

Contents:

1. Human Testing -----	Page 1
• 2021 West Nile Virus (WNV) Cases -----	Page 2
2. Mosquito Testing -----	Page 3
• WNV -----	Page 4
• Eastern Equine Encephalitis (EEE) -----	Page 8
• Jamestown Canyon Virus (JCV) -----	Page 10
• Other Virus Testing -----	Page 11
3. Syndromic Surveillance for Tick Related ED Visits -----	Page 12

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		
	2021 ^b	2020		2021 ^b	2020
Chikungunya	2	3	Anaplasmosis	163	115
Dengue	9	2	Babesiosis	200	238
Eastern equine encephalitis	-	-	Borrelia miyamotoi	15	9
Jamestown Canyon	2	-	Ehrlichiosis	45	78
Malaria	42	24	Lyme disease	2581	2572
West Nile	36	3	Powassan	-	1
Zika	-	3	Spotted fever group rickettsioses	26	35

^a Data for 2021 reflect confirmed and probable cases that have been reviewed/approved by NJDOH. This does not include cases under investigation. All 2021 numbers are preliminary and are subject to change.

^b Cumulative through CDC week 49 (week ending December 11, 2021).

Table 1.2 WNV Human Cases^b

County	Cases	Deaths	Positive Blood Donor
Burlington	8		1
Camden	6	2	
Monmouth	5	1	2
Bergen	4		
Essex	4		
Mercer	2	1	
Somerset	2		
Atlantic	1		
Cumberland	1		
Gloucester	1	1	
Middlesex	1		
Ocean	1		
Total	36	5	3

2021 West Nile Virus Cases

- In 2021, 36 human cases (5 fatalities) of West Nile virus (WNV) were reported from Burlington, Camden, Monmouth, Bergen, Essex, Mercer, Somerset, Atlantic, Cumberland, Gloucester, Middlesex, and Ocean (Figure 1.1). This is the 3rd highest number of annual cases after 2018 (61 cases) and 2012 (48 cases).
- 26 of the 36 (72%) WNV cases were diagnosed 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.
- Inpatient cases were hospitalized for an average of 14 days; with 16 of the 36 (44%) cases requiring additional medical care after hospitalization in a long-term care/rehabilitation facility.
- The median age of the cases was 64 years (range: 27-90 years). Of all the cases, 17 were female and 19 were male.
- Dates of symptom onset of the WNV cases ranged from July 16 to October 20 (CDC weeks 28-42) (Figure 1.2).
- Three viremic blood donors (PVD) were reported in Burlington and Monmouth counties. These are not considered cases but are reported to CDC as presumptive viremic blood donors (PVD).

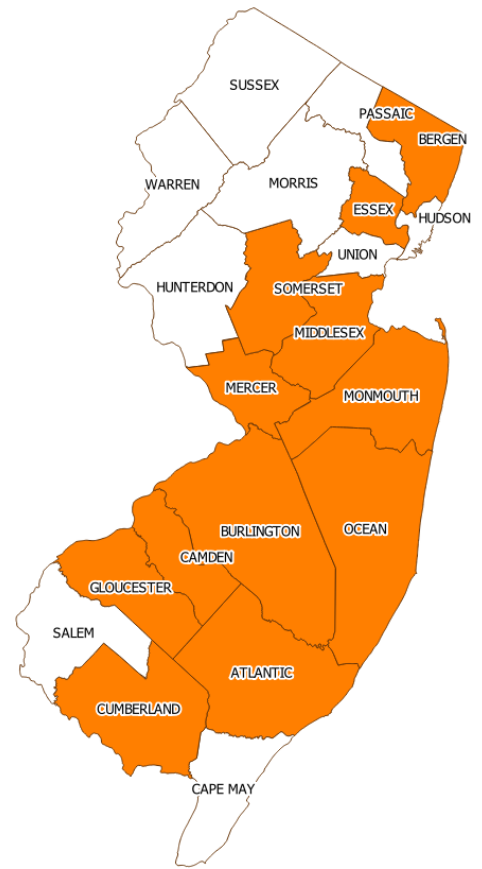
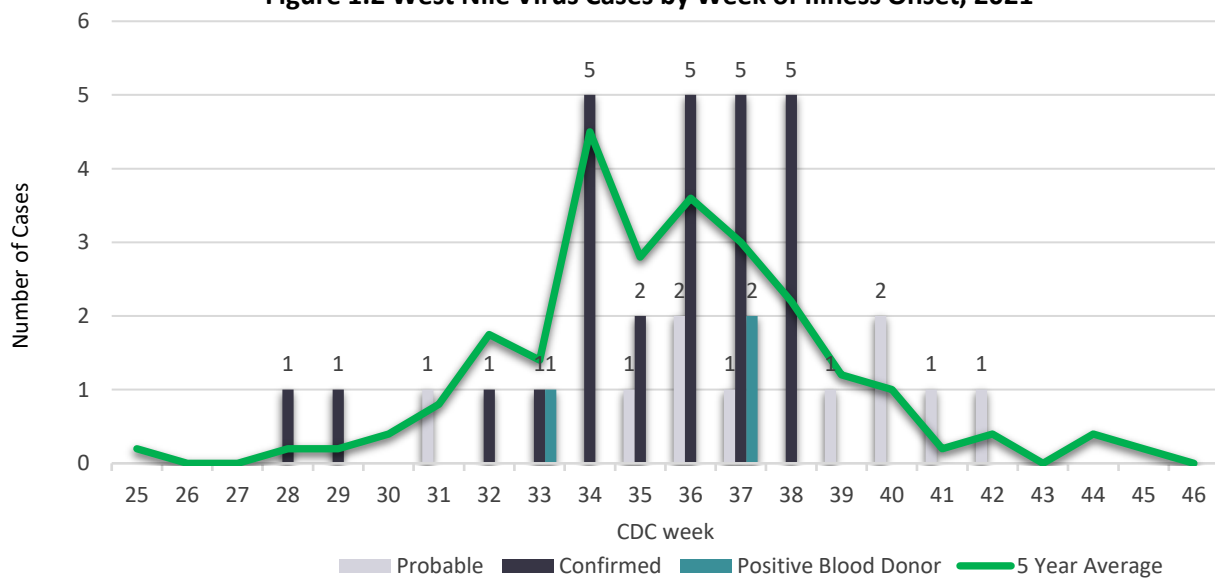


Figure 1.1 WNV Cases, NJ (2021)

Figure 1.2 West Nile Virus Cases by Week of Illness Onset, 2021



*Positive blood donor based on specimen collection date

2. Mosquito Testing

West Nile virus (WNV):

- In 2021, a total of 9773 mosquito pools were tested for West Nile virus of which 995 pools (10.2%) from 20 counties tested positive.
- The highest number of positive pools were detected between the second week and last week of August (figure 2.1). Bergen, Union, and Camden counties reported the most positive pools in 2021.
- Compared with the previous 5 years, 2021 was second most active WNV season (figure 2.2).
- At the county level, over the past five years, Atlantic, Burlington, Camden, Middlesex, Passaic, Somerset, and Union counties had their highest number of WNV pools in 2021. Salem County was the only county to not report WNV positive pools.
- Camden, Burlington, Middlesex, and Atlantic counties had a significant jump for WNV positive pools compared to the last five years.
- The WNV positive pools in 2021 were detected in *Culex pipiens/restuans/salinarius species mix*, *Cx. erraticus*, *Aedes trivittatus*, *Ae. taeniorhynchus*, *Ae. triseriatus*, *Ae. albopictus*, *Ae. japonicus*, *Ae. vexans*, *Anopheles bradleyi*, *An. punctipennis*, *An. quadrimaculatus s.l.*, *Coquillettia perturbans*, *Culiseta melanura*, *Psorophora ciliata*, and *Ps. ferox*; 94% (n=937) of the positive pools were *Culex* sp.

WNV Animal Testing:

- Thirteen birds tested positive for WNV in 2021.
 - 1 Peregrine falcon (Atlantic County) in Week 35
 - 4 Cooper’s hawks (3-Union County, 1-Middlesex County) in Week 30
 - 2 American crows (Burlington and Cumberland counties) in Week 27 and Week 28, respectively
 - 2 bald eagles (Burlington and Hunterdon counties) in Week 45
 - 3 northern saw-whet owls and 1 red-tailed hawk (Morris County) in Week 39

Figure 2.1 West Nile Virus Positive Mosquito Pools, NJ (2020-2021)

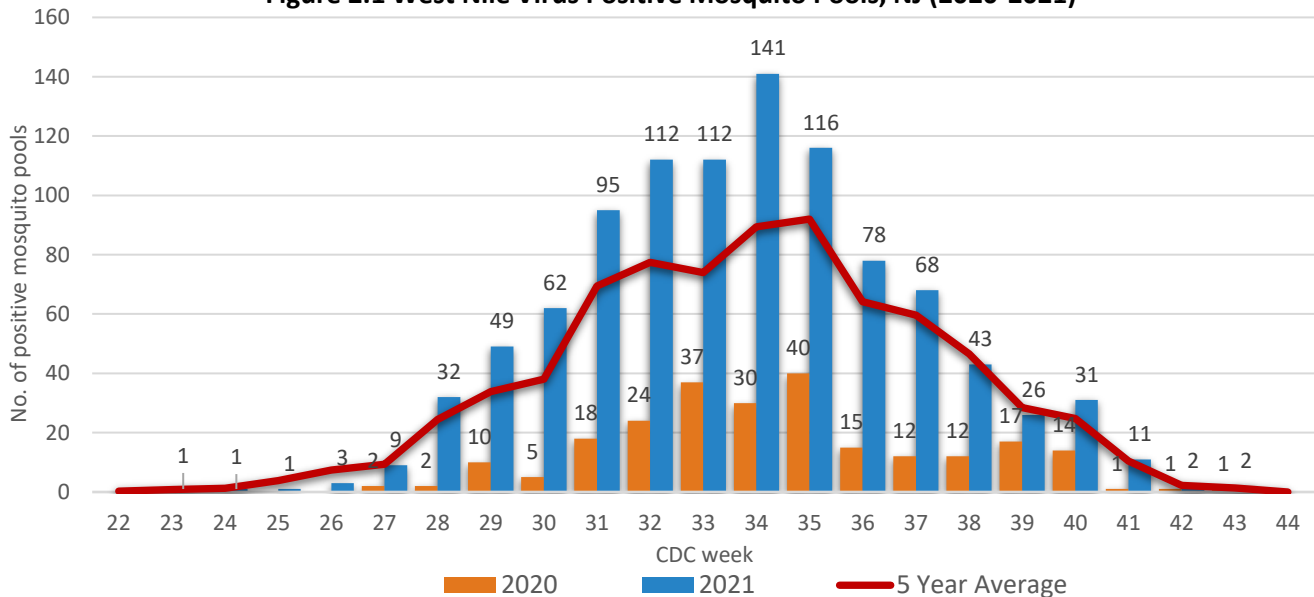
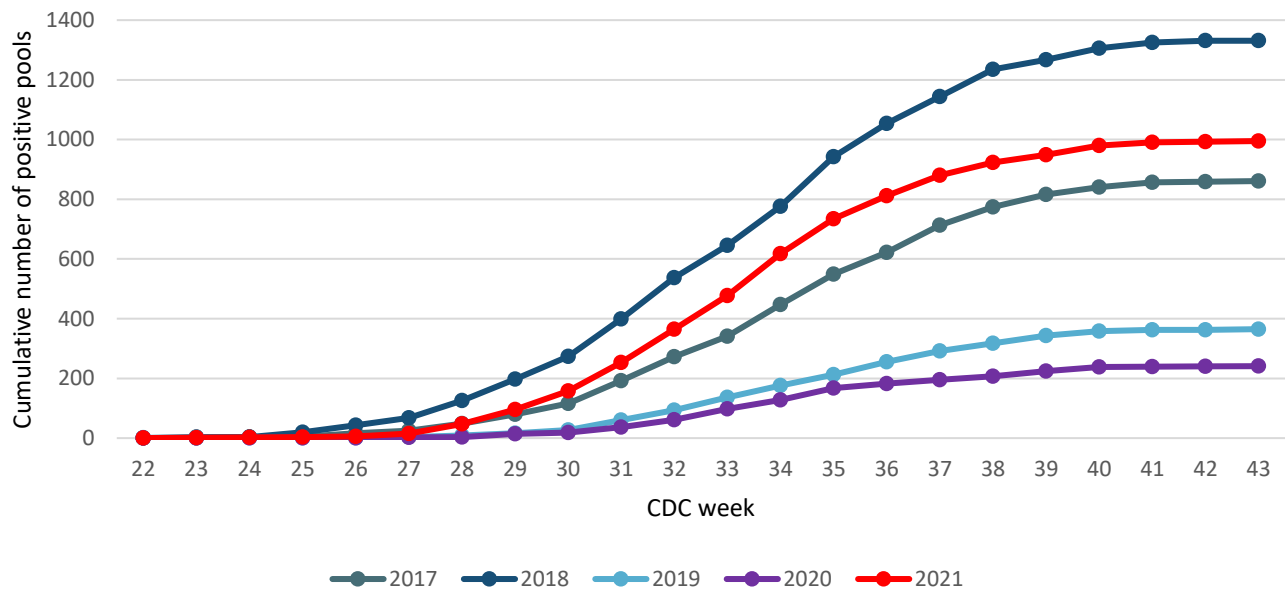


Figure 2.2 WNV Positive Mosquito Pools, NJ (2017-2021)



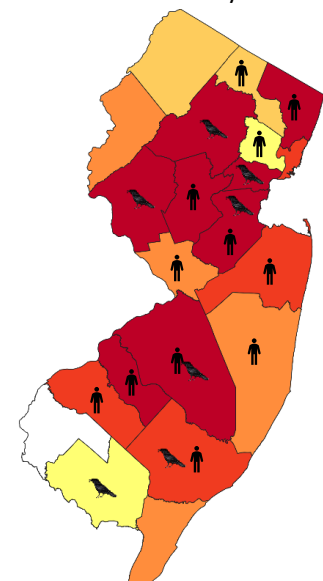
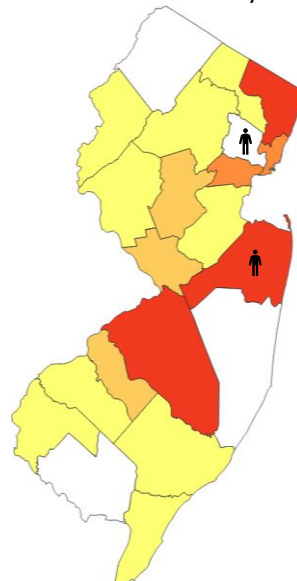
West Nile Virus (WNV)

2020 WNV Activity

2021 WNV Activity

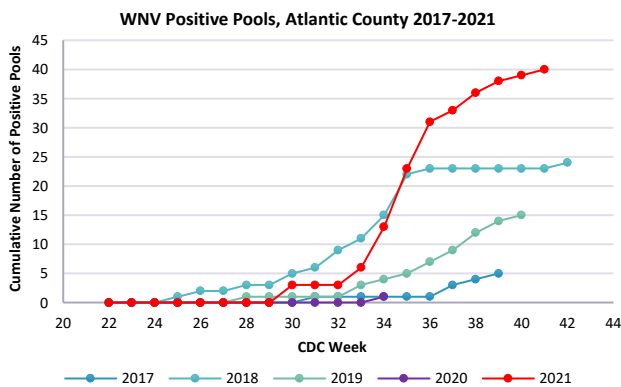
WNV Positive Pools

- > 50
- ≤ 50
- ≤ 30
- ≤ 20
- < 10
- 0
- ≥ 1 WNV human case
- ≥ 1 WNV equine case
- ≥ 1 WNV avian case

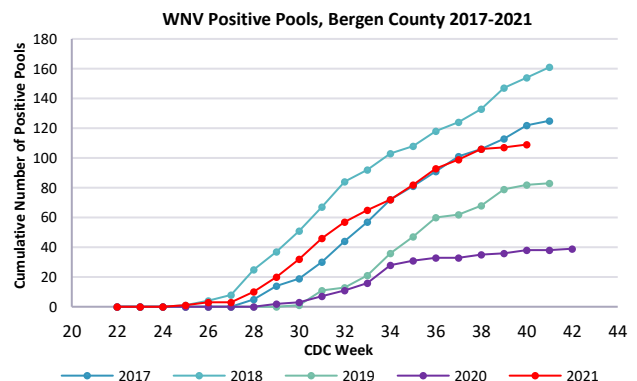


WNV Positive Mosquito Pools by NJ County 2017-2021

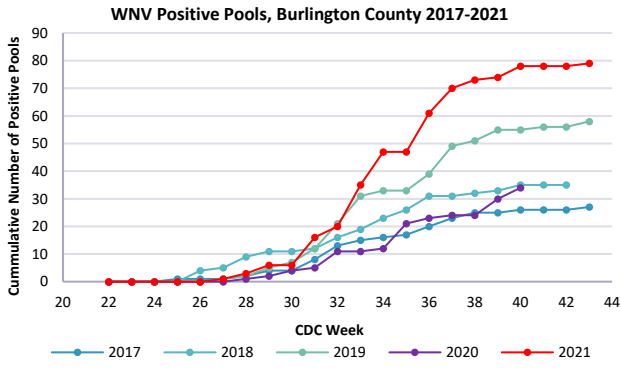
Atlantic County



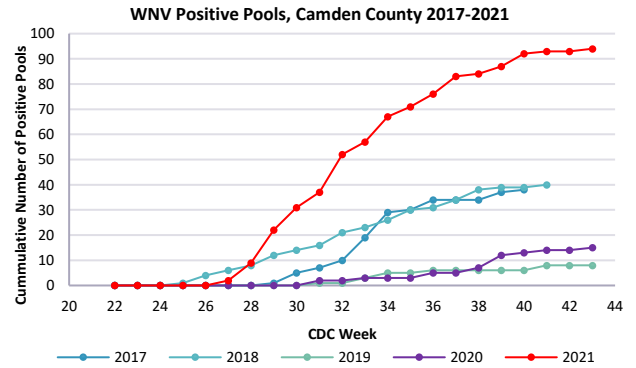
Bergen County



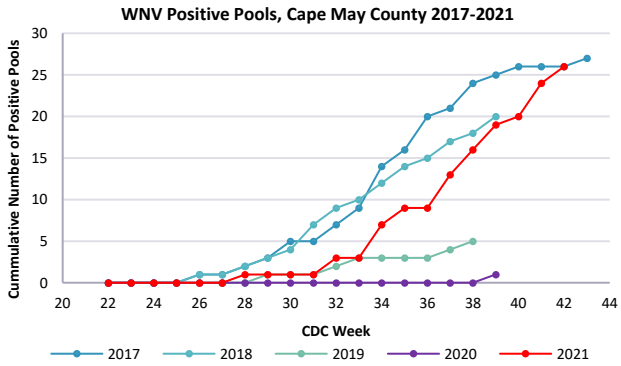
Burlington County



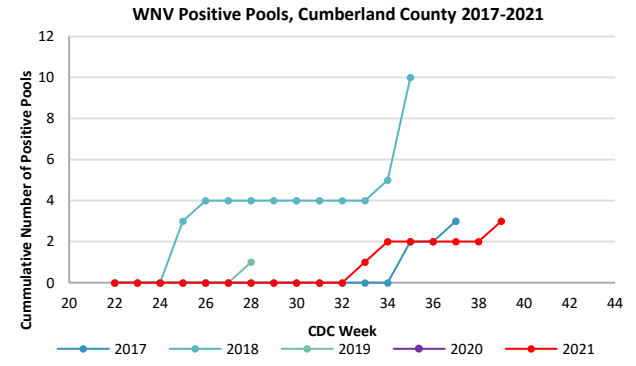
Camden County



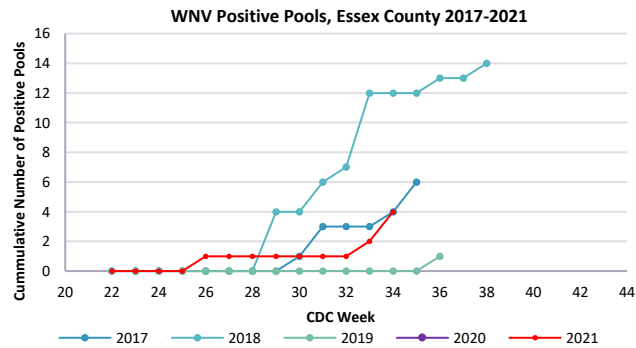
Cape May County



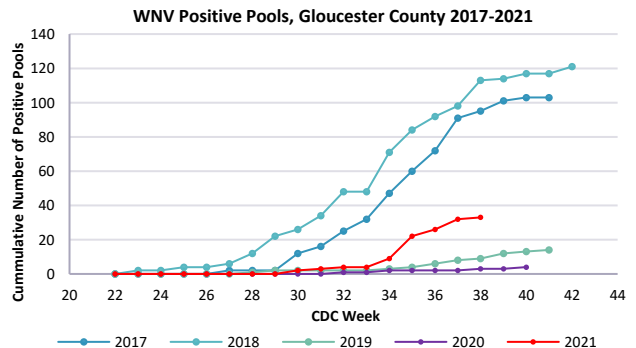
Cumberland County



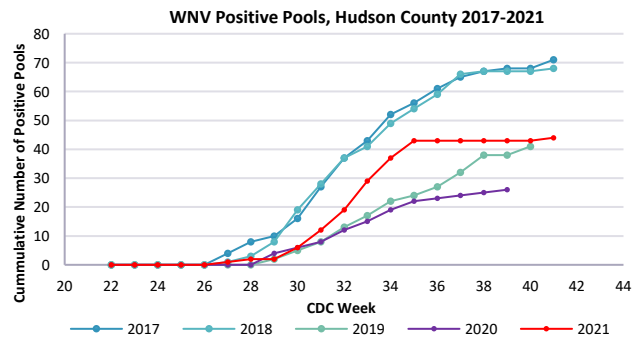
Essex County



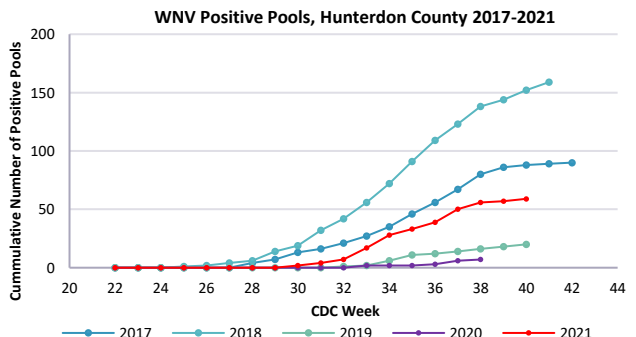
Gloucester County



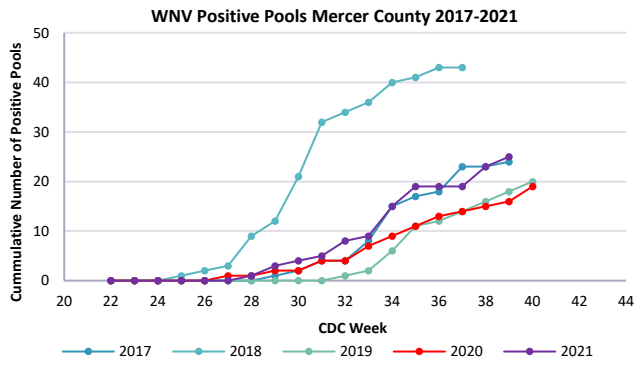
Hudson County



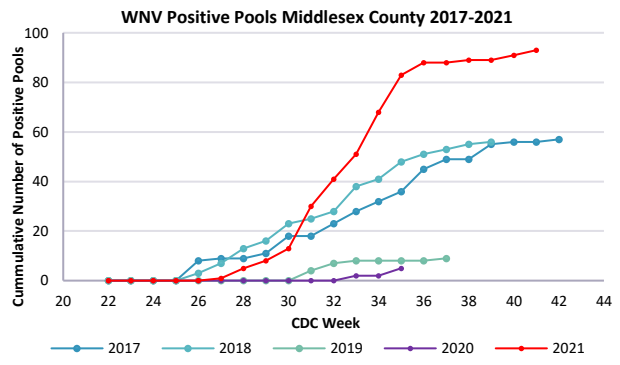
Hunterdon County



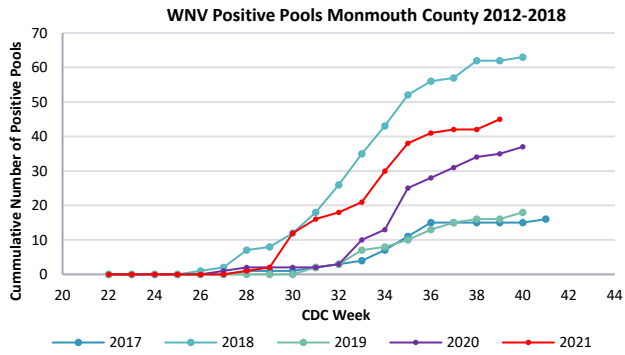
Mercer County



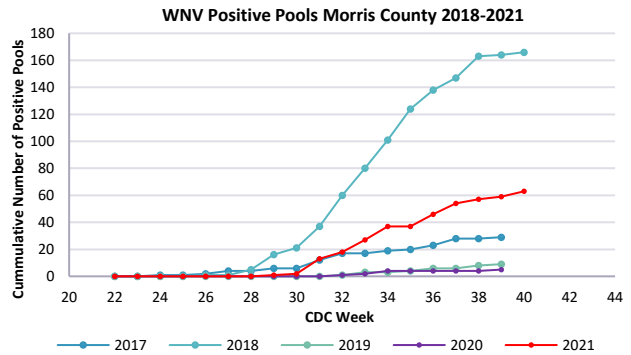
Middlesex County



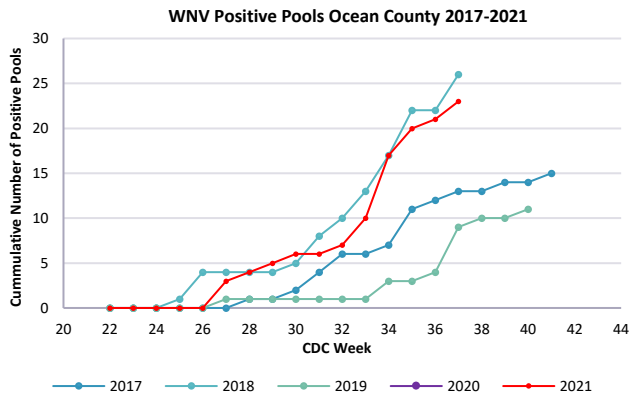
Monmouth County



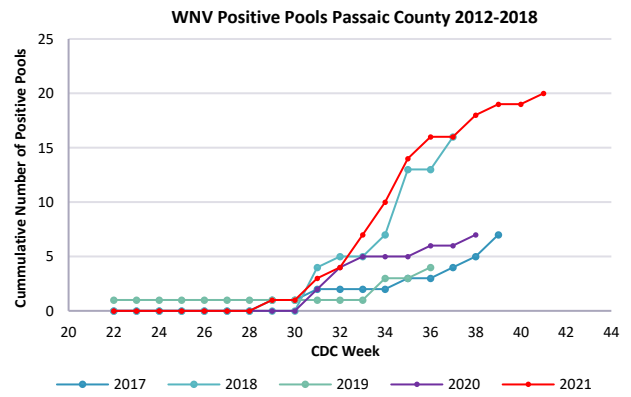
Morris County



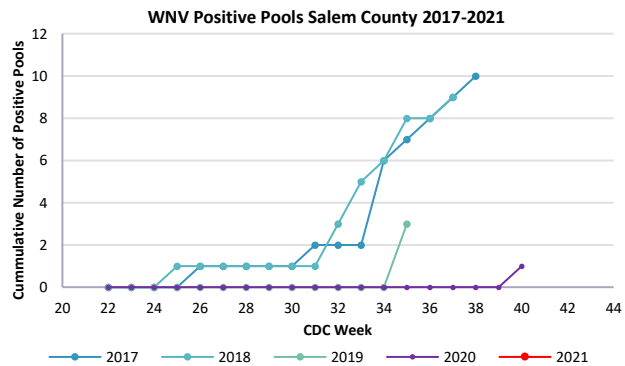
Ocean County



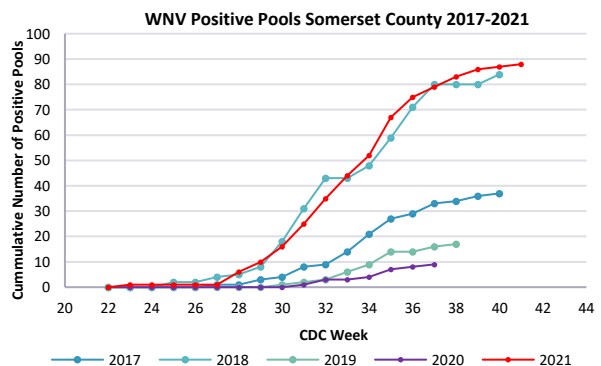
Passaic County



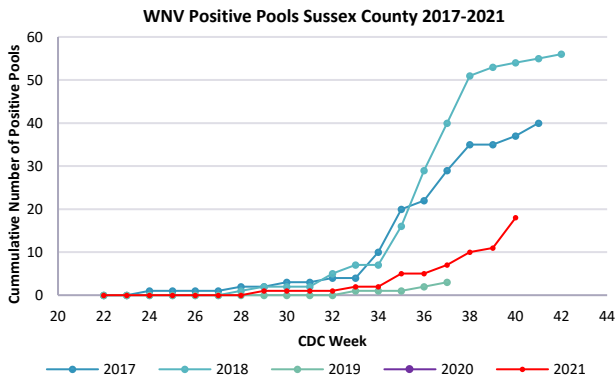
Salem County



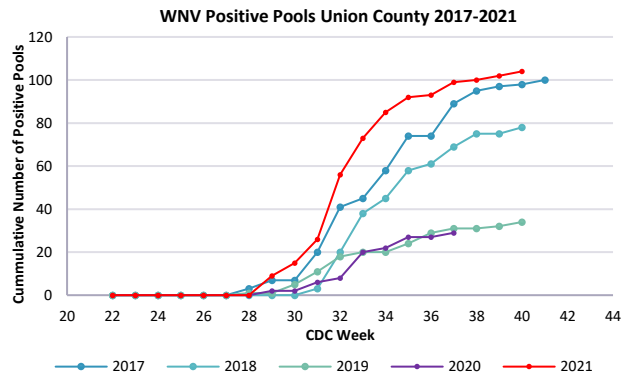
Somerset County



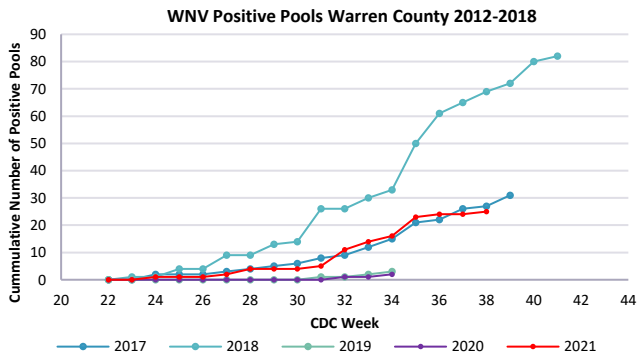
Sussex County



Union County



Warren County



Eastern equine encephalitis virus (EEE)

- In 2021, a total of 8938 mosquito pools were tested for EEE of which 35 pools from 7 counties tested positive (Table 2.1).
- The first positive mosquito pool in 2021 was detected in Week 26 from Gloucester County.
- The EEE positive pools were detected in *Cs. melanura*, *Ae. taeniorhynchus*, *Ae. triseriatus*, *Ae. vexans*, *Anopheles quadrimaculatus* s.l., *Cx. pipiens/restuans/salinarius*, and *Cx. erraticus*; 63% (n=22) were *Cs. melanura* mosquitoes.

EEE Animal Testing:

- Three horses tested positive for EEE in 2021. None tested positive for WNV.
- In Week 34, two unvaccinated horses tested positive for EEE from Atlantic County (8-year-old mare; onset Aug 28; euthanized Aug 29) and Camden County (onset Aug 26; euthanized Aug 27).
- One unvaccinated horse (7-year-old mare) from Cumberland County tested positive for EEE in Week 33 (onset Aug 18; euthanized Aug 19).
- Since 2013, there has been an average of 3 EEE cases per year in New Jersey.

Equine testing for WNV and EEE is conducted at the New Jersey Department of Agriculture's Animal Health and Diagnostic Laboratory.

Table 2.1 EEE Positive Mosquito Pools

County	Cumulative Total	
	2021	2020
Camden	13	3
Atlantic	9	7
Gloucester	6	1
Burlington	3	1
Cape May	2	
Cumberland	1	
Ocean	1	
Salem		1
Bergen		
Essex		
Hudson		
Hunterdon		
Mercer		
Middlesex		
Monmouth		
Morris		
Passaic		
Somerset		
Sussex		
Union		
Warren		
Total	35	13

Figure 3.1 EEE Virus Positive Mosquito Pools, NJ (2020-2021)

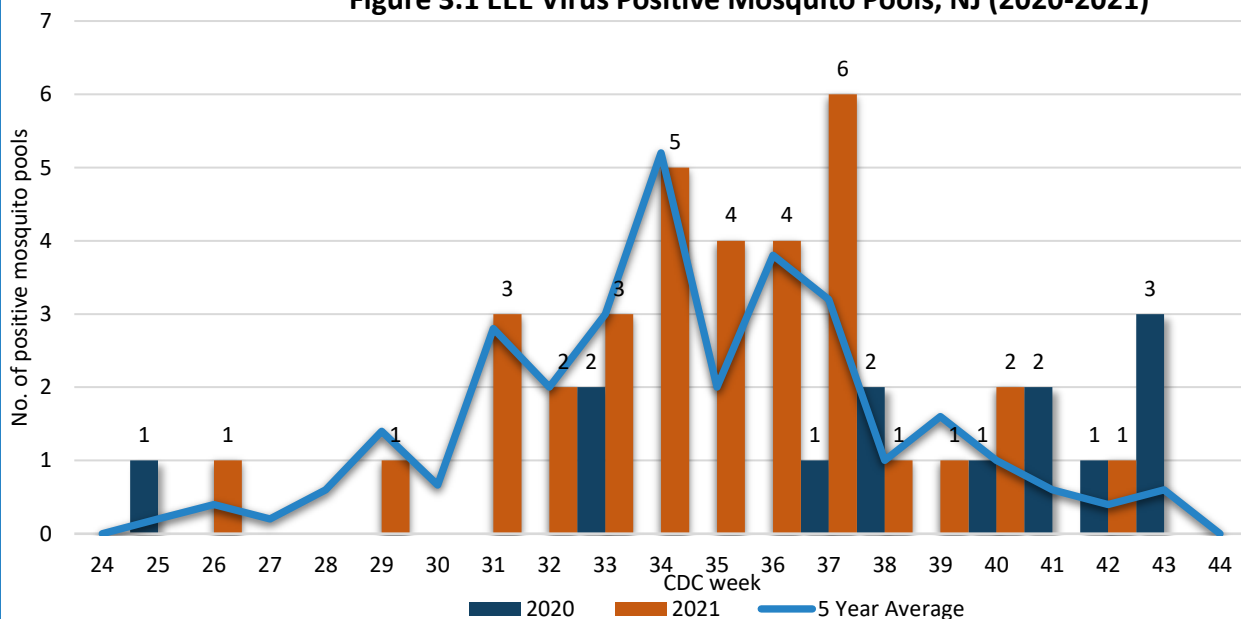
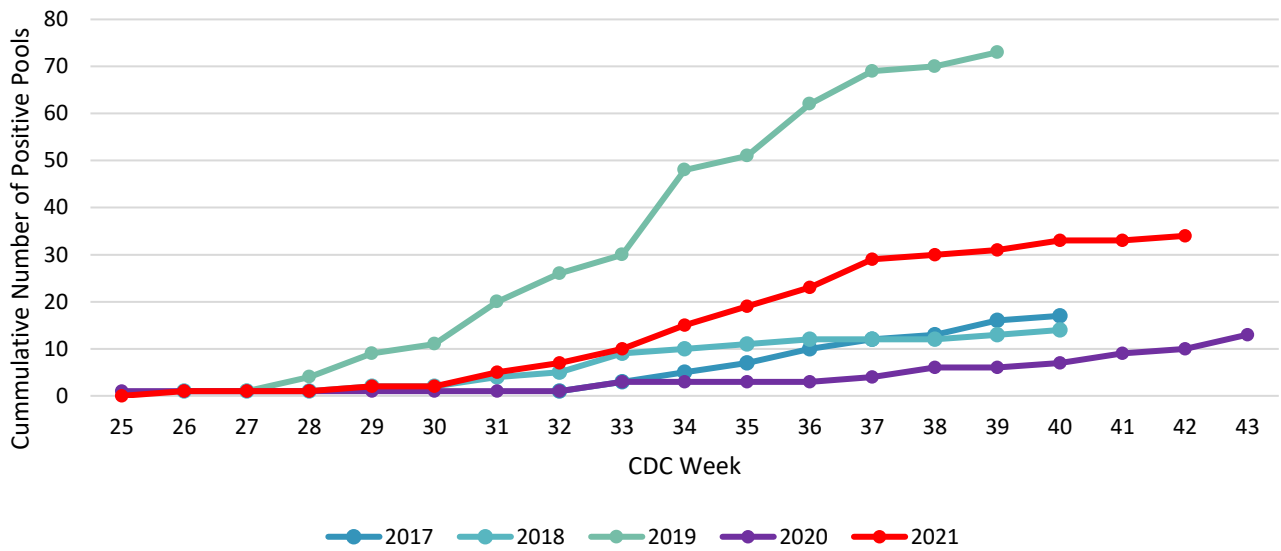


Figure 3.2 EEE Positive Mosquito Pools in NJ, 2017-2021

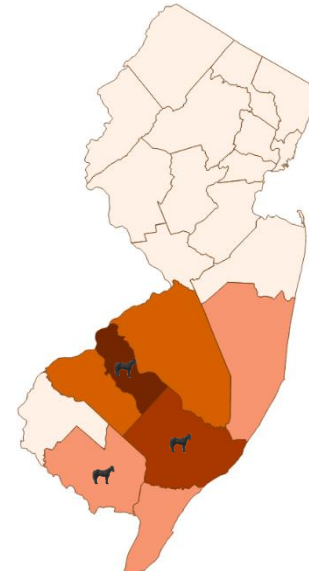
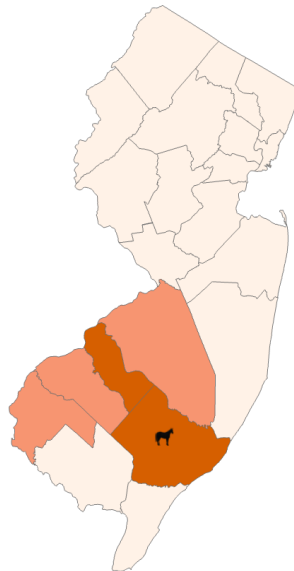


Eastern equine encephalitis (EEE)

2020 EEE Activity

2021 EEE Activity

- EEE Positive Pools**
- > 10
 - ≤ 10
 - ≤ 6
 - ≤ 2
 - No EEE activity
- Human case**
- Equine case**
- Alpaca case**
- Deer case**



Jamestown Canyon Virus (JCV)

- NJ reported 2 human JCV cases this year in Sussex County (week 18) and in Essex County (week 36). The first NJ case was reported in 2015 in Sussex County. The first case of 2021 was a male in his 60s from Sussex County. He was hospitalized for 38 days and expired in mid-June. The second case was a male in his 40s from Essex County. He was hospitalized for 5 days and was discharged to home.
- Eight positive JCV pools were reported in Atlantic County (week 38), Sussex County (week 27), Camden County (week 33, week 35, and Week 41), Essex County (week 34) and Gloucester County (week 35 and week 39).
- In 2020, six mosquito pools from 4 counties tested positive for JCV. The positive pools were identified in Bergen (week 23 and week 25), Cumberland (week 28 and week 33), Middlesex (week 31) and Monmouth (week 29).
- Compared to last year, except for week 27, JCV positive pools were detected later in the mosquito season.

Jamestown Canyon Virus (JCV)

2020 JCV Activity

2021 JCV Activity

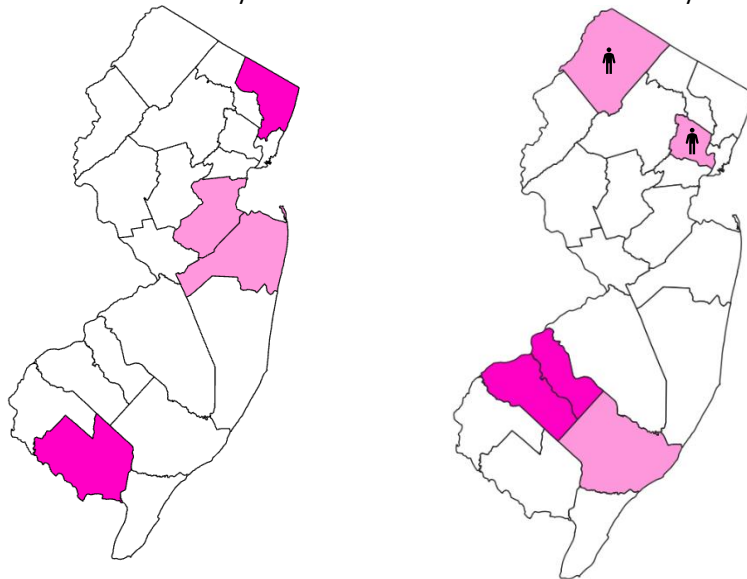
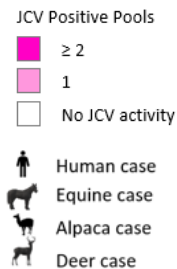


Figure 4.1 JCV Positive Mosquito Pools per CDC Week (2021)

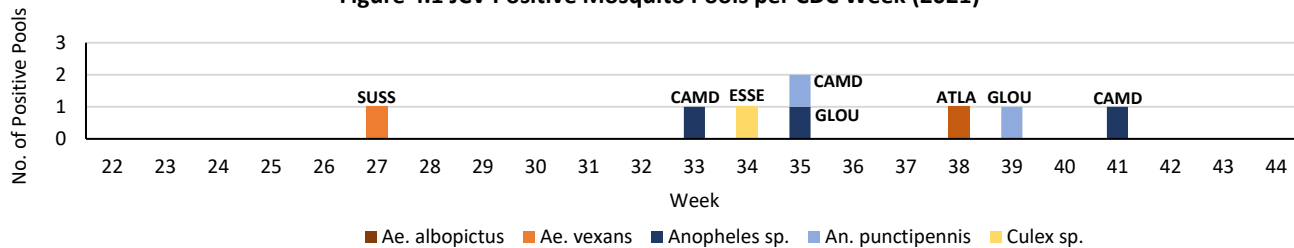
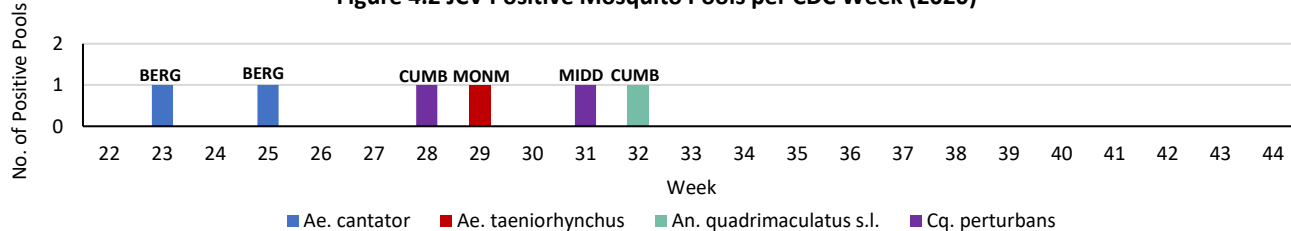


Figure 4.2 JCV Positive Mosquito Pools per CDC Week (2020)



Other viruses:

La Crosse encephalitis virus (LAC):

- No positive La Crosse virus pools have been identified in 2021.
- Prior to the current year, a mosquito pool collected in Passaic County tested positive for La Crosse virus at PHEL in 2019.
- There has not been any human La Crosse virus cases reported in at least the past 20 years.

Other Arboviruses (CHIKV, DENV, SLEV, ZIKV):

- 21 pools were tested for Chikungunya, Dengue, and Zika; none were positive.

Cumulative 2021 Mosquito Pool Testing (Other Viruses ^a)

County	CHIKV		DENV		JCV		LACV		SLEV		ZIKV	
	Pools	Pos	Pools	Pos	Pools	Pos	Pools	Pos	Pools	Pos	Pools	Pos
Atlantic	12		12		716	1			716		12	
Bergen	1		1		401				403		1	
Burlington	1		1		513		12		547		1	
Camden					1008	3			1008			
Cape May	1		1		551				568		1	
Cumberland					420				475			
Essex					94	1			105			
Gloucester					520	2			570			
Hudson					298				304			
Hunterdon					315				355			
Mercer	2		2		463		16		518		2	
Middlesex	2		2		302				339		2	
Monmouth					564				617			
Morris	2		2		407				451		2	
Ocean					344				357			
Passaic					287		3		310			
Salem					553		16		589			
Somerset					282				282			
Sussex					588	1	13		588			
Union					231				231			
Warren					394		4		394			
Total	21		21		9251	8	64		9727		21	

^a Chikungunya virus (CHIKV), Dengue virus (DENV), Jamestown Canyon Virus (JCV), La Crosse encephalitis virus (LAC), St. Louis encephalitis virus (SLE), Zika Virus (ZIKV)
 Numbers in white columns represent the number of pools tested to date in 2021

Numbers in blue shaded columns represent positive pools in 2021

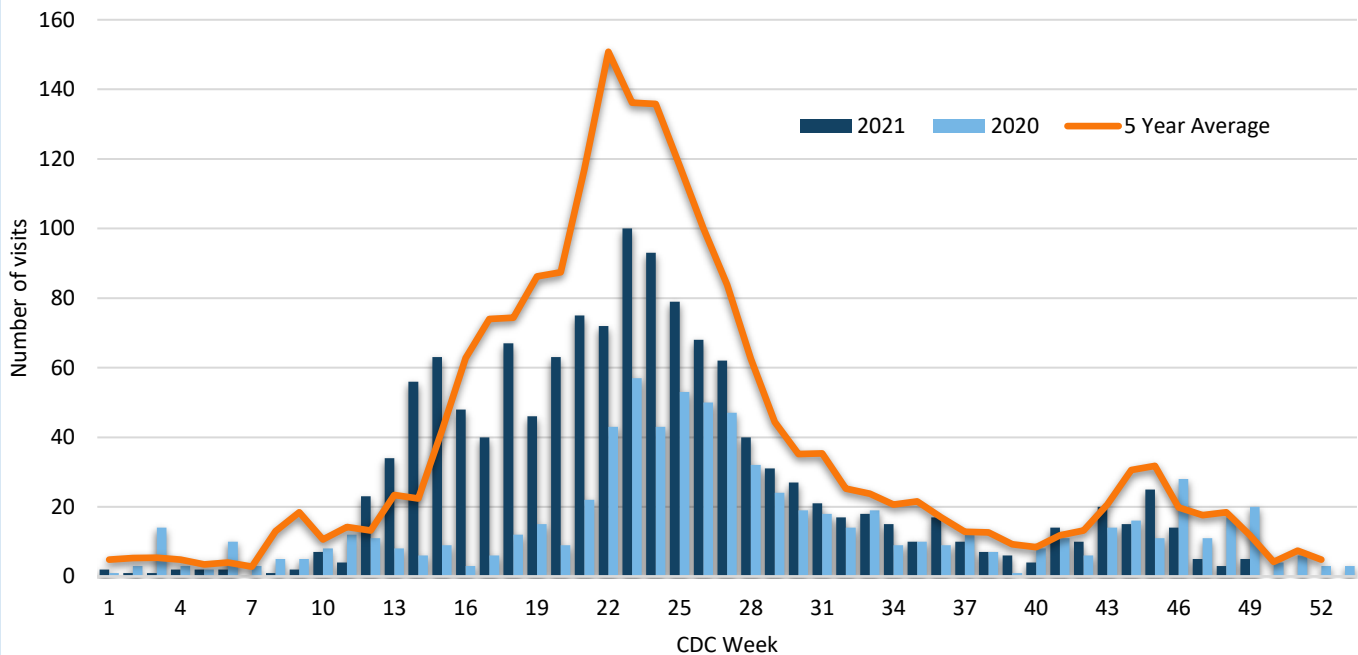
3. Syndromic Surveillance for Tick-related Emergency Department Visits

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 statewide 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 2021, overall tick-related ED visits were lower than the 5-year average, except between Weeks 12-15. However, tick-related ED visits were much higher compared to 2020, when there was a statewide "stay-at-home" order implemented for the COVID-19 pandemic. Despite the current pandemic, tick-related ED visits occurred throughout the year. Increases in tick visits starting on Week 12 coincides with the emergence of nymphal ticks and then again on Week 42 coinciding with the emergence of adult ticks.

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



Data reflects ED visits downloaded from EpiCenter as of December 13, 2021

For More Information

- NJDOH Communicable Disease Service: <http://nj.gov/health/cd/topics/vectorborne.shtml>
- New Jersey Arboviral Activity Maps: <http://bit.ly/JerseySurv>
- 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/>