

State and Territorial Health Agency Organizational Structures and Partnerships for Mosquito Control Management

Findings from ASTHO's 2017 Mosquito Control Survey



Mosquito control is a basic public health function employed by every region of the United States, including the U.S. territories and freely associated states. The mosquito-borne disease information state and territorial public health agencies collect and submit to the CDC's national surveillance system allows us to understand the risks of widespread mosquito-borne diseases like West Nile Virus, to track the emergence of other viruses such as dengue, chikungunya, and Zika and to control travel-related cases of diseases like malaria whose local transmission has been eliminated in the United States. In contrast, the capacity of state and territorial programs to track and control mosquitoes themselves is highly variable. Despite the essential role mosquito control plays in preparing for and controlling outbreaks of mosquito-borne disease, there is a lack of understanding of how state and territorial mosquito control activities are organized and managed.

To better support states and territories prepare for and respond to mosquito-borne public health crises, the Association of State and Territorial Health Officials (ASTHO) collected information on the organizational structure of mosquito control management, the involvement of key partners, and the implementation of mosquito control activities by state and territorial agencies.

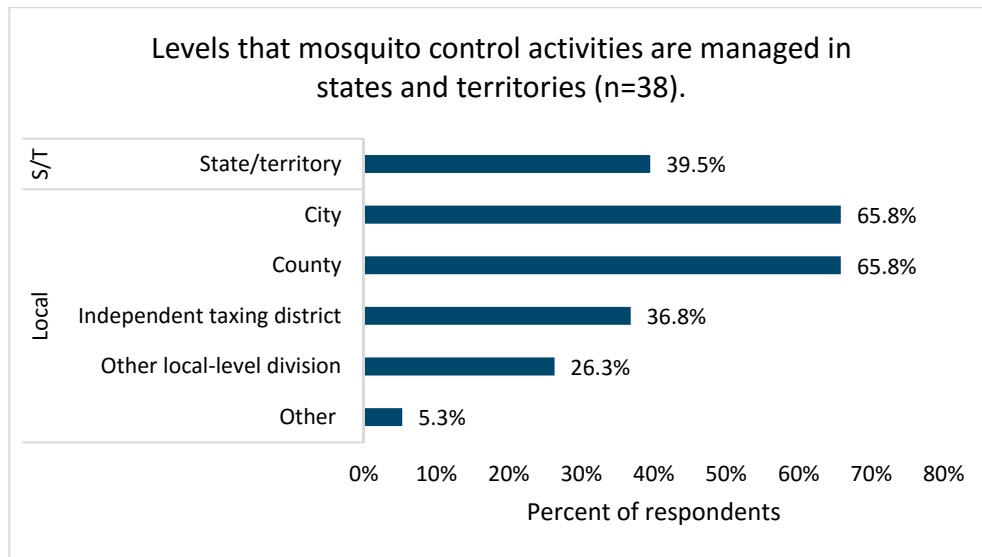
During late 2017, ASTHO invited environmental health directors from state and territorial health agencies to participate in a survey that explored the organizational structure of mosquito control activities, including the roles of key external partnerships, at the state- and territory-level. The results presented in this report represent the perspectives of thirty-eight jurisdictions (thirty-five states, two U.S. territories, and one freely associated state).

Organizational Structure of Mosquito Control Management

U.S. states, territories, and nations with compacts of free association with the United States employ a variety of structures to organize mosquito control activities within their individual jurisdictions. The 2017 ASTHO Mosquito Control Survey found that jurisdictions independently utilize unique structures for mosquito control management, resulting in a wide range of state- and territory-level structures used to control mosquito-borne disease.

Respondents identified a variety of state and local governmental and non-governmental agencies that are involved in the management of mosquito control. Figure 1 shows that most jurisdictions described mosquito control management to be a responsibility of local rather than state or territory-level entities. While most states and territories described the management of mosquito control activities to be **local in nature**, many respondents stated that when their state or territorial health agency is involved it is typically to provide resources and regulatory oversight of mosquito control activities. Even when the responsibility of mosquito control management falls at the state- or territory-level, health agencies described local nuance or variations in the development and implementation of mosquito control activities within their particular jurisdictions.

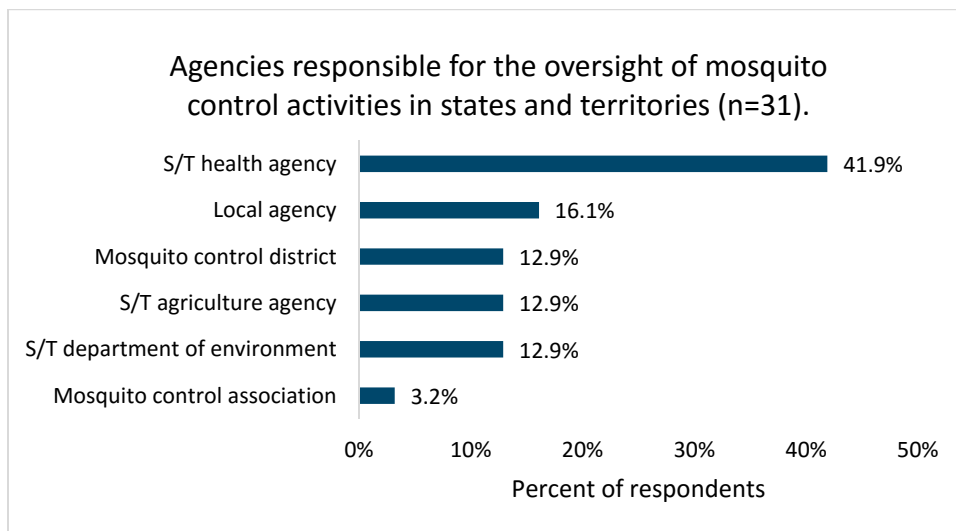
Figure 1: Level at which mosquito control activities are managed in states and territories.ⁱ



A range of agencies in both state and local governments are responsible for the oversight of mosquito control management in U.S. states and territories. The oversight of these activities often occurs outside the state or territorial health agency. The 2017 survey found that only 41.9 percent of responding state or territorial health agencies are responsible for the oversight of mosquito control activities in their states or territories. When these activities are managed outside the state or territorial health agency, most often it is the responsibility of a local agency (16.1%) such as the city, county, or municipality. Additionally, mosquito control districts, agriculture agencies, the department of environment, and mosquito control associations are responsible for the oversight of mosquito control management in states and territories. Figure 2 displays the frequency at which each agency or organization assumes responsibility for the oversight of mosquito control management activities.

ⁱ Respondents were able to select more than one level if needed.

Figure 2: Agencies that manage mosquito control activities in states and territories.



Mosquito control during emergency situations:

State and territorial health agencies (n=29) described how their organizational structure for mosquito control changes during emergency situations. While some agencies stated that they do not change the mosquito control structure during times of emergency, most described that state- or territory-level involvement increases during an emergency response. Survey findings suggest that each jurisdiction addresses mosquito control differently during emergency situations; however, the following key themes emerged:

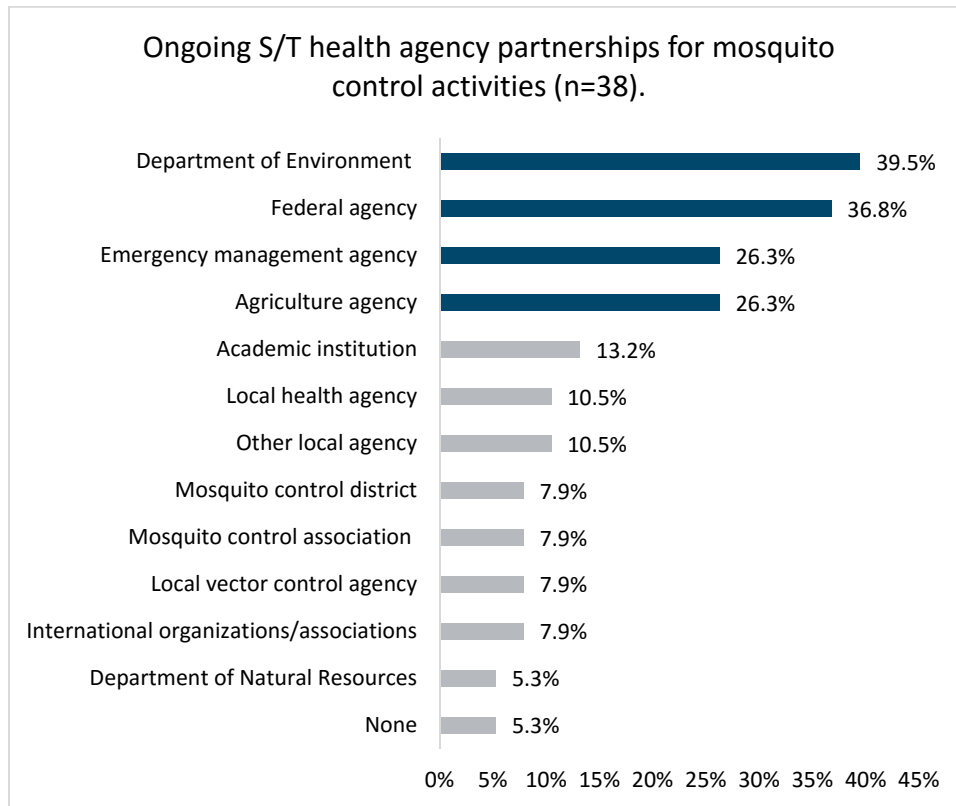
- State health agencies increase their support of local entities (e.g., increase funding, surveillance, and resources).
- Agencies improve coordination of partnerships with federal, state, and local governmental and non-governmental organizations.
- State and local government agencies execute vendor contracts to provide mosquito control during an emergency response.
- In the case of a declared state of emergency, state or territorial health agencies appropriately support the activation of an emergency operations center and manage their response accordingly.

Partnerships for Mosquito Control Activities

State and territorial health agencies regularly partner with external agencies and organizations to implement mosquito control activities. Nearly 40 percent of state and territorial health agencies partner with their Department of Environment on such activities, followed by federal agencies (36.8%), emergency management agencies (26.3%), and agriculture agencies (26.3%). Less frequent, but innovative partnerships include academic institutions (13.2%) and international organizations/associations (7.9%).

As expected, most agencies utilize organizational partnerships for mosquito control activities (94.7%); However, two agencies stated they do not regularly partner outside the state or territorial health agency on these activities. Figure 3 displays the frequency that each partner was described by a state or territorial health agency as an ongoing partner for mosquito control activities. Key partnerships (i.e., a partner agency or organization mentioned by more than 25% of responding agencies) are indicated in blue.

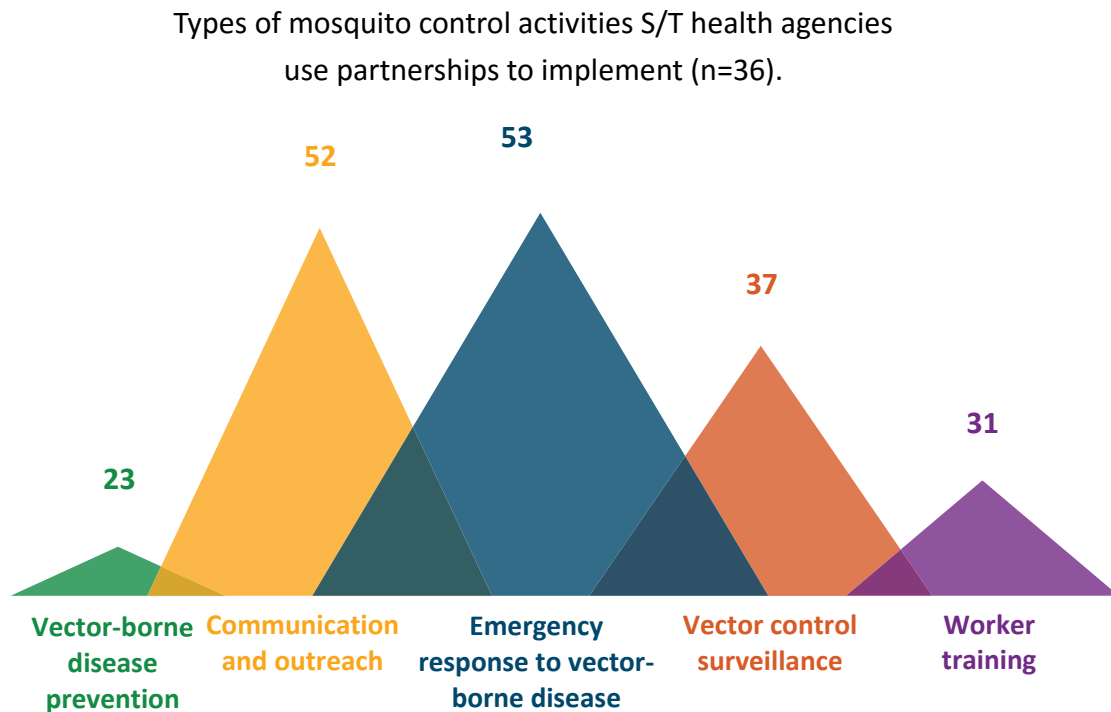
Figure 3: State and territorial health agency routinely partners for mosquito control activities.



Key mosquito control partnership activities:

State and territorial health agencies utilize a variety of partnerships to implement mosquito control activities in their jurisdictions. Survey respondents were asked to describe their ongoing partnerships for mosquito control management. These descriptions included the agency or organization involved and the activities being implemented through the particular partnership. In total, responding state and territorial health agencies described 196 unique partnerships. The majority of partnerships described were for emergency response to vector-borne disease activities followed by communications/outreach, vector control surveillance, worker training, and vector control preventative measures. Figure 4 describes the frequency that partnership activity categories were described by state and territorial health agencies.

Figure 4: Mosquito control activities for which state and territorial agencies use partnerships.ⁱⁱ



The 2017 survey found that when state and territorial health agencies describe **emergency response to vector-borne disease** partnerships, they are most frequently regarding educational outreach (71.7%), vector control (62.3%), and vector surveillance (60.3%). These activities are usually implemented in partnership with federal agencies, such as the Centers for Disease Control and Prevention.

As states and territories engage partners for **communication and outreach**, they generally utilize press releases, alerts, or advisories (78.8%), website (59.6%), social media (53.8%), and public meetings (51.9%). States and territories described more partnerships with their jurisdictions' departments of environment than any other agency or organization involved in communication and outreach for mosquito control.

Vector control surveillance partnerships often undertake adult mosquito surveillance (78.3%), pathogen testing in mosquitoes (75.7%), and larval mosquito surveillance (56.8%). States and territories employ a wide variety of partnerships to increase their vector control surveillance capacity, however most often they partner with the department of environment or academic institutions. Interestingly, all academic institutions partnerships with state or territorial health agencies on mosquito control activities are implementing vector control surveillance activities.

ⁱⁱ Figure is not to scale.

When state or territorial health agencies partner for **worker training** related to mosquito control, it is typically around employee workshops (54.8%), field surveillance or control training (51.6%), pesticide applicator licensing/recertification (45.2%), and webinars (38.7%). A majority of these partnerships are with their agriculture agencies. Of the international organizations/associations mentioned by states or territories, they were also all involved in worker training activities.

Finally, while the fewest number of partnerships was described for **vector-borne disease prevention**, those partnering for prevention are equally likely to do so for larval mosquito control, removal of container breeding sites for vector mosquitoes, and adult mosquito control activities. The survey found that vector control prevention partnerships are diverse; however, most often they are with their department of environment.

In conclusion, the mosquito control survey found that states, territories, and freely-associated states implement various organizational structures and establish an assortment of partnerships for mosquito control management. While state and territorial health agencies regularly provide oversight of mosquito control activities, these activities are usually local in nature. Furthermore, jurisdictions most often partner with federal agencies, the department of environment, emergency management agencies, and agriculture agencies to protect their communities against mosquito-borne diseases. These independent structures and partnerships are influenced by local and state-level nuances, which contribute to the wide-range of mosquito control management seen in the United States.