

NEBRASKA ARBOVIRUS SURVEILLANCE REPORT 2020 UPDATE Week #18

Date: 10/13/2020. Please note that mosquito testing has completed for the 2020 season. Human, bird, and equine surveillance data may include more recent data. All data is provisional.

SUMMARY

Statewide Arbovirus Summary

Arbovirus	Positive Mosquito Pools	Equine Cases	Human Cases	Asymptomatic Human Blood Donors
West Nile Virus (WNV)	21	2	8	3
St. Louis Encephalitis Virus (SLE)	1	0	0	NA
Western Equine Encephalitis Virus (WEE)	0	0	0	NA
La Cross Encephalitis Virus (LAC)	0	NA	0	NA
Chikungunya Virus (CHIK)	0	NA	0	NA
Dengue Virus (DEN)	0	NA	2	NA
Zika Virus (ZIKA)	0	NA	0	NA

*Please note that data included in this table are from reports received in 2020. Exposure and onset dates may not have occurred in 2020.

Table 1. – Summary Regional West Nile Virus Mosquito Testing Data, Season Cumulative Data (Final)

West Nile Virus (WNV) Mosquito Testing Data									
Region	Pools Tested*	# of Culex Tested	WNV Positive Pools*	WNV Mosquito Minimum Infection Rate (MIR)**	5 Yr Avg MIR	MIR Activity****	WNV Vector Index (VI)***	5 Yr Avg VI	VI Activity****
West*****	404	6735	5	0.74	1.75	1	0.016	0.121	1
Central*****	582	6385	12	1.89	1.47	3	0.031	0.053	1
East*****	716	5662	4	0.71	1.34	1	0.010	0.058	1
Statewide	1702	18782	21	1.12	1.56	1	0.019	0.076	1

*Pools are a collection of *Culex* mosquitoes consisting of between 1-50 adult female mosquitoes. The *Culex* are pooled according site, species, and collection date. For example, if site “A” had 55 *Culex tarsalis* female mosquitoes collected on 5-30-20, then there would be two pools of *Culex tarsalis* consisting of one pool of 50 and another pool of 5.

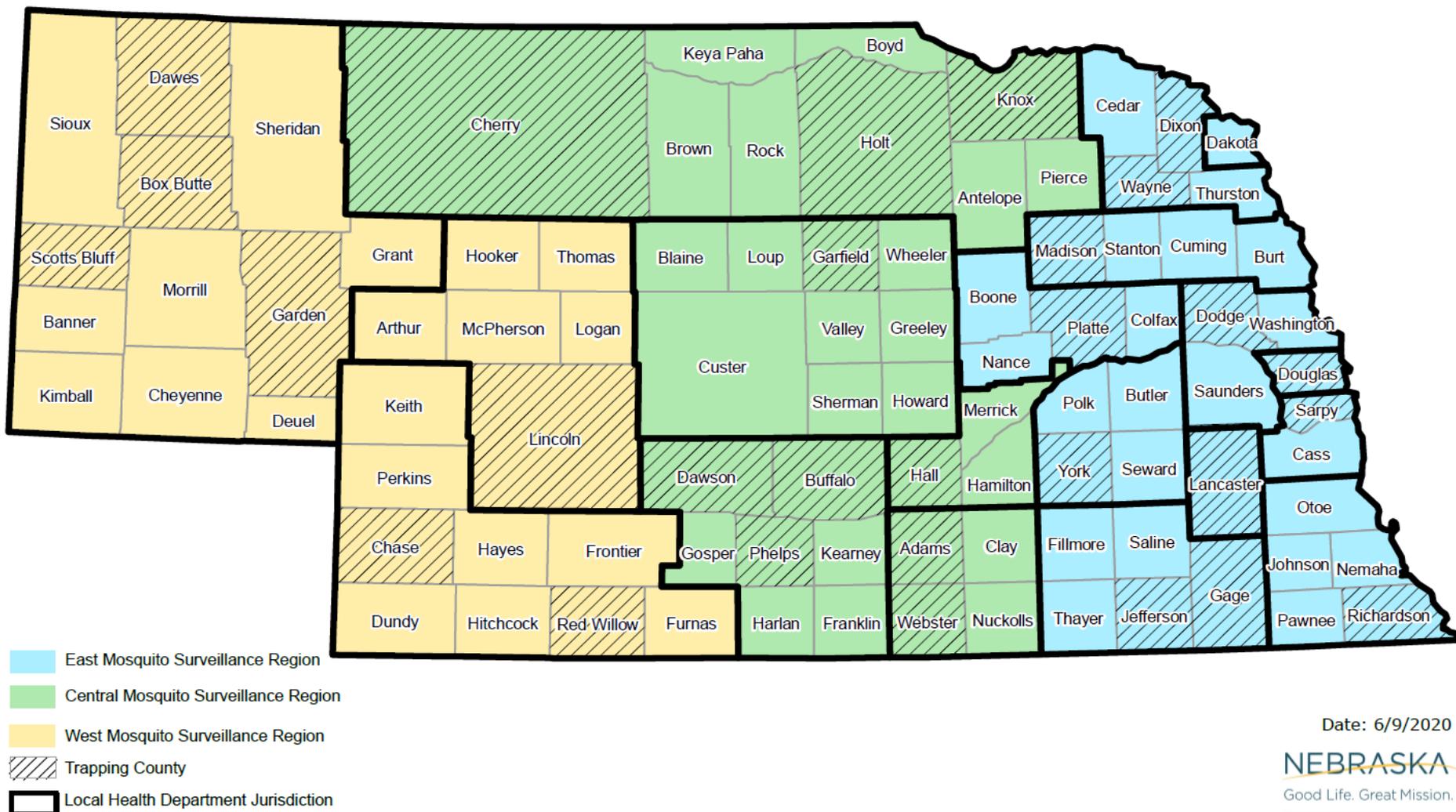
**WNV mosquito minimum infection rate (MIR) is a calculation used to estimate the proportion of infected mosquitoes in an area. It is calculated by: MIR = WNV positive pools/# of mosquitoes tested x 1,000.

***Vector index (VI) is another estimate of the abundance of infected mosquitoes in an area but incorporates information describing relative abundance and the MIR into a single index. It is calculated by: VI= WNV positive pools/# of mosquitoes tested x trap index of mosquito species being tested.

****Activity levels are described in relative terms based on historical data from at most the previous 5 years. Activity levels correspond to: **1= activity at or below average**, **2 = activity marginally elevated above average (up to 15% greater than average)**, **3 = activity moderately elevated above average (up to 30% greater than average)**, **4 = activity significantly elevated above average (up to 45%)**, and **5 = activity extremely elevated above average (>45%)**.

***** Regional breakdowns (see pg. 2 for map) are as follows: **West** = Panhandle Public Health Department (Box Butte, Dawes, and Garden Counties), Southwest NE Public Health Department (Chase and Red Willow Counties), Scotts Bluff County Health Department (Scotts Bluff County); **Central** = Central District Health Department (Hall County), East Central District Health Department (Platte County), Four Corners Health Department (York County),Loup Basin Public Health Department (Garfield County), North Central District Health Department (Cherry, Holt, and Knox Counties), South Heartland Health Department (Adams and Webster Counties), Two Rivers Public Health Department (Buffalo, Dawson, and Phelps Counties), West Central District Health Department (Lincoln Co.); **East** = Douglas County Health Department (Douglas County), Elkhorn-Logan Valley Public Health Department (Madison County), Lincoln-Lancaster County Health Department (Lancaster County), Northeast NE Public Health Department (Dixon and Wayne Counties), Public Health Solutions (Gage and Jefferson Counties), Sarpy-Cass Health Department (Sarpy County), Southeast District Health Department (Richardson County), Three Rivers Public Health Department (Dodge County).

Nebraska Mosquito Trapping Regions, 2020



Date: 6/9/2020

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Figure 1. Nebraska Mosquito Light Trap Regions, 2020.

State summary: Routine mosquito surveillance and testing has come to an end for the 2020 season. For the season, 21 positive WNV pools (Central Region: 12, East Region: 4, West Region: 5) and one positive SLE pool (Central Region: 0, East Region: 0, West Region: 1) were detected in the state. This was well below the 5 year average of 81.2 positives. Overall, WNV MIR activity in mosquitoes for the season was below average in most regions. Only the Central region saw MIR moderately above historical norms. The statewide cumulative MIR (pg. 6) was below the 5 year average for the season. VI activity for the season was also below the 5 year average in all regions this season. Cumulatively, the statewide VI was also below the 5 year average (pg. 7) this season. While risk of WNV typically declines as we go through the fall, it is important to remember that while mosquitoes are still active (through first hard freeze), the potential to be infected by a WNV carrying mosquito still remains. **Low or no activity does not mean NO RISK.** Mosquitoes do not advertise if they are infected with a virus and it only takes one bite from a mosquito for a person to become ill. Therefore, proper mosquito prevention should always be practiced when individuals will be outside during the mosquito season. **Four additional WNV human clinical cases were reported in Nebraska. Unfortunately, this also includes the state's first WNV death of 2020. An additional WNV equine case was also reported. To date, eight human clinical WNV cases (and one death), three human blood donors, and two equine case have been reported.** Additionally, several travel related human mosquito-borne diseases cases have been reported. Three dengue cases with exposure in Central America (n = 2) and Puerto Rico (n = 1) and two malaria cases with exposure in Africa (n= 2).

Mosquito Testing Protocol: Nebraska Department of Health and Human Services (NDHHS) tests *Culex* mosquito pools (NDHHS partners with local public health departments to collect mosquitoes as part of a mosquito and arboviral surveillance network) through the Nebraska Public Health Laboratory (NPHL). NPHL uses a multiplex RT-PCR panel to test *Culex* pools for West Nile Virus (WNV), St. Louis Encephalitis Virus (SLE), and Western Equine Encephalitis Virus (WEE). All three viruses are endemic in Nebraska with *Culex* mosquitoes being the primary vectors. Additionally, NDHHS tests (via NPHL) any collected invasive *Aedes* (*Aedes aegypti* and *Aedes albopictus*) for Chikungunya Virus (ChikV), Dengue Virus (DENV), Zika Virus (Zika), and La Crosse Encephalitis Virus (LACV) through another multiplex RT-PCR panel. No historical transmission of ChikV, DENV, and Zika has ever been reported in Nebraska, but residents traveling abroad have the potential to bring back the viruses from endemic areas in the world. NDHHS will also continue to test (via NPHL's ChikV, DENV, Zika, and LACV multiplex RT-PCR) collected *Ochlerotatus* (*Aedes*) *triseriatus* (primary vector), *Ochlerotatus* (*Aedes*) *atropalpus*, and *Ochlerotatus* (*Aedes*) *japonicus* (potential secondary vectors) primarily for the presence of La Crosse Encephalitis Virus (LACV). LACV is an endemic virus to the United States with most human cases occurring in the upper Midwest, mid-Atlantic, and southeastern state. While Nebraska has never reported a case, states surrounding Nebraska have reported human cases including: Iowa, Kansas, and Missouri.

Nebraska CDC Light Trap Network Mosquito Surveillance, 2020

Date: 10/13/2020 Final

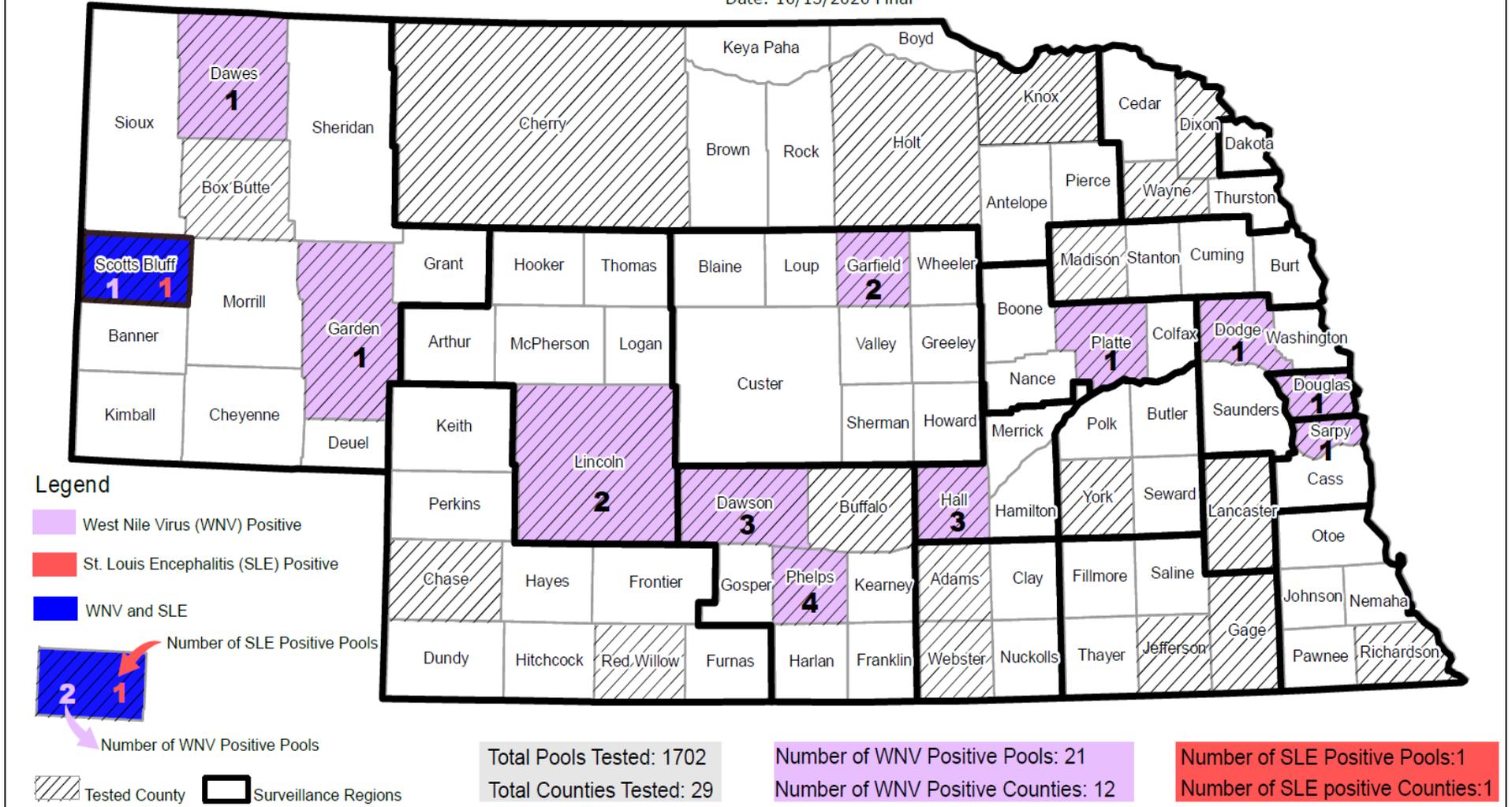


Figure 2. WNV Positive Mosquito Pools by County in the Nebraska CDC Light trap Network, 2020.

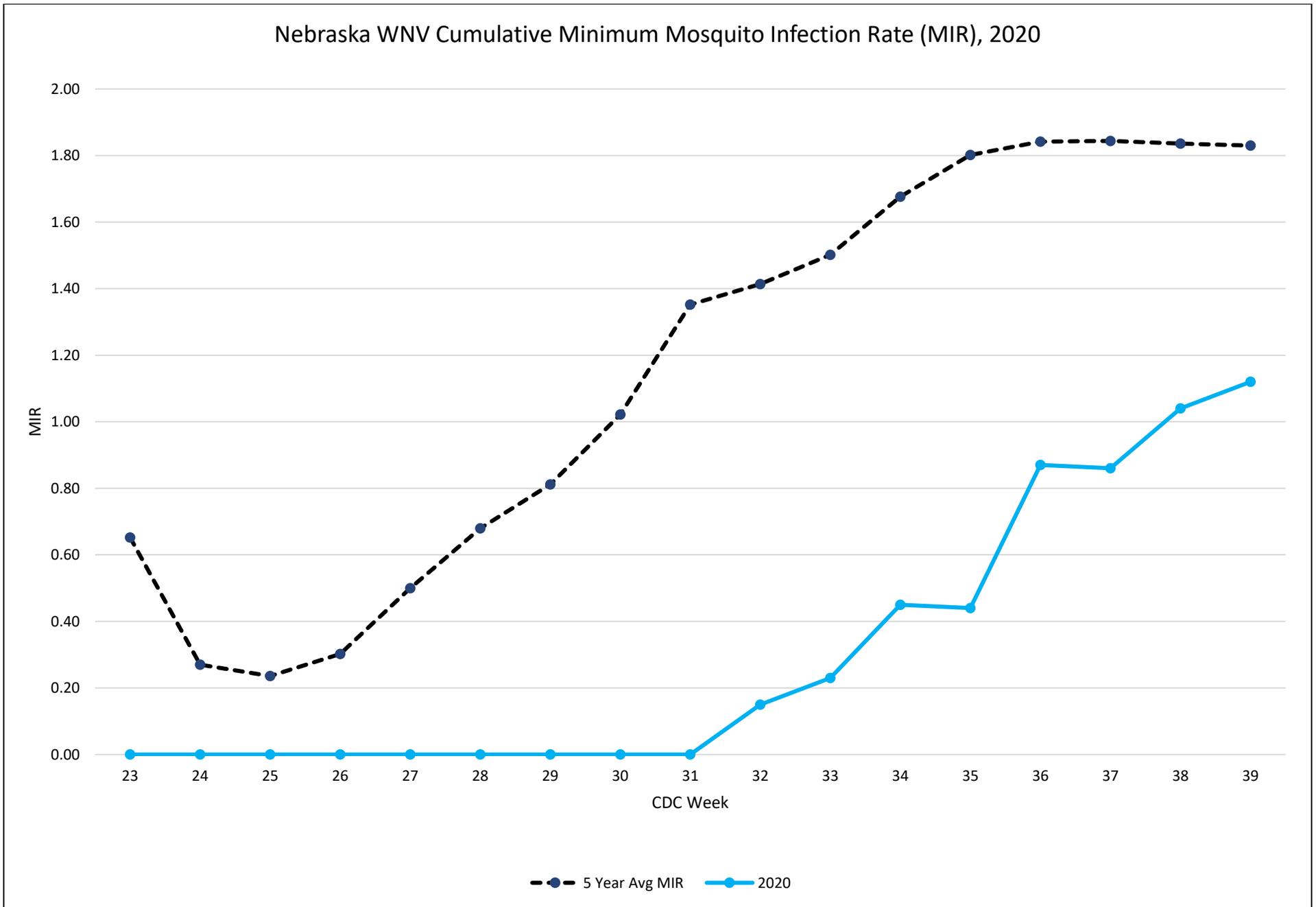


Figure 3. Cumulative WNV Minimum Mosquito Infection Rate (MIR) Nebraska, 2020.

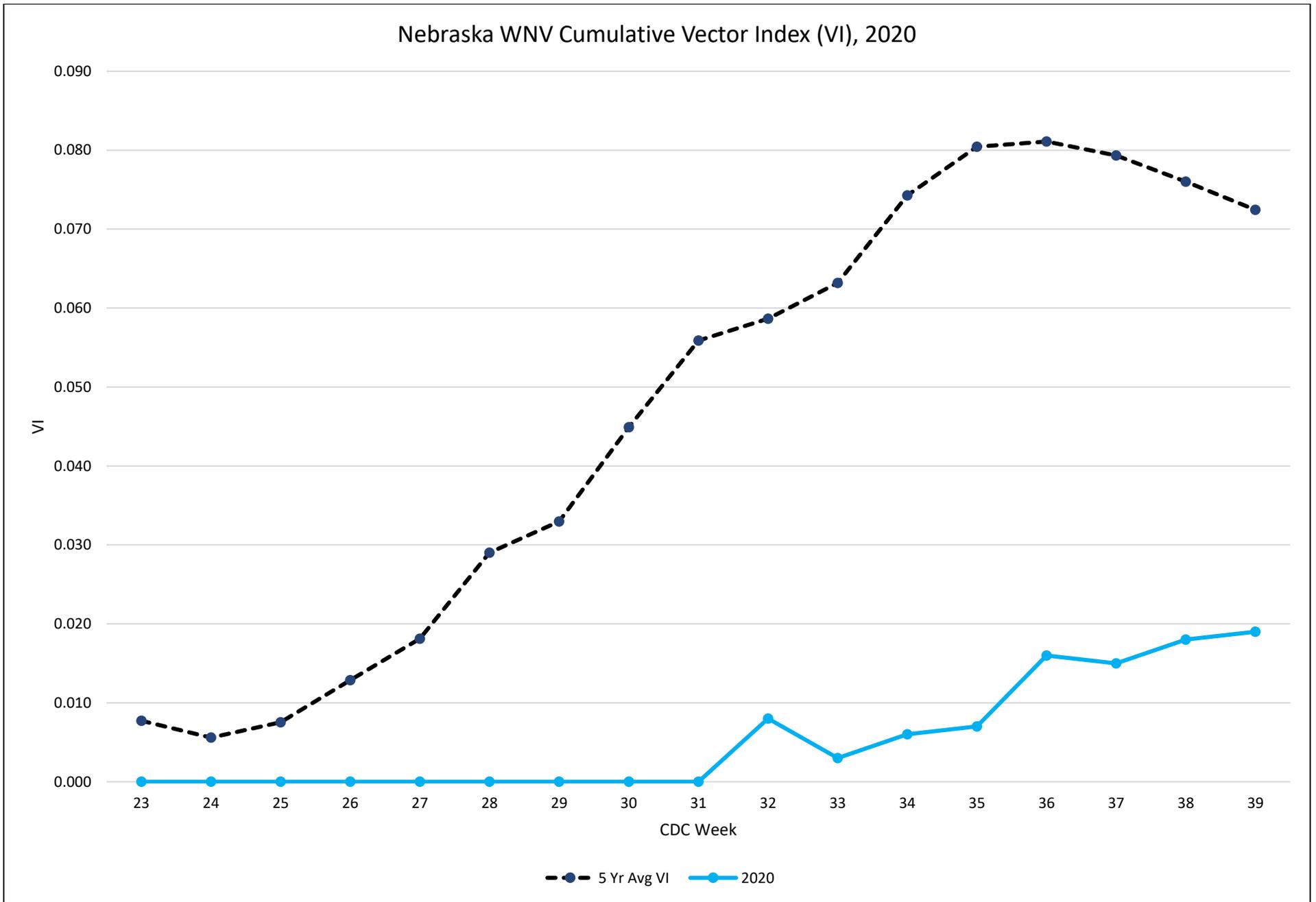


Figure 4. Cumulative WNV Mosquito Vector Index (VI) Nebraska, 2020.

BIRD AND EQUINE SURVEILLANCE

Dead bird reporting and testing: For the 2020 season, 40 total dead birds were reported to the NDHHS dead bird database. The NDHHS dead bird database is now closed for the 2020 season. Due to reductions in funding, dead birds were not be tested in 2020. However, local residents were still encouraged to report dead birds to their local health departments. Dead bird activity can indicate areas where WNV may be circulating locally.

Equine WNV surveillance: The Nebraska Department of Agriculture (NDA) reports equine cases of WNV to NDHHS. As of 10/13/2020, two equine WNV cases have been reported (Holt =1; Wayne= 1) by NDA (see Figure 5 on page 9).

West Nile Virus Equine Surveillance, Nebraska, 2020 (n=2)

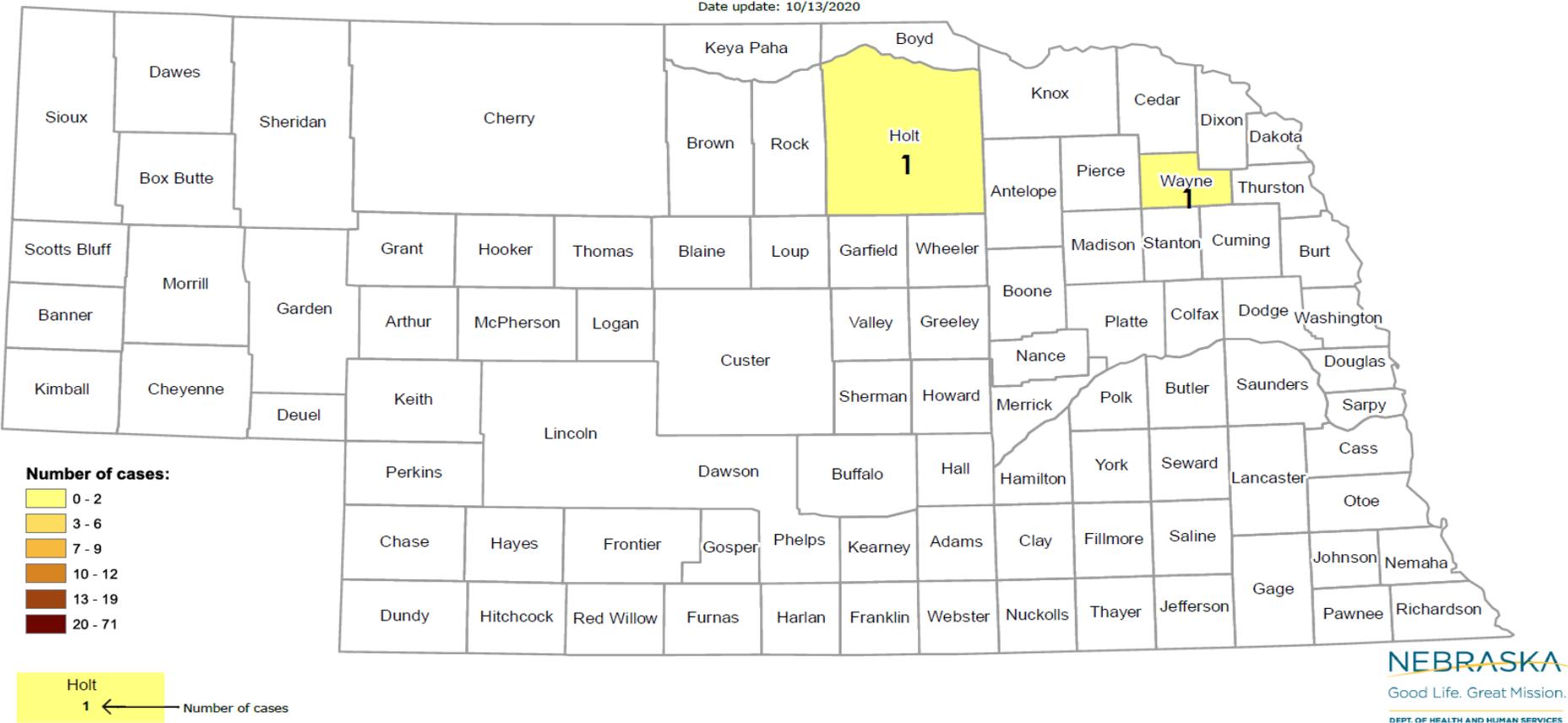


Figure 5. 2020 Nebraska Equine WNV Cases.

HUMAN MOSQUITO-BORNE DISEASE CASES

Weekly reported cases (confirmed and probable) of human clinical mosquito-borne disease infections in Nebraska residents is summarized in the table below. It includes human infections of WNV, SLE, WEE, ChikV, DENV, Zika, and malaria. Please note that cases are by earliest report date of infection not necessarily by date of onset. Table includes cases reported in 2020. Please note that had exposure or onset of disease may not have occurred during 2020. All data is preliminary and may change as more information is received.

Remarks: To date Nebraska has reported eight human WNV clinical cases and three human WNV blood donors. Several travel related mosquito-borne disease cases have been reported this year and include two malaria and three dengue cases (all acquired from outside of Nebraska).

Table 2. Mosquito-Borne Disease Cases in Nebraska Residents by Report Week, 2020

CDC Week	Week Ending Date	WNV^ (Clinical Cases)	WNV^ (Asymptomatic Blood Donors)	SLE^	WEE^	CHIKV*	DENV*	ZIKA*	Malaria*	Total
1	4-Jan-20	0	0	0	0	0	0	0	0	0
2	11-Jan-20	0	0	0	0	0	1	0	0	1
3	18-Jan-20	0	0	0	0	0	0	0	1	1
4	25-Jan-20	0	0	0	0	0	0	0	0	0
5	1-Feb-20	0	0	0	0	0	0	0	0	0
6	8-Feb-20	0	0	0	0	0	0	0	0	0
7	15-Feb-20	0	0	0	0	0	0	0	0	0
8	22-Feb-20	0	0	0	0	0	0	0	0	0
9	29-Feb-20	0	0	0	0	0	0	0	0	0
10	7-Mar-20	0	0	0	0	0	0	0	0	0
11	14-Mar-20	0	0	0	0	0	0	0	0	0
12	21-Mar-20	0	0	0	0	0	0	0	0	0
13	28-Mar-20	0	0	0	0	0	0	0	1	1
14	4-Apr-20	0	0	0	0	0	0	0	0	0
15	11-Apr-20	0	0	0	0	0	0	0	0	0
16	18-Apr-20	0	0	0	0	0	0	0	0	0
17	25-Apr-20	0	0	0	0	0	0	0	0	0

18	2-May-20	0	0	0	0	0	0	0	0	0
19	9-May-20	0	0	0	0	0	0	0	0	0
20	16-May-20	0	0	0	0	0	0	0	0	0
21	23-May-20	0	0	0	0	0	0	0	0	0
22	30-May-20	0	0	0	0	0	0	0	0	0
23	6-Jun-20	0	0	0	0	0	0	0	0	0
24	13-Jun-20	0	0	0	0	0	0	0	0	0
25	20-Jun-20	0	0	0	0	0	0	0	0	0
26	27-Jun-20	0	0	0	0	0	0	0	0	0
27	4-Jul-20	0	0	0	0	0	0	0	0	0
28	11-Jul-20	0	0	0	0	0	1	0	0	1
29	18-Jul-20	0	0	0	0	0	0	0	0	0
30	25-Jul-20	0	0	0	0	0	0	0	0	0
31	1-Aug-20	0	0	0	0	0	0	0	0	0
32	8-Aug-20	0	0	0	0	0	0	0	0	0
33	15-Aug-20	0	0	0	0	0	0	0	0	0
34	22-Aug-20	0	0	0	0	0	0	0	0	0
35	29-Aug-20	0	0	0	0	0	0	0	0	0
36	5-Sep-20	1	0	0	0	0	0	0	0	1
37	12-Sep-20	1	0	0	0	0	0	0	0	1
38	19-Sep-20	0	1	0	0	0	0	0	0	1
39	26-Sep-20	3	1	0	0	0	1	0	0	5
40	3-Oct-20	1	1	0	0	0	0	0	0	2
41	10-Oct-20	2	0	0	0	0	0	0	0	2
	Total	8	3	0	0	0	3	0	2	16

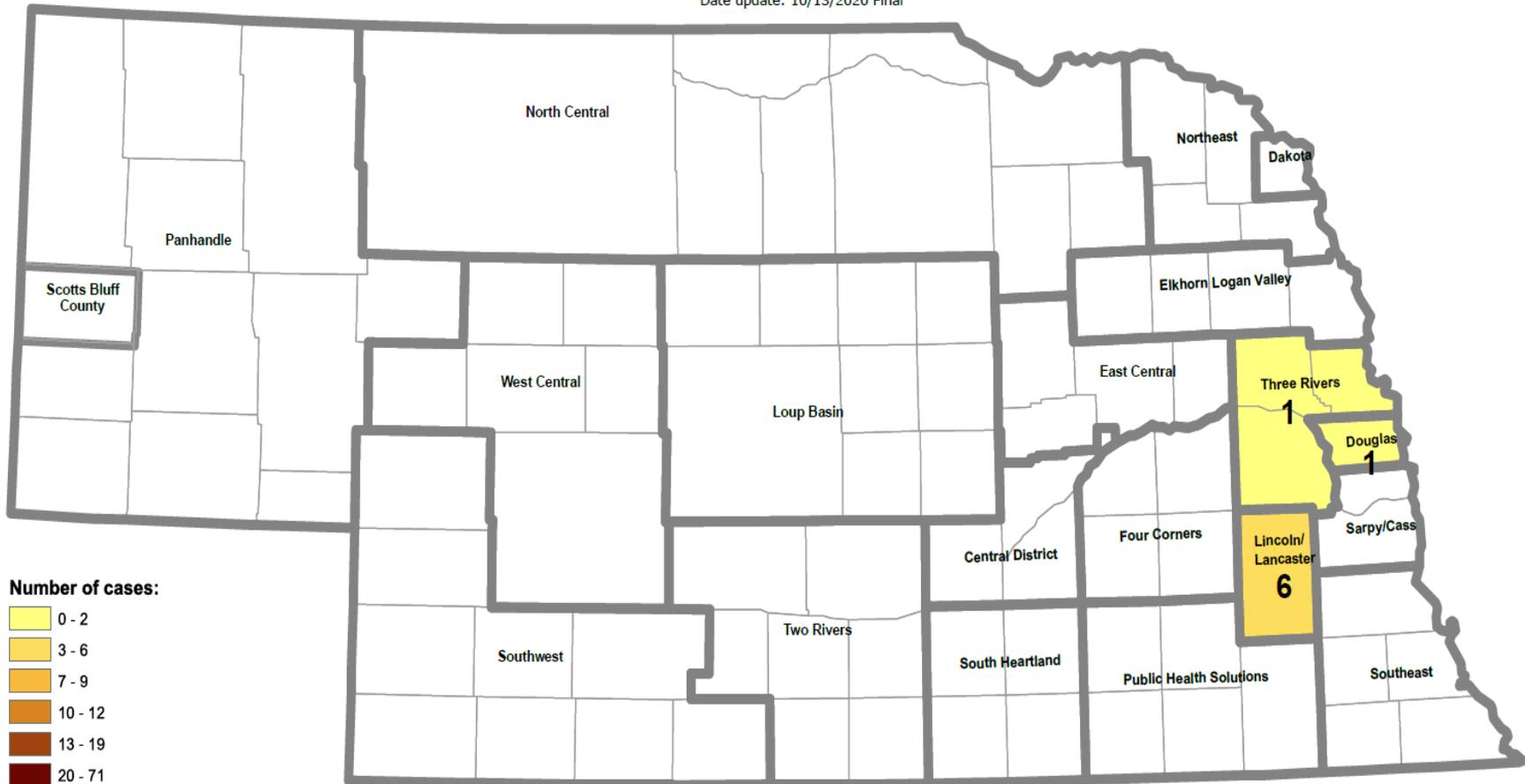
^These are endemic viruses that have been historically transmitted by mosquitoes in Nebraska and maybe acquired within the state. It should be noted that reports are for Nebraska residents and that infection may have been acquired elsewhere. *These diseases are typically acquired via travel overseas to areas where the virus or parasite is endemic. Currently, Nebraska does not have local transmission via mosquitoes of these organisms and the probability of local transmission by local mosquitoes is thought to be very low and not expected. However, to further lower and prevent the chance of local transmission of these “travel-related” diseases, returning travelers or visitors from these areas should prevent mosquito bites for at least three weeks upon arrival to Nebraska. Additionally, although cases of CHIKV, DENV, and ZIKA are most often acquired via overseas travel, small areas of transmission and small, local outbreaks within the U.S. have occurred and may occur in the future. Examples of states that have seen local transmission include: Florida, (DENV, CHIKV, and ZIKA), Hawaii (DENV), and Texas (DENV, CHIKV, and ZIKA).

Table 3. Human WNV Clinical Case Information, Nebraska 2020

Age Range	Number
0 to 10	0
11 to 20	0
21 to 30	1
31 to 40	1
41 to 50	1
51 to 60	2
61 to 70	0
71+	3
Gender	
Male	7
Female	1
Diagnosis	
WNV Neuroinvasive Disease	4
WNV Non-Neuroinvasive Disease	4
Hospitalized	5
Death	1

2020 Human Clinical Positives for West Nile Virus in Nebraska (n=8)

Date update: 10/13/2020 Final



Number of cases:

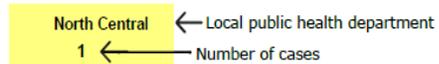
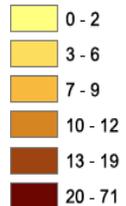
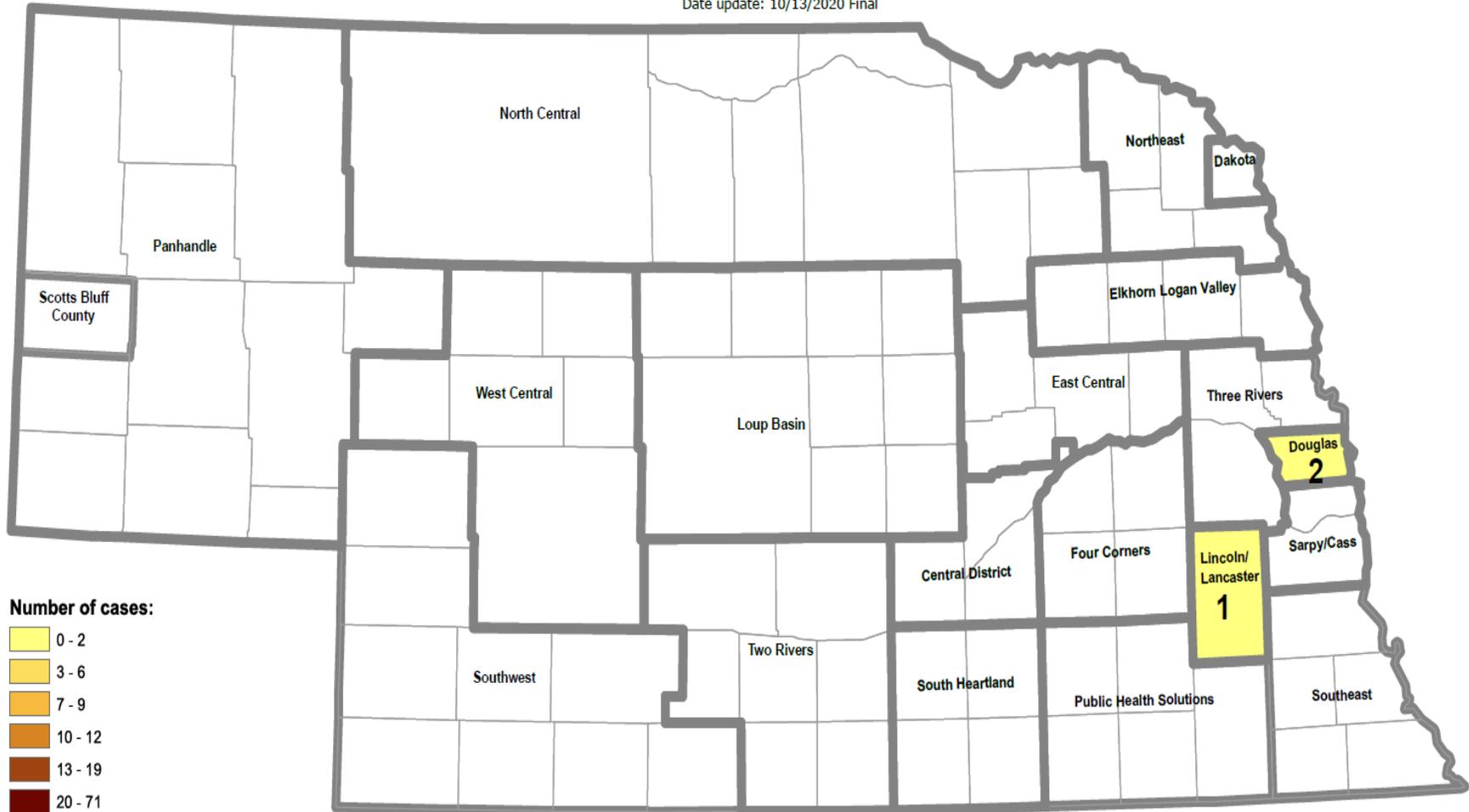


Figure 6. 2020 Nebraska Human WNV Clinical Cases by Local Health Department Jurisdiction.

2020 Human Blood Donor Positives for West Nile Virus in Nebraska(n=3)

Date update: 10/13/2020 Final



Number of cases:

- 0 - 2
- 3 - 6
- 7 - 9
- 10 - 12
- 13 - 19
- 20 - 71

Public Health Solutions ← Local public health department
 1 ← Number of cases

Figure 7. 2020 Nebraska Human WNV Blood Donor Cases by Local Health Department Jurisdiction.

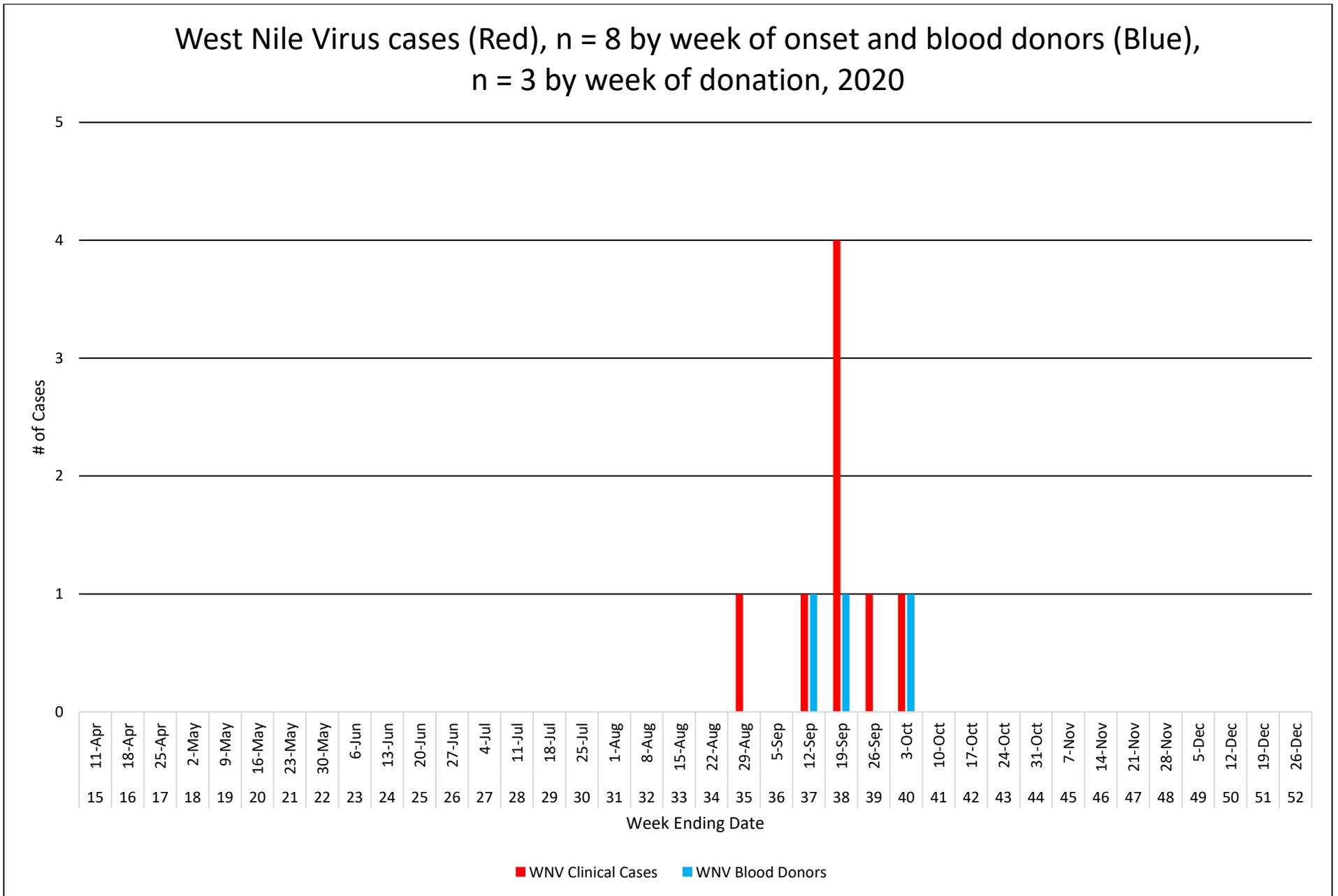


Figure 8. Epi-curve of human WNV infections (clinical and asymptomatic blood donors) by onset week (clinical) and week of donation (blood donor), Nebraska 2020.

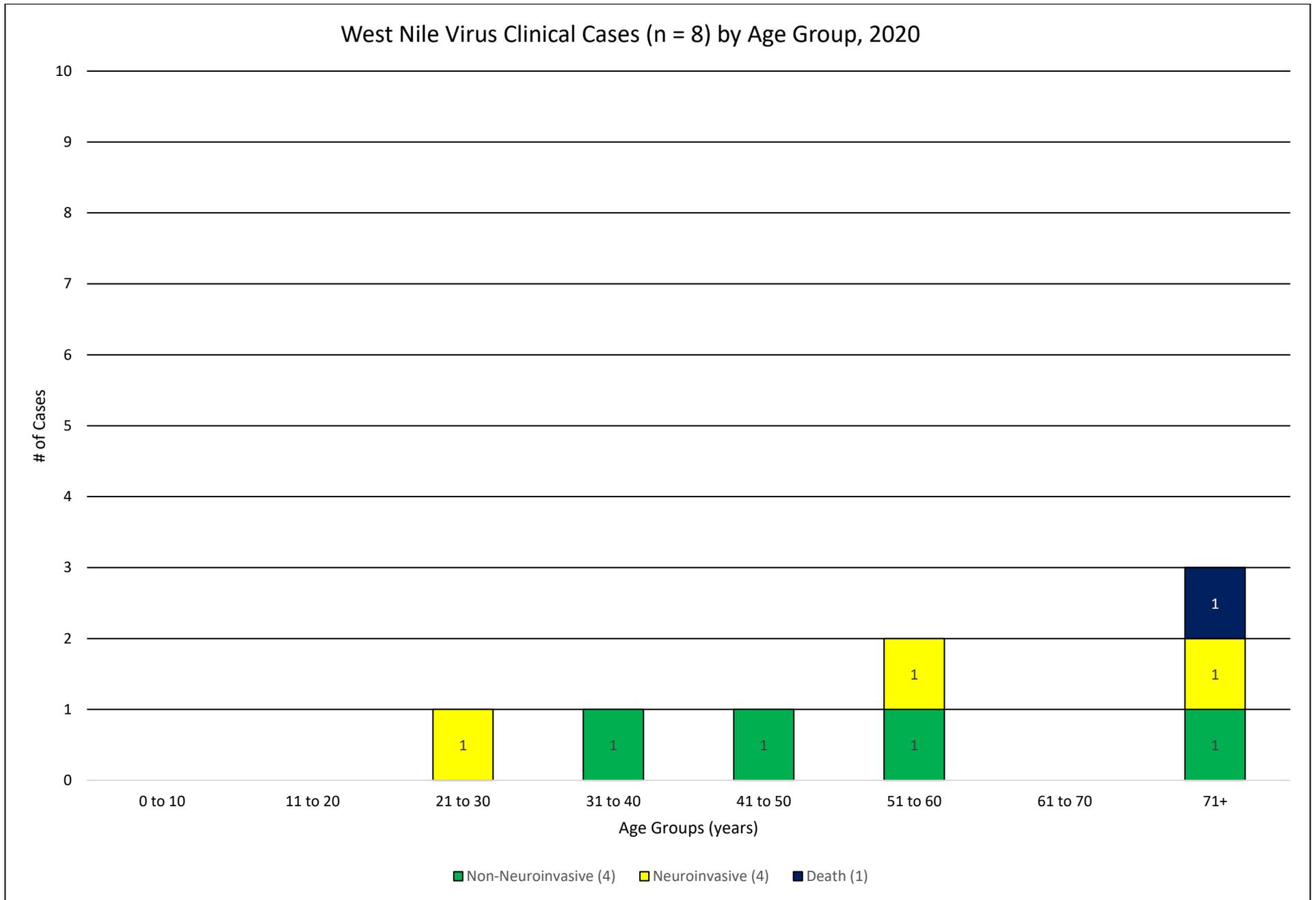


Figure 9. WNV human clinical cases by 10 year age groups, 2020.

Table 4. Number of Human WNV Clinical Cases by Onset Week and Nebraska Local Health Jurisdiction, 2020

CDC Wk.	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	Total	
Local Health Dept. Jurisdiction																					Total	
Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dakota County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
East Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elkhorn-Logan Valley Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Four Corners Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln-Lancaster County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	1	0	0	0	6
Loup Basin Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northeast Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panhandle Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Health Solutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarpy-Cass Dept. of Health and Wellness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scotts Bluff County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Heartland District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southeast District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southwest Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Three Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Two Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statewide Total	0	1	0	1	4	1	1	0	0	8												

Table 5. Number of Human WNV Blood Donors by Week of Donation and Nebraska Local Health Jurisdiction, 2020

CDC Wk.	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42		
Local Health Dept. Jurisdiction																					Total	
Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dakota County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Douglas County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	2
East Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elkhorn-Logan Valley Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Four Corners Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lincoln-Lancaster County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Loup Basin Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
North Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Northeast Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Panhandle Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public Health Solutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sarpy-Cass Dept. of Health and Wellness	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scotts Bluff County Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
South Heartland District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southeast District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Southwest Nebraska Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Three Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Two Rivers Public Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
West Central District Health Dept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statewide Total	0	1	1	0	1	0	0	3														

Anytime mosquitoes are active there is always the possibility of acquiring WNV or another mosquito-borne disease and proper mosquito prevention methods should be utilized both here at home and when traveling abroad. Examples include:

- Applying an EPA approved mosquito repellent (DEET, picaridin, oil of lemon eucalyptus, or IR3535).
- Limiting exposure when outdoors by wearing long sleeve shirts and pants.
- Limiting time spent outdoors when mosquitoes are most active, typically dusk to midnight.
- Getting rid of standing water that mosquitoes may breed in at least once a week. Remember to change water in outdoor pet watering dishes along with bird baths and dump out water in flower pots, garden containers, or other objects that may hold water.

For more information on mosquito-borne diseases and prevention information please visit the following websites:

<http://dhhs.ne.gov/wnv> (Nebraska Department of Health and Human Services WNV Surveillance Program web site).

<http://dhhs.ne.gov/Pages/West-Nile-Virus-Education.aspx> (Nebraska Department of Health and Human Services Mosquito-Borne Disease web site and links to downloadable educational pamphlets).

<https://www.cdc.gov/westnile/> (CDC West Nile Virus web site).

<https://www.cdc.gov/sle/> (CDC St. Louis Encephalitis Virus web site).

<https://www.cdc.gov/chikungunya/index.html> (CDC Chikungunya Virus web site).

<https://www.cdc.gov/dengue/index.html> (CDC Dengue Virus web site).

<https://www.cdc.gov/zika/index.html> (CDC Zika Virus web site).

<https://www.cdc.gov/parasites/malaria/index.html> (CDC Malaria web site).

<https://www.cdc.gov/features/stopmosquitoes/index.html> (CDC Avoid Mosquito Bites web site)



Fight the Bite!!