Annual Arbovirus Report
Rhode Island, 2020

The Rhode Island Department of Environmental Management (DEM) traps mosquitoes at various locations throughout Rhode Island from early June to late September or October annually. Mosquito traps are placed strategically throughout the state based on the knowledge of environmental conditions conducive to West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE) amplification in the mosquito population. Once traps are collected, the mosquitoes captured in each trap are sorted by species into "pools." The Rhode Island State Health Laboratory tests each pool for the presence of WNV and EEE through PCR testing.

Human arboviral cases are investigated by the Center of Acute Infectious Disease Epidemiology within the Rhode Island Department of Health to try to identify potential locations of exposure and ensure that the national arboviral case definition is met. Suspected human cases are reported by providers. Additionally, positive human arboviral test results are received from commercial laboratories by fax or electronic laboratory reports. In either case, confirmatory testing is performed by the Centers for Disease Control in Ft. Collins, Colorado.

2020 Highlights:

- Mosquito traps were set weekly from June 23-October 14, 2020.
- In 2020, 1,798 mosquito pools (22,906 individual mosquitos) were trapped. Of those, 1,681 mosquito pools (21,628 individual mosquitoes) were prioritized for testing for the presence of WNV and EEE, of which one pool tested positive (0.1%) for EEE. In 2019, there were 12 mosquito pools that tested positive for arboviruses (EEE: 8, WNV: 4).
- The single EEE positive mosquito pool was collected in Westerly on August 11, 2020 and consisted of *Culiseta melanura*, an important vector for EEE.
- A white-tailed deer euthanized in North Kingstown on August 21, 2020 tested positive for EEE.
- There were no human cases of EEE or WNV reported in 2020.

2020 Rhode Island Arbovirus Surveillance	
Total Number of Mosquito Pools Tested	1,681
WNV-Positive Mosquito Pools	0
EEE-Positive Mosquito Pools	1
WNV-Positive Horses	0
EEE-Positive Horses	0
EEE-Positive Deer	1
Human WNV Cases	0
Human EEE Cases	0

Over the summer months, DEM issues a weekly mosquito advisory announcing the most recent mosquito pool test results along with information on how Rhode Islanders can prevent mosquito bites. Please refer to the RIDEM Website for past and future mosquito advisories, as well as for additional information on mosquito control and prevention.

- Please refer to the RIDOH EEE website for more information on EEE
- Please refer to the RIDOH WNV website for more information on WNV.
- Additional information can be found on the CDC's WNV website and the CDC's EEE website.

Division of Preparedness, Response, Infectious Disease and Emergency Medical Services
Center for Acute Infectious Disease Epidemiology
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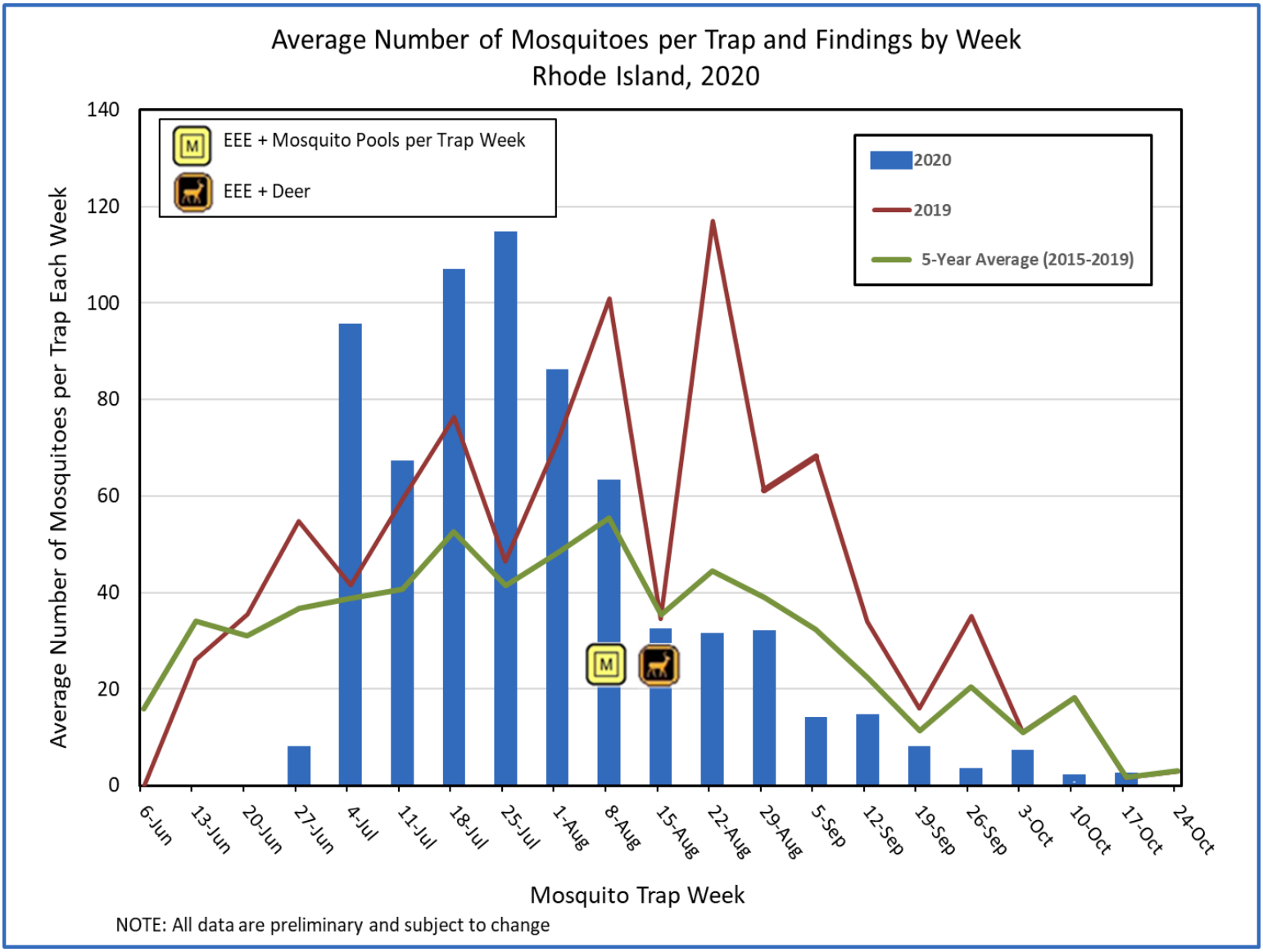
Figure 1: Average Mosquito Density per Trap by Week, Rhode Island, 2020

- The figure below demonstrates the weekly Rhode Island mosquito trap density from June to October 2020.
- While the overall average mosquito trap density peaked in July, the only EEE-positive pool identified during the season was trapped in mid-August when the average mosquito trap densities were declining. Identifying positive mosquitoes in the late summer and early fall is expected since mosquito-borne disease have had the opportunity over the summer to magnify in the mosquito population. The positive pool was comprised of *Culiseta melanura* trapped in Westerly on August 11.
- Comparatively in 2019, the season's peak density was seen in early August and eight EEE positive mosquito pools were identified from early August until early October.



NOTE: All data are preliminary and subject to change

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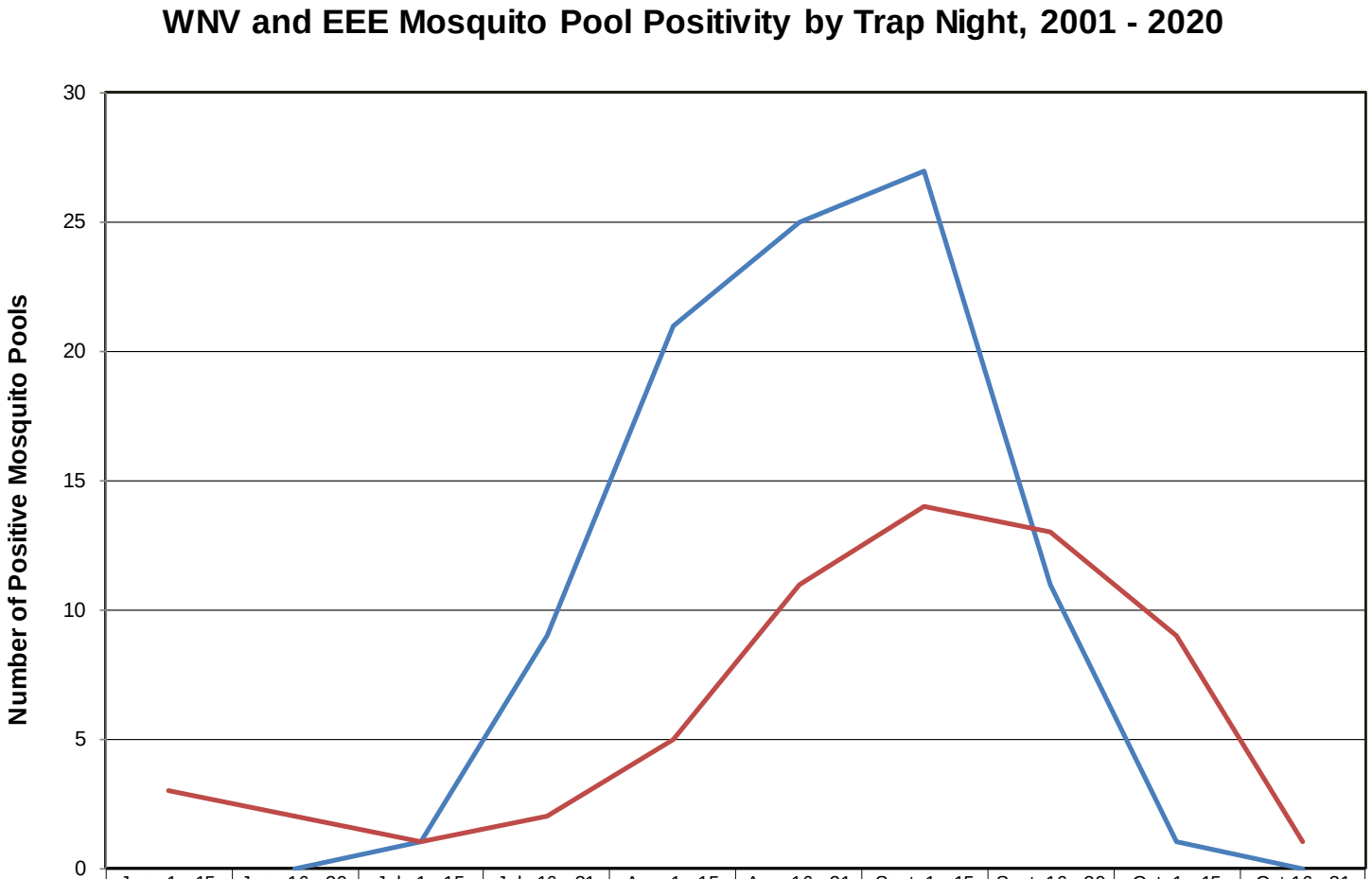
Table 1 : Mosquito Surveillance: Pools by Species, Rhode Island, 2020

Between June 23, 2020 and October 14, 2020, the Rhode Island Department of Environmental Management trapped 1,798 mosquito pools comprised of 22,907 individual mosquitoes. The table below describes the mosquito species trapped monthly during the 2020 arboviral season.

Species	June	July	August	September	October	Total
Aedes abserratus	2					2
Aedes albopictus	3	1	5	3		12
Aedes aurifer	7	1				8
Aedes canadensis	21	52	8	2		83
Aedes cantator	5	29	4	3		41
Aedes communis		1				1
Aedes excrucians	1					1
Aedes fitchii		1				1
Aedes grossbecki		2				2
Aedes hendersoni			2			2
Aedes japonicus	7	30	28	10	2	77
Aedes provocans		1		2		3
Aedes sollicitans	3	2	2	1		8
Aedes sticticus		1				1
Aedes stimulans	1	4	1			6
Aedes taeniorhynchus	9	51	30	12	1	103
Aedes thibaulti	2	3	2			7
Aedes triseriatus	1	15	11	5		32
Aedes trivittatus		1	2			3
Aedes vexans	1	34	24	12	2	73
Aedes spp.	9	24	10	2		45
Anopheles crucians	1	15	27	9	2	54
Anopheles punctipennis	8	22	33	21	1	85
Anopheles quadrimaculatus	6	29	46	18	3	102
Anopheles walker	3	16	15	2	2	38
Anopheles spp.		1	8	1		10
Coquilletidia perturbans	35	188	95	20	1	339
Culex spp.	22	111	135	68	11	347
Culiseta melanura	22	49	51 1 EEE (+)	33	9	164 0.7% Positivity (151 of 164 pools tested)
Culiseta morsitans			2			2
Culiseta spp.		3				3
Psorophora ferox		4	1	1		6
Uranotaenia sapphirine	4	27	63	37		131
Unknown spp.		1	4	1		6
Total	173	719	609	263	34	1,798

Figure 2 : Mosquito Pools Identified by Trap Night

- During the latter part of summer, mosquito populations decrease, but older mosquitoes are more likely to carry arboviruses, thus increasing the risk of human infection. This is illustrated in the Figure below, which describes the biweekly frequency of WNV and EEE positive mosquito pools for 2001-2020.
- As indicated in the figure, the frequency of positive pools increases through the mid-summer months until it peaks in early September.



	June 1 - 15	June 16 - 30	July 1 - 15	July 16 - 31	Aug. 1 - 15	Aug. 16 - 31	Sept. 1 - 15	Sept. 16 - 30	Oct. 1 - 15	Oct 16 - 31
WNV	0	0	1	9	21	25	27	11	1	0
EEE	3	2	1	2	5	11	14	13	9	1

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Table 2: Mosquito Surveillance: Mosquito Pools Collected by Town, Rhode Island, 2020

Town	Total Pools	Percentage of all Pools Collected	Positive Pools	Percent Positivity by Town
Barrington	80	4.4	0	0
Block Island	60	3.3	0	0
Central Falls	71	4.0	0	0
Charlestown	91	5.1	0	0
Coventry	34	1.9	0	0
Cranston	70	3.9	0	0
Cumberland	13	0.7	0	0
East Providence	64	3.6	0	0
Exeter	122	6.8	0	0
Foster	35	1.9	0	0
Glocester	80	4.4	0	0
Hopkinton	25	1.4	0	0
Johnston	49	2.7	0	0
Lincoln	3	0.2	0	0
New Shoreham	6	0.3	0	0
Newport	57	3.2	0	0
North Kingstown	81	4.5	0	0
North Smithfield	54	3.0	0	0
Pawtucket	47	2.6	0	0
Portsmouth	50	2.8	0	0
Providence	25	1.4	0	0
Scituate	8	0.4	0	0
South Kingstown	102	5.7	0	0
Tiverton	160	8.9	0	0
Warren	21	1.2	0	0
Wawick	19	1.1	0	0
West Greenwich	36	2.0	0	0
West Kingston	1	0.1	0	0
West Warwick	58	3.2	0	0
Westerly	276	15.4	1 EEE	0.4 (264 of 276 pools tested)
Total	**1,798**	**100**	**1 EEE**	**0.1 (1,681 of 1,798 pools tested)**

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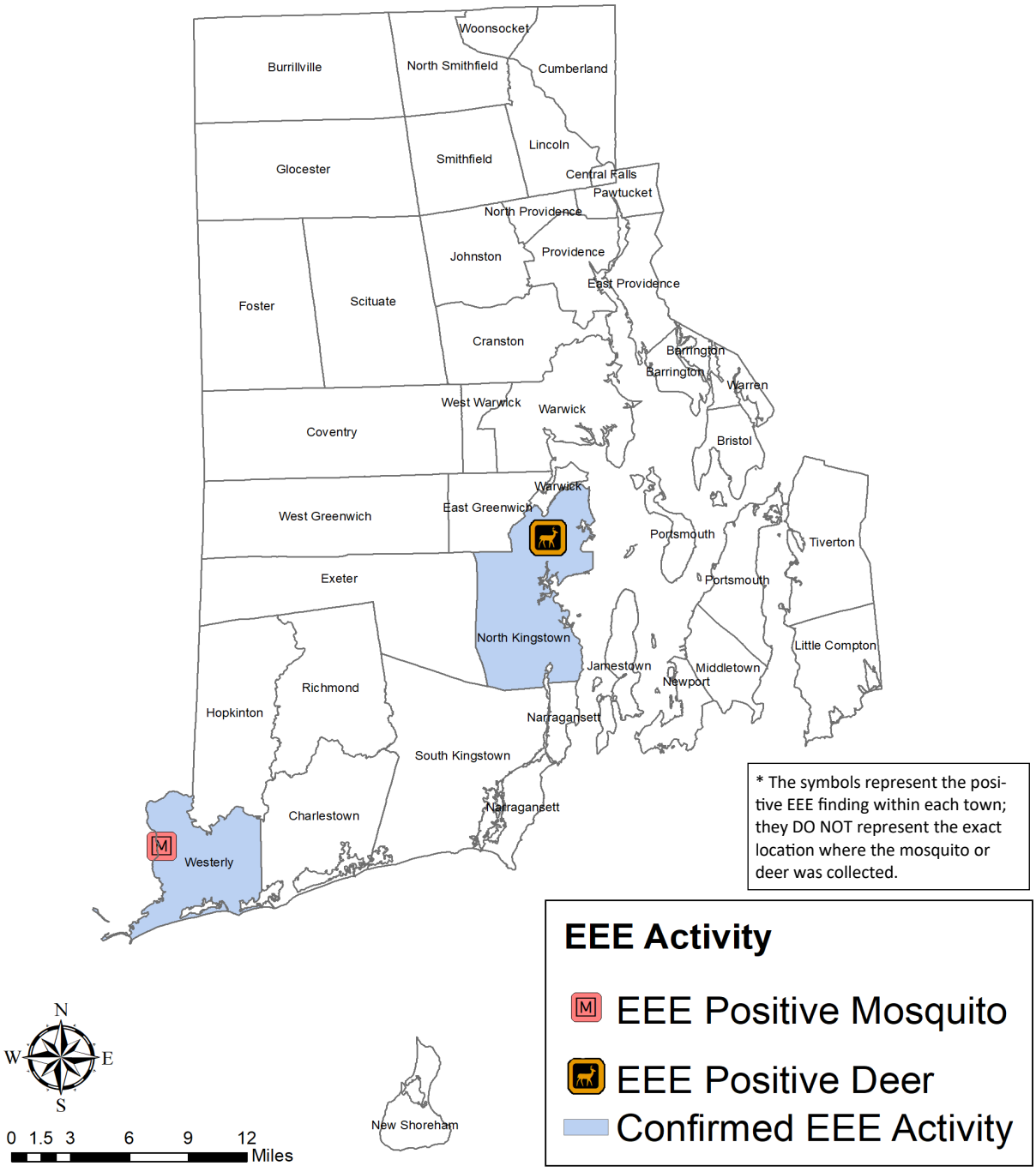
Rhode Island Eastern Equine Encephalitis Activity
Rhode Island, 2020



Center for Acute Infectious Disease Epidemiology, Rhode Island Department of Health

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Table 3: Mosquito Surveillance: Summary Data, Rhode Island, 2001-2020

Year	Number of pools tested	Number of positive counties	Total number of positive Pools	Number of WNV positive pools	Earliest positive trap date for WNV	Number of EEE positive pools	Earliest positive trap date for EEE
2001	1856	3	14	14	7/16/2001	0	NA
2002	1417	2	4	4	8/28/2002	0	NA
2003	2383	4	27	7	8/21/2003	17	9/10/2003
2004	3062	2	7	0	NA	7	7/19/2004
2005	1466	2	2	1	9/19/2005	0	NA
2006	1382	4	19	10	8/8/2006	3	9/17/2006
2007	1048	2	5	5	8/20/2007	0	NA
2008	1207	2	10	10	8/26/2009	0	NA
2009	1138	2	14	3	9/8/2009	3	8/24/2009
2010	1621	3	9	2	8/30/2010	2	8/23/2010
2011	1690	3	3	2	8/22/2011	0	NA
2012	2234	4	16	5	7/9/2012	6	8/6/2012
2013	2311	4	17	8	7/29/2013	4	8/26/2013
2014	1727	2	4	2	8/4/2014	0	NA
2015	2117	3	5	4	8/12/2015	0	NA
2016	1969	3	4	1	7/25/2016	2	8/1/2016
2017	1533	3	5	3	8/7/2017	2	6/26/2017
2018	1967	5	14	10	7/30/2018	4	6/11/2018
2019	2501	4	12	4	8/26/2019	8	8/5/2019
2020	1681	1	1	0	NA	1	8/11/2020

Table 4: Human Arboviral Cases, Rhode Island, 2016-2020

Date	2016	2017	2018	2019	2020	5-Year Total
Eastern Equine Encephalitis Virus (Neuroinvasive)	0	0	0	3	0	3
Powassan Virus (Neuroinvasive)	1	2	0	1	0	4
West Nile Virus	2	2	1	0	0	5
Neuroinvasive	2	1	0	0	0	3
Non-neuroinvasive	0	1	1	0	0	2
Travel Associated Arboviral Cases						
Chikungunya	3	0	0	1	0	4
Dengue	5	1	1	8	1	16
La Crosse Virus (Neuroinvasive)	0	0	1	1	0	2
Zika Virus	75	23	0	0	0	98
Zika Virus Disease, Non-congenital	56	3	0	0	0	59
Zika Virus Infection, Non-congenital	18	20	0	0	0	38
Zika Virus Infection, Congenital	1	0	0	0	0	1

Preventing Mosquito Bites

Mosquitoes are carriers (vectors) for many diseases, including West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE). The species of mosquitoes that carry WNV and EEE are found in Rhode Island and bite until the first heavy frost (usually the end of October). Everyone who participates in outdoor activities should take actions to protect themselves from mosquito bites.

WEST NILE VIRUS

Severe West Nile Virus symptoms can include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. Milder symptoms can include fever, headache, body aches, nausea, vomiting, swollen lymph glands, or rash on the chest, stomach, and back.

EASTERN EQUINE ENCEPHALITIS

EEE symptoms include an abrupt onset of chills, fever, generally unhealthy feeling, joint pain, and muscle pain. Signs and symptoms in patients with encephalitis (brain inflammation) are fever, headache, irritability, restlessness, drowsiness, loss of appetite, vomiting, diarrhea, bluish discoloration, convulsions, and coma.

WHAT YOU SHOULD DO

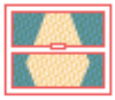
PROTECT YOURSELF

NETTING

Put insect netting over strollers and playpens.

CLOTHING

When spending time outside during warm weather, wear long-sleeved shirts/pants whenever possible, especially if outside during dawn or dusk.



SCREENS

Put screens on windows and doors.
Fix screens that have holes.

BUG SPRAY

Use EPA-approved bug spray with one of the following active ingredients: DEET (20-30% strength), picaridin, IR3535, and oil of lemon eucalyptus or paramenthane-diol.
Do not use DEET on infants.

GET RID OF MOSQUITO BREEDING GROUNDS

CLEAN GUTTERS

Remove anything around your house and yard that collects water. Clean gutters and downspouts to ensure proper drainage.

DUMP STANDING WATER

Remove any water from unused swimming pools, wading pools, boats, planters, trash and recycling bins, tires, and anything else that collects water, and cover them.

PRACTICE SMART SCHEDULING

Avoid scheduling outdoor activities between dusk and dawn.

TIP: Try to end outdoor activities ½ hour before sunset.

For more information, visit the Rhode Island Department of Health's website www.health.ri.gov/mosquito
or the Centers for Disease Control and Prevention Website: www.cdc.gov/eee

FIGHT THE BITE

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