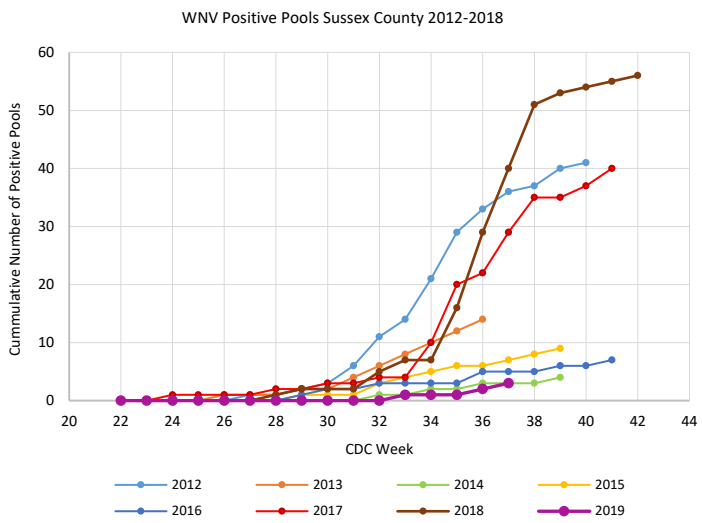
Salem County



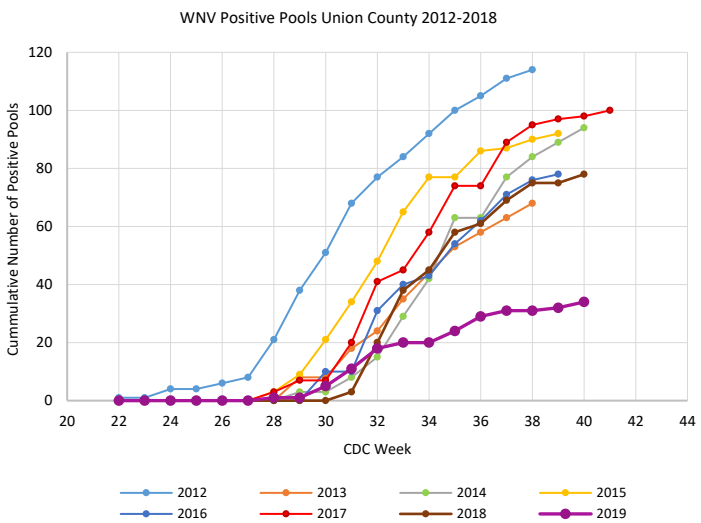
Somerset County



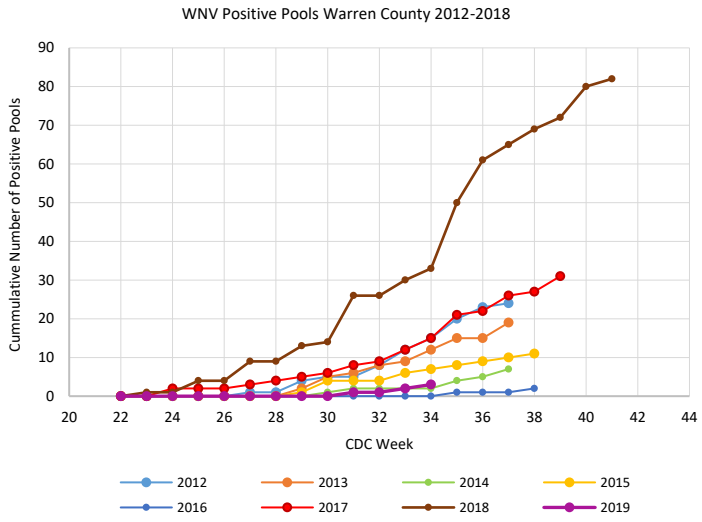
Sussex County



Union County



Warren County



- Compared with the previous 7 years, 2019 was the least active season for more than 50 percent of NJ counties.
- Burlington County had the most active season in 2019 compared with the previous 7 years, reporting 58% more positive pools than in 2018. The County also had the highest number of WNV positive pools in 2019.

Other viruses:

La Crosse encephalitis virus (LAC):

In 2019, one mosquito pool collected in Passaic County (week 22) tested positive for La Crosse virus at PHEL. The positive pool was detected in *Aedes triseriatus* species. This was the first positive pool detected in the state since 2014.
In 2014, 2 mosquito pools collected from the Joint Base MDL (Burlington County) by the Department of the Airforce tested positive for LACV. The virus was detected in both *Aedes triseriatus and* Aedes albopictus.
There have not been any human La Crosse virus cases reported in at least the past 20 years.

Jamestown Canyon virus (JCV):

In 2019, five mosquito pools from 4 counties have tested positive for Jamestown Canyon virus. Positive pools were identified in the following counties: Sussex (week 23 and week 37), Bergen (week 25), Burlington (week 27) and Salem (week 34).

The positive pools were detected in *Aedes abserratus*, *Aedes cantator*, *Anopheles crucians*, *Anopheles punctipennis and Coquillettidia perturbans* species.
NJ reported its first and only human case of Jamestown Canyon virus in 2015 in a Sussex County resident.

No pools tested positive for SLE, CHIKV, DENV or ZIKV.

Table 2. 3 Cumulative 2019 Mosquito Pool Testing (Other Viruses [a])

	SLE		JCV		LAC		CHIKV		DENV		ZIKV	
County	Pools	Pos	Pools	Pos	Pools	Pos	Pools	Pos	Pools	Pos	Pools	Pos
Atlantic	500		500				84		84		84	
Bergen	332		332	1	23		5		5		5	
Burlington	484		484	1	22							
Camden	143		114				16		16		16	
Cape May	2940		21		190		444				444	
Cumberland	357		357		11							
Essex	152		152		1							
Gloucester	628		613		7		17		17		17	
Hudson	254		254		8							
Hunterdon	364		364		3							
Mercer	447		447		34		24		24		24	
Middlesex	288		288		4		10		10		10	
Monmouth	571		571		20							
Morris	601		601									
Ocean	402		402									
Passaic	207		207		18	1						
Salem	594		576	1	21							
Somerset	315		315									
Sussex	416		416	2	21							
Union	228		228		10							
Warren	357		357									
Total	10580	-	7599	**5**	393	**1**	600	-	156	-	600	-

[a] St. Louis encephalitis virus (SLE), Jamestown Canyon Virus (JCV), La Crosse encephalitis virus (LAC), Chikungunya virus (CHIKV), Dengue virus (DENV), Zika Virus (ZIKV)
Numbers in white columns represent number of pools tested in 2019
Numbers in blue shaded columns represent positive pools in 2019

3. Equine/Other Animal Testing

Equine testing for West Nile Virus (WNV) and Eastern equine encephalitis virus (EEE) is conducted at the New Jersey Department of Agriculture's Animal Health and Diagnostic Laboratory.

In 2019, there were eleven equine cases, one alpaca case and one deer case of EEE reported in New Jersey. In 2018, a total of 5 equine cases was reported. Since 2013, there has been an average of 4 EEE cases per year in New Jersey.

The first 2019 equine case was reported in a deer case from Camden county in week 28. This is the earliest report of EEE in the State since 2012.

No animal WNV cases were reported in 2019. In 2018, one equine case of WNV was reported

Table 3.1 Equine Cases (EEE)

CDC Week	County	Age	Sex	Vaccination Status	Onset Date	Animal Status
30	Ocean	12-year-old	Mare	Unvaccinated	7/23/19	Euthanized 7/23/19
30	Ocean	20-year-old	Gelding	Unvaccinated	7/26/19	Euthanized 7/26/19
32	Monmouth	1-year-old	Colt	EWT 2019	8/05/19	Euthanized 8/05/19
33	Ocean	2-year-old	Gelding	Incomplete	8/15/19	Euthanized 8/16/19
33	Morris	18-year-old	Gelding	Unvaccinated	8/15/19	Euthanized 8/16/19
35	Salem	4-month-old	Colt	Unknown	Unknown	Euthanized 8/25/19
35	Atlantic	1 year old	Filly	Unknown	Unknown	Euthanized 8/24/19
35	Ocean	Unknown	Gelding	Unknown	Unknown	Euthanized 8/26/19
35	Ocean	4-year-old	Gelding	Unknown	Unknown	Euthanized 8/26/19
39	Burlington	1-year-old	Filly	Unknown	9/24/19	Euthanized 9/29/19
40	Camden	3-year-old	Gelding	EWT 2019	9/30/19	Euthanized 9/30/19

Table 3.2 Other Animal Cases (EEE):

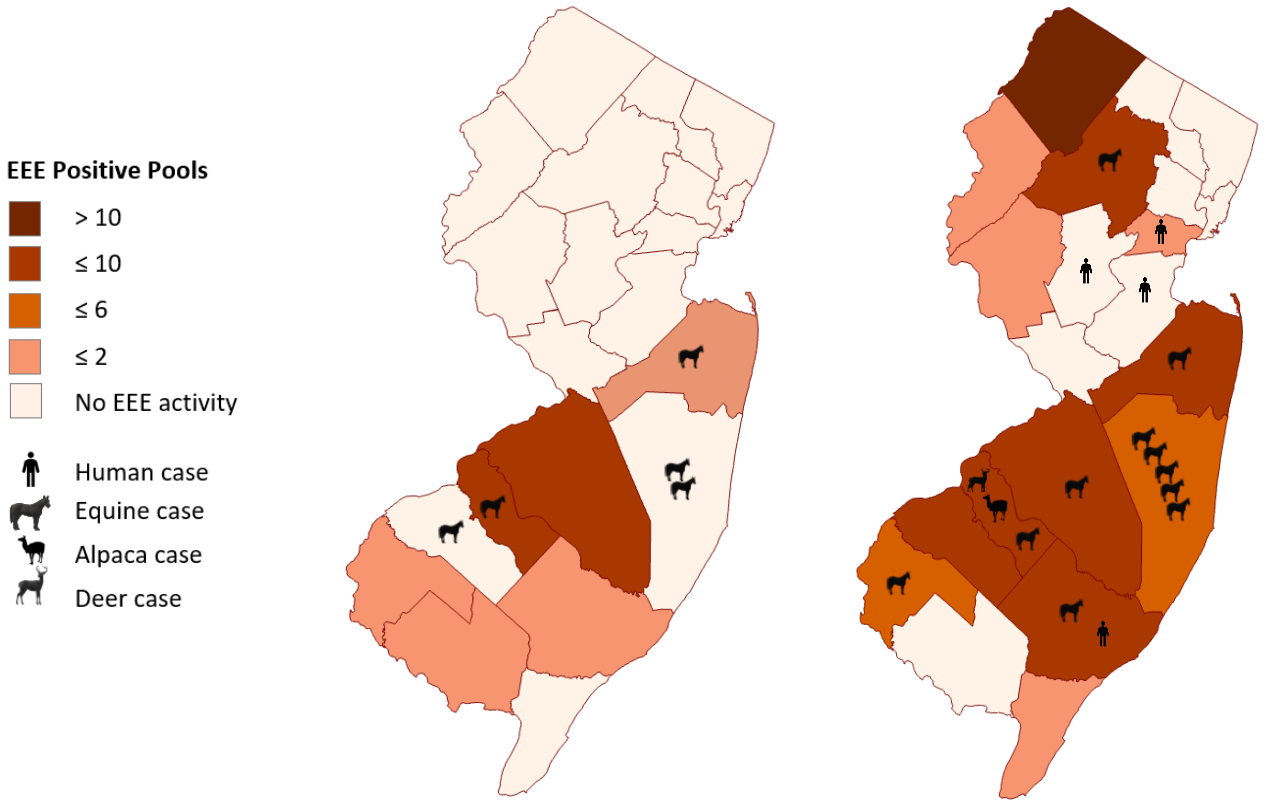
CDC Week	**Animal**	County	Age	Sex	Onset Date	Animal Status
28	**Deer**	Camden	Unknown	Unknown	Unknown	Died 7/11/19
31	**Alpaca**	Camden	7-year-old	Male Alpaca	8/02/19	Euthanized 8/3/19

4. Surveillance Maps

Eastern equine encephalitis

2018 EEE Activity

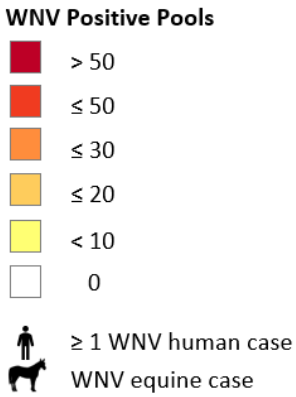
2019 EEE Activity

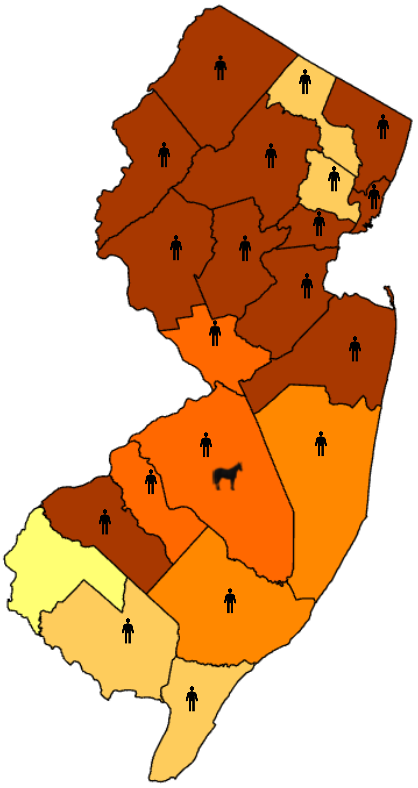


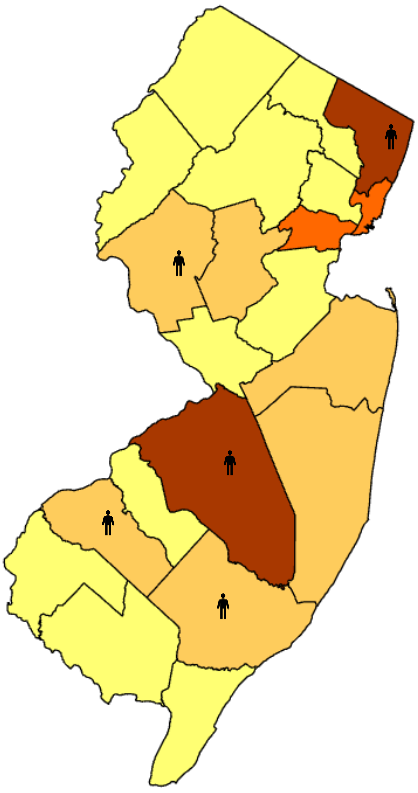
West Nile Virus (WNV)

2018 WNV Activity

2019 WNV Activity

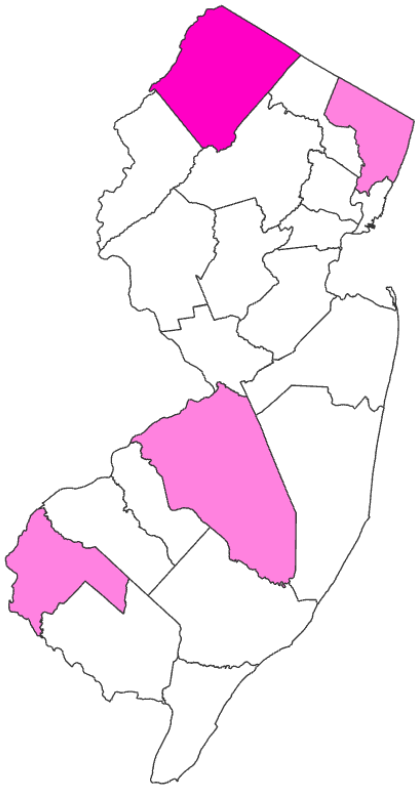


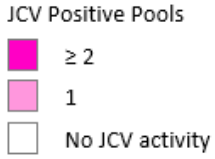


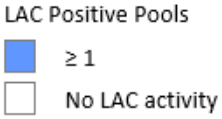


Jamestown Canyon Virus Activity 2019

La Crosse Virus Activity 2019







5. Syndromic Surveillance for Tick-related Emergency Department Visits

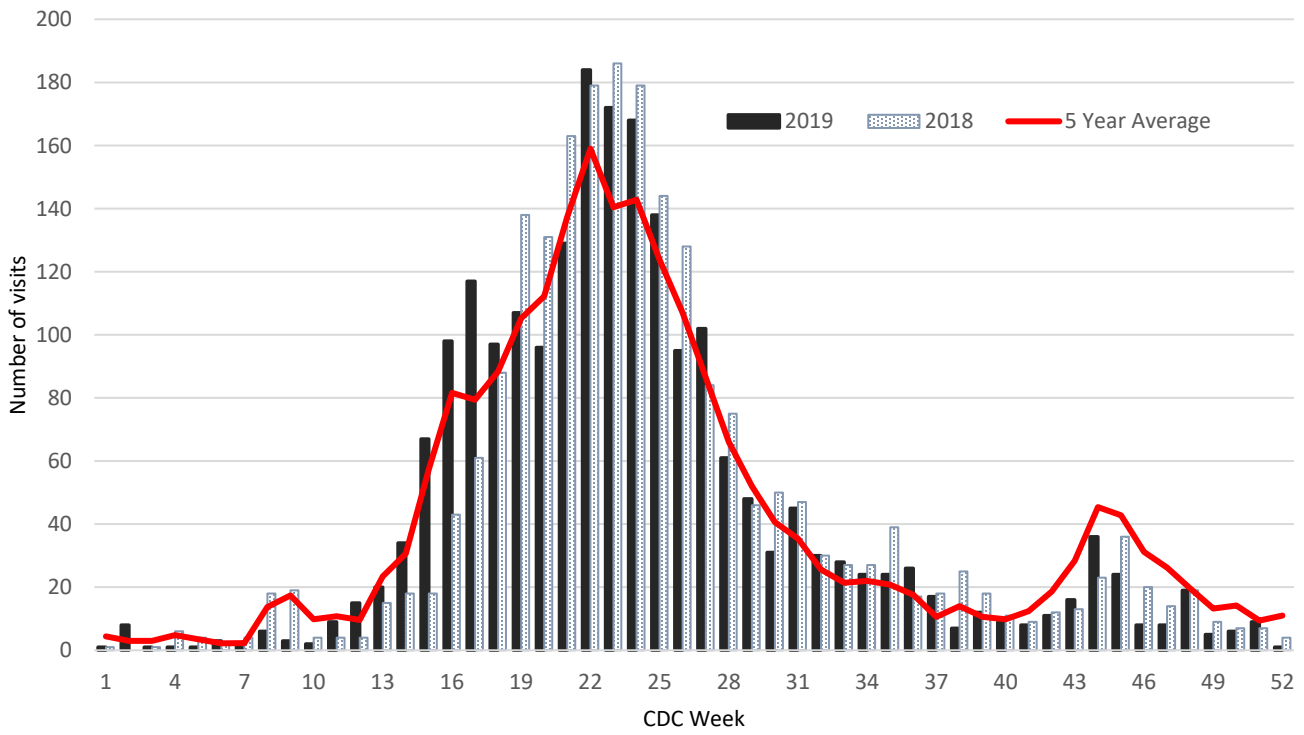
EpiCenter is a syndromic surveillance system developed and maintained by Health Monitoring Systems, Inc, for monitoring by health departments in the United States. New Jersey's EpiCenter receives real time Emergency Department (ED) data from 78 acute care and satellite health (99 percent reporting) facilities statewide. The system collects "chief complaint" information and limited patient registration data from existing ED computer systems.

The chart below represents NJ residents seen at emergency departments state wide with a tick-bite complaint or signs/symptoms associated with a reported tick-bite. Tick-related ED visits occur throughout the year with peak number of visits in the summer months and a smaller peak in the fall weeks when adult Ixodes scapularis (blacklegged ticks) are active.

In 2019, tick-related ED visits occurred throughout the year. The highest number of visits in 2019 occurred between May and June (weeks 21-25) with a secondary peak in weeks 44-45, corresponding to when adult deer ticks are active.

Overall, the total number of visits was relatively consistent compared with 2018 and followed seasonal trends observed in the past 5 years.

Figure 5.1 New Jersey EpiCenter: Tick-Related Emergency Department Visits



For More Information

- NJDOH Communicable Disease Service: http://nj.gov/health/cd/topics/vectorborne.shtml
- NJDEP Office of Mosquito Control Coordination: http://www.nj.gov/dep/mosquito/
- NJDA Division of Animal Health: http://www.nj.gov/agriculture/divisions/ah/
- Rutgers Center for Vector Biology: http://vectorbio.rutgers.edu/
- ***New!*** New Jersey Arboviral Activity Maps: https://maps.vectorsurv.org/arbo/