Public Health
MADISON & DANE COUNTY
Healthy people and places

West Nile Virus Surveillance in Madison and Dane County
2012

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Summary

- Bird surveillance found positive evidence of West Nile virus (WNV) on 09 July 2012.
- A total of 299 sick or dead birds were reported in 2012; this included a total of 213 sick or dead crows and blue jays.
- The Public Health Department continued partnerships with other City of Madison agencies, six neighboring communities, and the University of Wisconsin campus to implement mosquito larvae monitoring and control activities in the Madison metropolitan area.
- Mosquito larvae monitoring determined that nearly 6.5% of water sources in the Madison metropolitan area produced high numbers of *Culex* mosquitoes at least once in 2012; another 2.1% produced high numbers of *Aedes* larvae.
- A total of 5 cases of WNV illness were reported among Dane County residents in 2012. No disease-related death was reported.

Bird Surveillance

In 2012, Public Health Madison and Dane County (PHMDC) cooperated with statewide efforts to collect and test dead crows and blue jays for WNV; two types of birds shown to be susceptible to West Nile infection and compose the majority of birds that test positive for the virus. Table 1 provides a summary of the sick or dead bird surveillance data. In the current reporting year, a total of 213 crows and blue jays were reported and/or collected; three birds were submitted for testing for WNV. All other reported dead birds were either not collected or unsuitable for testing. A positive result for the virus was reported on 09 July 2012.

Table 1. Results of sick/dead bird (crows and blue jays) surveillance in Dane County.

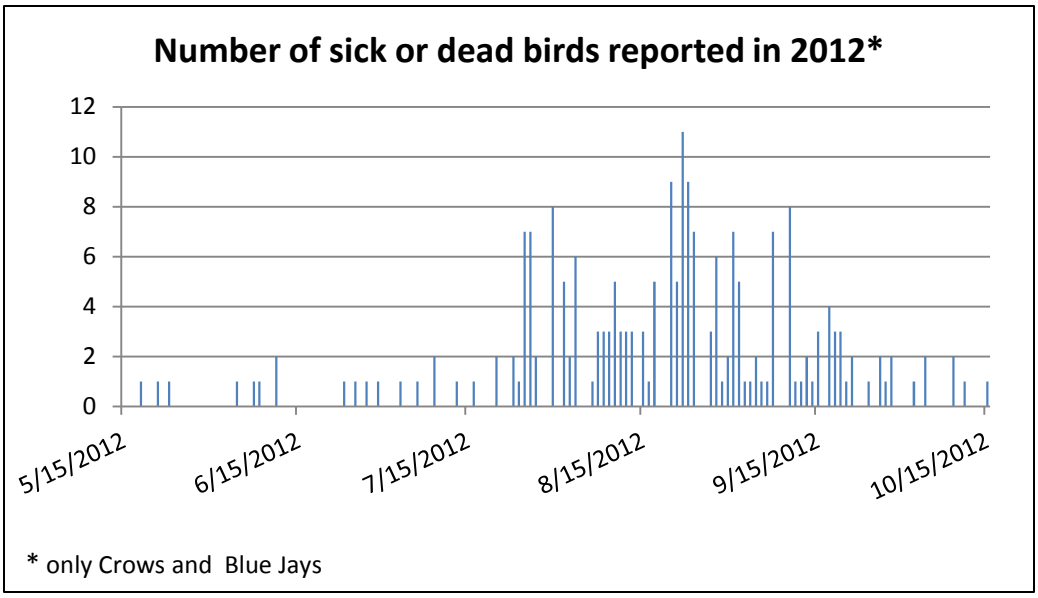
	2004	2005	2006	2007	2008	2009	2010	2011	2012
Date first bird reported	Apr 27	Apr 23	May 3	May 10	May 19	May 18	May 24	March 1	May 18
Date first WNV positive bird collected	May 28	May 19	Jun 5	Jun 13	Aug 6	N/A	N/A	Aug 9	Jul 9
Date WNV testing discontinued for the year	Jun 9	Jun 7	Jun 19	Aug 21	Aug 28	Sep 5	Aug 10	Aug 9	Jul 9
Total # WNV positive birds	6	2	7	2	2	0	0	1	1
Total # birds collected	52	9	15	2	5	6	3	5	3
Total # of sick or dead crows and blue jays reported	389	283	365	106	55	17	8	26	213
Peak weekly average of sick/dead bird reports	7.1	8.4	5.2	1.9	1.4	0.4	0.3	0.9	5.6
Date of sick/ dead bird report peak	June 14	Aug 22	Aug 17	Jul 3	Jul 7	Aug 3	July 13	Aug 24	Aug 22

As in previous years, only a small percentage of the birds reported as sick or dead were collected for WNV analysis. In 2007, the Department changed procedures to focus on collecting sick birds. Prior to 2007, considerable effort was made to collect both sick and dead birds; however, we found that many dead birds reported for collection were not suitable for testing or clearly died from a cause other than WNV. Dead birds were still recorded during 2012 for monitoring purposes. Figure 1 shows the number and date of occurrence for all crows and blue jays reported and/or collected during the current reporting period.

As demonstrated in the table above, the number of reported sick and dead bird (crows and blue jays) was significantly increased compared to the previous five years. Only 2004 and 2005 had larger numbers of reported sick or dead birds. The increase in sick and dead birds in 2012 demonstrates a documented increase of WNV activity for the current reporting period but it is unknown whether this trend will continue or represents an anomaly in activity.

In 2012, approximately 83% of the sick or dead crows and blue jays reported came from the City of Madison; the remaining reports originated from the surrounding communities including Sun Prairie, DeForest, Fitchburg, Cottage Grove, Monona, McFarland, and Waunakee. According to bird reports and displayed in the accompanying figure, WNV activity was low throughout the early months of the season and surged during the summer months (July through September) and peaked in late August.

The peak average reports per week (5.6 reports) during this reporting timeframe was greatly increased compared to previous years, only the reported averages for 2004 and 2005 exceed the level observed in 2012. Similar to 2011, one WNV positive result was reported in 2012 from the tested birds.



Mosquito Surveillance

Similar to previous years, PHMDC continued its partnership with the Town of Madison, Village of Maple Bluff, City of Middleton, City of Monona, Village of Shorewood Hills, City of Sun Prairie, and the University of Wisconsin during 2012 to monitor and control the breeding activity of targeted mosquito species on public property. The primary targeted mosquito species of this annual surveillance is the *Culex* species due to its identification as the principal vector for human transmission of WNV and has accounted for the vast majority of WNV infected mosquitoes captured throughout the country. If present, other potential mosquito species that deemed potential vectors for WNV are also monitored; in Dane County, this primarily includes the *Aedes* mosquito species. Mosquito control involved public outreach to promote removal of water sources (source reduction) and larvicide applications when water sources were found to produce high levels of target mosquito larvae; *Culex* and/or *Aedes* mosquito species. Overall, during the 2012 mosquito season, a total of 66 treatments were performed at 42 sites reported high levels of mosquito larvae; three additional treatments were scheduled but cancelled due to weather or site conditions that prevented effective treatment or eliminated the need for treatment. The table below (Table 2) lists the number of sites by community that reported high concentrations of Culex or Aedes larvae; all other sites tested reported either low concentrations that did not require treatment or no larvae detected.

Table 2. Summary results of 2012 mosquito larvae inspections of accessible sources in the Madison metropolitan area.

	City of Madison	Village of Maple Bluff	City of Middleton	City of Monona	Village of Shorewood Hills	City of Sun Prairie	Town of Madison	UW Madison	**Total Metro Area**
High *Culex*	34	0	2	0	0	4	0	0	**40**
High *Aedes*	8	0	1	0	0	1	0	0	**10**
# of inspected sites	378	2	70	20	1	105	14	25	**615**
% High *Culex*	9.0%	0.0%	2.9%	0.0%	0.0%	3.8%	0.0%	0.0%	**6.5%**
% High *Aedes*	2.1%	0.0%	1.4%	0.0%	0.0%	0.9%	0.0%	0.0%	**1.6%**

During 2012, department staff made 2,208 inspections of 615 sites in the metro area. Similar to previous years, the bulk of these inspections were made at ditches (50.3%, 265 individual sites), detention/ retention ponds (38.7%, 265 individual sites); however, other sites evaluated included, but not limited to, creeks, marshes, rivers, and rain gardens. In the metro area, 6.5% of all inspected sites produced high number of *Culex* larvae at least once during surveillance (approximately May through September); 1.6% of inspected sites produced high numbers of Aedes larvae. No other mosquito species was found in high numbers.

At the community level, the City of Madison reported the largest percentage of sites with high numbers of Culex larvae (9.0%); high concentrations were also reported at sites in the Cities of Sun Prairie (3.8%) and Middleton (2.9%). The City of Madison also reported the largest percentage of sites with high numbers of Aedes larvae (2.1%) but high numbers were also reported in the Cities of Middleton (1.4%) and Sun Prairie (0.9%) and the UW campus.

For additional information on these efforts for 2012, please refer to the full mosquito monitoring and control program reports for these years entitled "Mosquito Monitoring and Control – Madison Metropolitan Area"; a separate report is available for each year. These reports are available at: http://www.publichealthmdc.com/.

Human Surveillance

Most humans (~80%) infected with WNV experience no adverse symptoms and less than 1% will have serious encephalitis or meningitis result from infection. As of December 11, 2012, a total of 5,387 cases of the disease (2,734 cases of neuroinvasive disease and 2,653 cases of non-neuroinvasive disease) were reported in the United States in 2012 including 243 deaths attributed to WNV; these disease-related deaths composed 4.5% of all reported cases during that year and 49.2% of those with neuroinvasive disease. A considerable increase in human disease compared to the 2011 reporting period (712 cases and 43 deaths).

West Nile virus infection is a reportable illness in Wisconsin. PHMDC continues to conduct passive surveillance for human cases of WNV infection at the county level. Area providers are also encouraged to participate in Wisconsin's Enhanced Arbovirus Surveillance program, which tests serum and cerebrospinal fluid of patients who met specific clinical criteria. In 2012, a total of 56 cases were reported statewide including 4 deaths; no deaths were reported in Dane County related to the disease but 5 cases of WNV were identified. No cases were reported in Dane County in 2011. Since 2002, surveillance has recorded a total of 19 cases of human WNV infection in Dane County. A breakdown of these cases is given in Table 3 below.

Table 3. Number of human WNV cases in Dane County.			
	Cases Identified		
	2011	2012	Total since 2002
WNV Fever	0	2	10
WNV Encephalitis (non-fatal)	0	3	7
WNV Encephalitis (fatal)	0	0	2
Total	0	0	19

Public Outreach

At the beginning of each of the seasons reported above, a press release was issued that provided a written briefing to educate the media. In addition, PHMDC staff continued efforts to provide information to the public including the risks of WNV illness, mosquito bite prevention, the reduction of mosquito-breeding areas, and an annual report of WNV and mosquito activity in the county. This and additional information is available on the PHMDC website (http://www.publichealthmdc.com/disease/westNile/).

Conclusion

West Nile virus surveillance activities continue to indicate that WNV risk for humans in Madison and Dane County is low but there are still areas that continue to report high level of *Culex* and/or *Aedes* mosquitoes. One positive case of WNV activity was found in the dead birds collected for surveillance; five cases of WNV was reported in humans in 2012. Although the documented levels of WNV activity had increased in 2012 compared to the previous six years, low numbers of mosquitoes and humans with WNV infection are typically reported in the City of Madison and Dane County. Due to this level of annual activity, the collection of sick and dead bird reports continues to be the Department's best measure of WNV activity in the area. Adult mosquito surveillance also continues to be an important tool for measuring overall mosquito activity.

Based on activity trends demonstrated in the data over the past decade, we can expect at least a low level of WNV infection in mosquitoes, birds, and humans in the future. Continued surveillance efforts are necessary to assess the intensity of this illness in our communities and provide recommendations on addressing the threat of illness. Program efforts planned for 2012 will continue to include:

- Dead and sick bird surveillance and testing identifies when the virus is active in the community and provides a measure of severity between years.

- Mosquito larvae monitoring and control detects standing water that may provide breeding opportunity for WNV competent mosquitoes and provides a mechanism for responding to sites on public property shown to produce high numbers of mosquitoes. This also provides an example for area residents to follow in preventing water sources on their property from producing mosquitoes.

- Adult mosquito surveillance provides information on the level of mosquito activity.

- Human illness surveillance detects when WNV activity has moved from bird populations to humans.