

Mosquito Control Capacity Survey – Kansas, 2015



Background

West Nile virus (WNV) is most commonly transmitted to humans by mosquitoes. WNV had not been previously reported in the U.S. prior to an outbreak in New York in 1999. Since 1999, more than 30,000 people have been reported with WNV and more than 1,200 have died in the U.S. As of August 2012, an outbreak of 1,118 cases of WNV was confirmed by the Centers for Disease Control and Prevention (CDC). This is the highest number of reported WNV cases in a single year since the virus was first detected in the U.S.¹ From 2012-2014, Kansas has had a median of 57 WNV human cases each year and reported 11 deaths caused by WNV.

About 1 in 5 people who are infected will develop a fever with other symptoms such as headache, body aches, joint pains, vomiting, diarrhea, or rash. Most people with this type of WNV disease recover completely, but fatigue and weakness can last for weeks to months. Less than 1% of people who are infected will develop a serious neurologic illness such as encephalitis or meningitis.²

The most effective way to avoid WNV disease is to prevent mosquito bites.³ Mosquito bites can be avoided by following the “Three D’s”: drain (eliminate standing water where mosquitoes live and breed), dress (cover your skin with clothing when outdoors), and DEET (use insect repellents that contain DEET). There are no medications to treat or vaccines to prevent WNV infection.²

In addition to reducing mosquito breeding sites, pesticides can be used to reduce the mosquito population. Larvicides are products used to kill immature mosquitoes before they become adults and adulticides are products used to kill adult mosquitoes.⁵ Source reduction and larvicide treatments may be inadequate to maintain vector populations at low levels. The objective of adulticide is to complete the larval management program by reducing the abundance of adult mosquitoes in an area, thereby reducing the number of eggs laid in breeding sites.⁶ Mosquito-based surveillance can indicate when integrated vector management programs can institute proactive measures to maintain mosquito populations at levels below which WNV amplification can occur.⁶

Funding for vector control programs experienced a lengthy period of decline prior the arrival of WNV in the United States in 1999. By the time WNV disease cases peaked in 2003, many health departments saw an increase in vector control budgets to combat the disease. Unfortunately, the trend did not last. After WNV became established throughout the United States, vector control capacity continued to decline.⁴ Although local health departments are often the front lines of defense against mosquito-borne diseases, state health agencies conduct vector surveillance and serve important technical assistance roles.⁴ Kansas does not have a state

vector control program. Mosquito control efforts are directed by city or county government; however, information on these programs has not been previously available.

The Kansas Department of Health and Environment (KDHE) conducted a survey to evaluate city and county mosquito control practices. The ability to respond to a mosquito-borne disease outbreak was also assessed.

Methods

An online survey of 30 questions (Appendix A) was distributed by email to city and county clerks listed in the 2013-2014 Directory of Kansas Public Officials. The cover letter instructed the most knowledgeable person in the city or county office on mosquito control practices to complete the form. The survey was sent to 551 city and 105 county clerk offices in Kansas; 76 city clerk offices did not have an email address listed in the directory and, therefore, were not included in the survey. Respondents were asked to provide their name, city, county, organization name, phone number, and email so survey results could be shared.

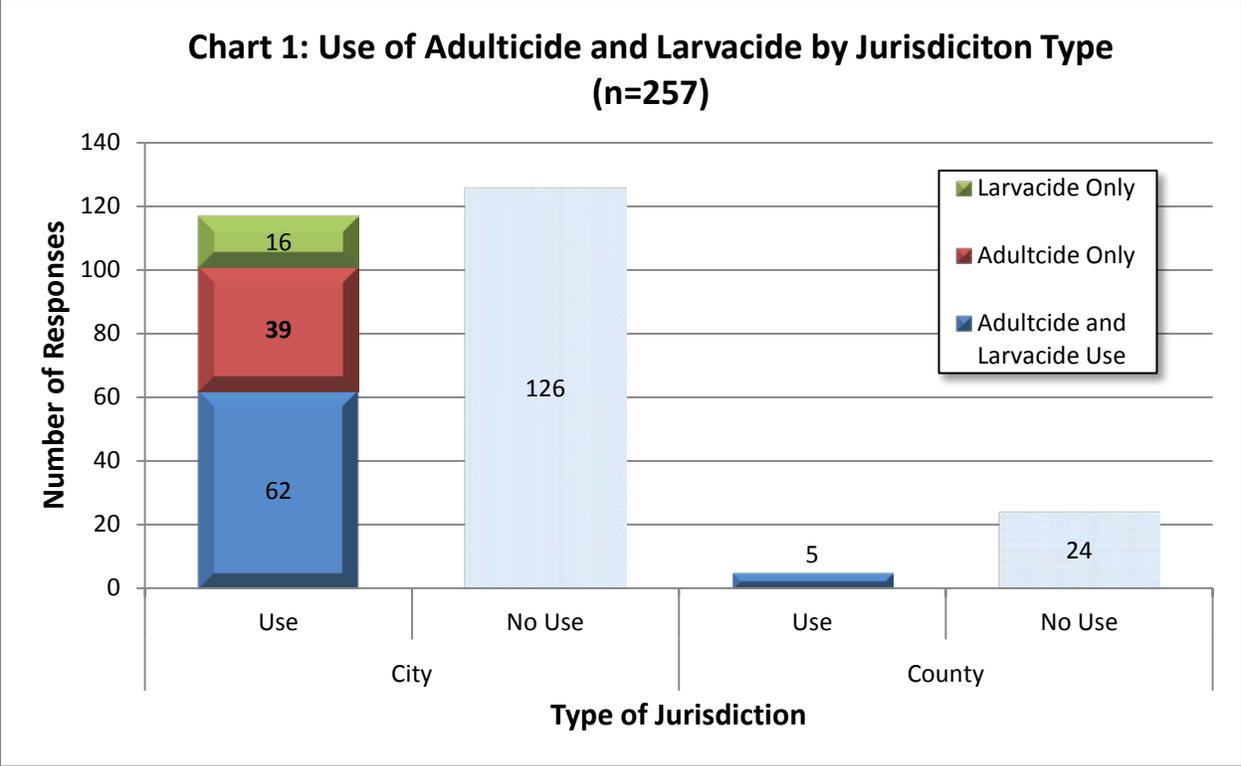
Questions addressed current and past mosquito control practices including use of adulticide, larvacide, and available educational resources. Reasons why each jurisdiction applied or did not apply adulticide were recorded. The survey also determined whether bodies of water (e.g. lakes, ponds) were checked for larvae before application of larvacide. Other questions included potential annual expenditures; pesticide, equipment, and staffing. The median of these categories were calculated and sorted by population density. The ability to increase mosquito control measures during a mosquito-borne outbreak was assessed. Analysis was conducted using Microsoft Excel®.

Results

A total of 656 jurisdictions (551 municipalities and 105 counties) were sent the link to the survey; a 43% (285/656) total response rate was achieved. 245 (53%) municipalities and 40 (38%) counties completed the survey.

49% of the respondents (131/ 245 cities, 8/ 40 counties) indicated mosquito control was conducted.

Of the 139 jurisdictions that conduct mosquito control, 76% reported adulticide use and 56% reported larvacide application (Chart 1).



Those respondents that reported adulticide use were asked additional questions regarding the reasons for its use (Table 1). Over 50% felt it reduced the number of mosquitoes and fulfilled their residents’ requests. Other notable responses included confirmed cases of illness in the community, addressed resident complaints, and kept mosquito numbers down for community events. Alternatively, those respondents who did not use adulticides were also evaluated (Table 2). The most common response among this subset was lack of available funding. Other listed reasons why adulticide is not used included mosquito-borne disease not a large threat, and uncertainty of how to conduct mosquito control.

Table 1: Reasons for Mosquito Adulticide Application Among Respondents Who Reported Adulticide Use* (n=157)

	Number of Reponses	Percentage
Always have sprayed for mosquitoes	66	42.0%
Reduces number of mosquitoes	84	53.5%
Residents request	89	56.7%
Other	12	7.6%

*Respondents selected all reasons that applied to their jurisdiction.

Table 2: Reasons Why Mosquito Adulticide Application Did Not Occur* (n=151)

	Number of Reponses	Percentage
Lack of equipment/supplies	78	51.7%
Not in budget	87	57.6%
Staffing shortage	43	28.5%
Other	58	38.4%

*Respondents selected all reasons that applied to their jurisdiction.

The survey assessed how jurisdictions determine when to start seasonal application of adulticide for mosquitoes. The majority, 81 (76%), begin when they receive complaints from their citizens (Table 3). Other notable reasons used to determine initial mosquito adulticide application included mosquitoes observed, pest control company recommendations, and application after a period of high precipitation.

Table 3: Determining Factors to Begin Seasonal Mosquito Adulticide Application* (n=106)

	Number of Reponses	Percentage
Receive complaints	81	76.4%
Set date every year	13	12.3%
Other	38	35.8%

*Respondents selected all factors that applied to their jurisdiction.

County respondents spent a median of \$188 on mosquito control each year, and city respondents spent a median of \$1,525. Pesticide use, equipment purchases, and staff costs were measured (Chart 2 and 3). Pesticide costs constituted the majority of the budget for both cities and counties.

Cities with a population between 1,000-5,000 and counties with 5,000-100,000 residents spent the most on mosquito mitigation annually.

Chart 2: Median City Mosquito Control Yearly Costs (n=86)

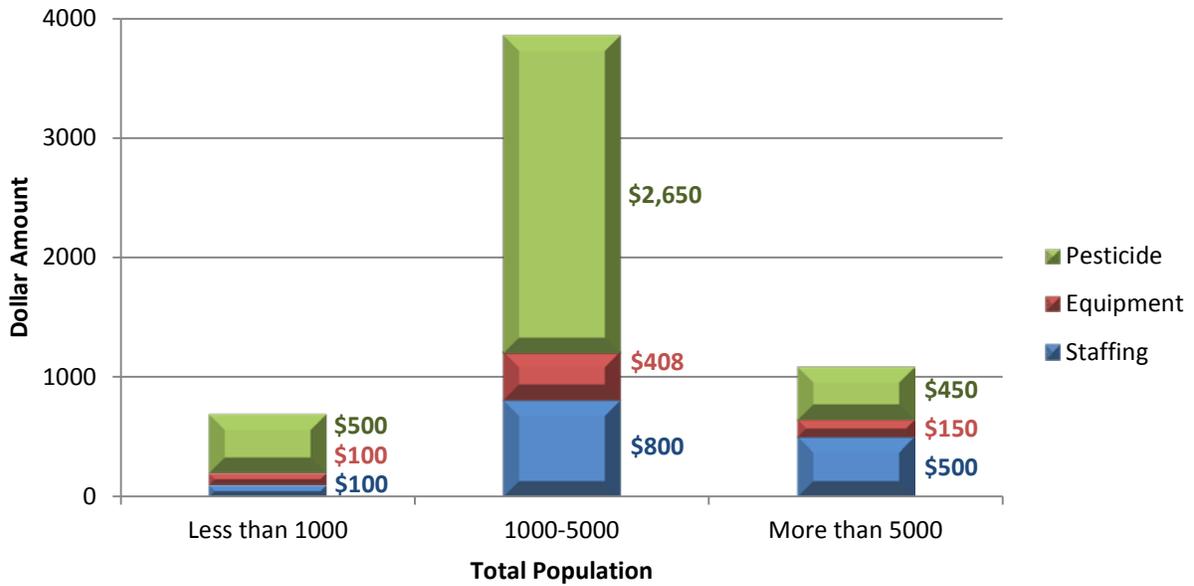
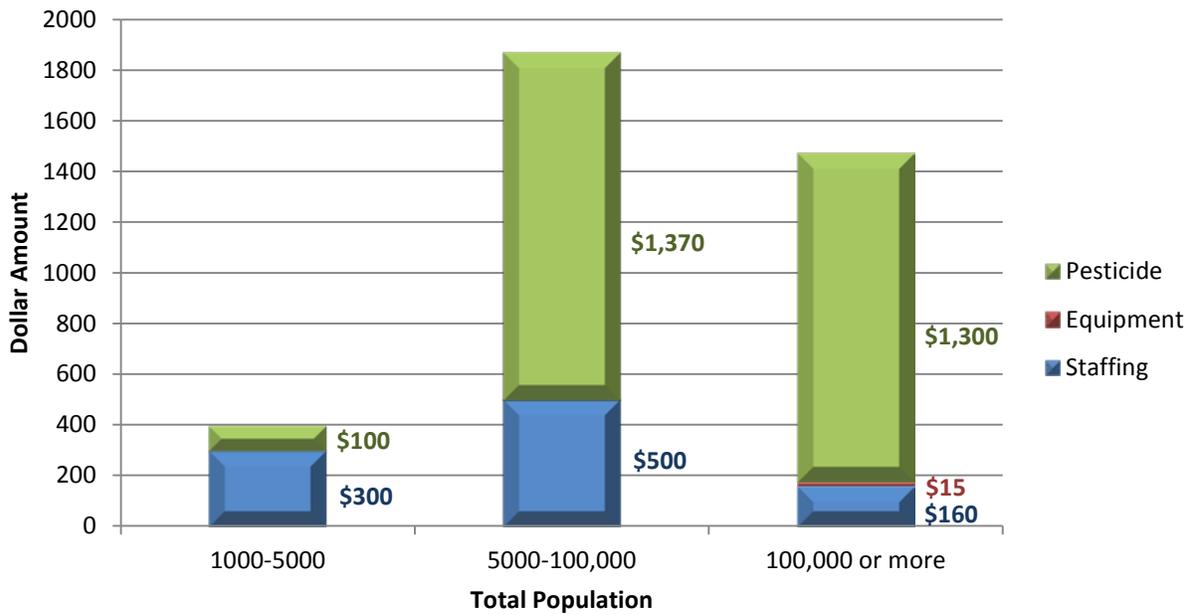


Chart 3: Median County Mosquito Control Yearly Costs (n=7)



Respondents rarely reviewed any mosquito surveillance data published by KDHE, CDC or other public health entities prior to mosquito control decision-making. Only 4% of respondents reviewed mosquito surveillance data; however, 89% would like to have communications with local or state health departments regarding mosquito-borne diseases. The local health department was the most utilized resource for both city/county works departments with questions regarding mosquito-borne diseases. In addition, citizens who contacted works departments for mosquito-borne disease questions were most often referred to local health departments.

If a mosquito-borne disease outbreak were to occur, 158 (67%) of respondents reported the ability to increase mosquito control measures in their jurisdiction.

Conclusions

Half of the cities in Kansas perform mosquito control but do not use mosquito surveillance to guide their efforts. The majority of counties rely on the cities within their county to perform mosquito control.

City officials and local health departments should open a line of communication on mosquito-borne diseases and utilize existing mosquito surveillance data. The capacity to conduct adulticide activities should be maintained in the event of an outbreak of endemic or emerging mosquito-borne disease.

Report Date:

July 31, 2015

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Our Mission

To protect and improve the health and environment of all Kansans

References

1. West Nile Virus: Facts About Symptoms and Transmission. (n.d.). Retrieved June 8, 2015, from http://www.medicinenet.com/west_nile_encephalitis/article.htm#what_is_the_history_of_west_nile_virus
2. (2015, February 12). Retrieved June 8, 2015, from <http://www.cdc.gov/westnile/>
3. Mosquito Control. (2015, March 31). Retrieved May 20, 2015, from <http://www.cdc.gov/westnile/faq/mosquitocontrol.html>
4. Herring, M. (2010). Where Have All the Vector Control Programs Gone? *Journal of Environmental Health*, November 2010.
5. Insect Repellent Use & Safety. (2015, March 31). Retrieved May 20, 2015, from <http://www.cdc.gov/westnile/faq/mosquitocontrol.html>
6. West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control. (2013, June 14). Retrieved June 8, 2015, from <http://www.cdc.gov/westnile/resources/pdfs/wnvguidelines.pdf>

Appendix A: Mosquito Control Capacity Survey Questions

Name:

City:

County:

Organization name:

Phone:

Email:

1. Do you conduct mosquito control in your city/county? (e.g. dunks, spray)
 - a. Yes
 - b. No
 - i. Have you ever conducted mosquito control in your city?
 1. No
 2. Yes
 - a. When did mosquito control efforts stop?
 - b. Why did mosquito control stop? Check all that apply.
 - i. Budget reduction
 - ii. Loss of staff positions
 - iii. Other (please explain): _____

IF NO, SKIP TO QUESTION 15

2. How many licensed pesticide applicators does your city/county employ?
 - a. Number: _____
3. What types of equipment does your city/county have for mosquito control? Check all that apply and indicate the number. (Yes, no, not sure. Number box appears if yes)
 - a. Truck-mounted sprayer, Number: ____
 - b. Hand-held applicators, Number: ____
 - c. Mosquito eliminating traps (e.g. mosquito magnet, dynatraps), Number: ____
 - d. Larvicidal dunks (e.g. mosquito dunks, bti briquettes, vectobac) Number: ____
 - e. We do not have any mosquito control equipment.
 - f. Other: _____, Number: _____
 - g. Other: _____, Number: _____
 - h. Other: _____, Number: _____
4. When you conduct mosquito control, how many hours per week are dedicated to mosquito control in your city/county?
5. Do you spray for mosquitoes in your city/county? (e.g. apply adulticide)
 - a. Yes
 - i. Why do you spray for mosquitoes? Check all that apply.
 1. We have always sprayed for mosquitoes
 2. Helps keep the number of mosquitoes down
 3. Patrons request mosquito control
 - b. No
 - i. Why not? Check all that apply.
 1. Lack of equipment
 2. Not in budget
 3. Staffing shortage
 4. Other: _____

IF NO, SKIP TO QUESTION 11

6. How do you decide when to start spraying for mosquitoes? Check all that apply.
 - a. Start receiving complaints from citizens
 - b. Set date every year
 - c. Other: _____
7. How often do you spray for mosquitoes?

8. How do you decide where to spray? Check all that apply.
 - a. Wherever you have the most complaints
 - b. Set route
 - c. Focus around bodies of water
 - d. Other: _____

9. How do you decide when to stop spraying? Check all that apply.
 - a. Complaints have stopped
 - b. Set date
 - c. First frost
 - d. Other: _____

10. In relation to the amount of time and effort you spend spraying for mosquitoes in your community, how much effect on reducing mosquitoes do you think it has?
 - a. No effect
 - b. Neutral
 - c. Some effect
 - d. Big effect

11. Do you use larvicide in your mosquito control program?
 - a. Yes
 - b. No
 - i. Why not? Check all that apply.
 1. Lack of equipment
 2. Not in budget
 3. Staffing shortage
 4. Other: _____

IF NO, SKIP TO QUESTION 15

12. Do you check for larvae (e.g. use a dipper) before applying larvicide to a body of standing water?
 - a. Yes
 - b. No

13. How do you decide when and where to larvicide?
 - a. Dipping for larvae
 - b. Standing water
 - c. Change in weather
 - d. Complaints
 - e. Other: _____

14. In relation to the amount of time spent applying larvicide in your community, how much of an effect on reducing mosquitoes do you think it has?
 - a. No effect
 - b. Neutral
 - c. Some effect
 - d. Big effect

15. Do you review current mosquito surveillance data?
 - a. No
 - b. Yes
 - i. Where do you get this data from?
 1. CDC
 2. Kansas Department of Health and Environment
 3. Local Health Department
 4. Other: _____

16. Do you communicate with your local health department about mosquito-borne diseases in your community?
- a. Yes
 - b. No
 - i. Would you like to have this communication?
 1. Yes
 2. No
17. Who do you contact if you have questions about mosquitoes? Check all that apply.
- a. Extension office
 - b. Local Health Department
 - c. Kansas Department of Health and Environment (KDHE)
 - d. Kansas Department of Agriculture (KDA)
 - e. Other: _____
18. Where do you direct citizens who have questions about mosquito-borne diseases? Check all that apply.
- a. Extension office
 - b. Local Health Department
 - c. Kansas Department of Health and Environment (KDHE)
 - d. Kansas Department of Agriculture (KDA)
 - e. Other: _____
 - f. We do not receive questions about mosquito-borne diseases.
19. Do you provide educational materials to your community about how to implement mosquito control such as standing water source reduction?
- a. No
 - b. Yes
 - i. How? (check all that apply)
 1. Ad in newspaper
 2. Radio
 3. TV
 4. Social Media
 5. Other: _____
20. Are you responsible for any other townships in your area?
- a. No
 - b. Yes
 - i. Which one(s)? _____
21. If there were to be a large outbreak of a mosquito-borne disease, would you be able to increase your mosquito control measures?
- a. Yes
 - b. No