

# NACCHO

National Association of County & City Health Officials

## Vector Control Menu



### ***What vector control resources can you look for in your local jurisdiction?***

Consider this a “menu” of options for building up capacity in your local vector control program. Much like a restaurant menu, you don’t have to order everything all at once. If you’re not sure where to start, pick one or two options from each category to begin.

If you already have a well-established program, you can skip down to the drinks and desserts to see what extra activities might enhance your program. And if you’re on a budget, consider skipping straight to the main course.

### *Courses*

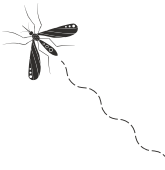
**Starters:** Begin by reaching out to experts in your area who can help inform and advise you.

**Specials:** Figure out how to access laboratory capacity and determine which type of tests you need to utilize.

**Entrees:** Trap types and placement —the core of every effective vector control program.

**Drinks:** After establishing the basics of your program, consider who needs to know about your work, and how you can reach them.

**Dessert:** Consider a few additional steps to help enhance your program.





# About


## ***Why is vector control important?***

Vector control is the monitoring and mitigation of zoonotic diseases spread by arthropods (aka bugs). Mosquitoes and ticks are the most common disease vectors in the U.S., responsible for spreading West Nile virus, Lyme disease, and many other pathogens and illnesses, and most vector control programs focus on these two, with a majority focused exclusively on mosquitoes. Effective vector control strategies include: **surveillance, education, larviciding, adulticiding, and insecticide resistance testing.**

Local governments may have mosquito control or vector control divisions dedicated to these activities, or may have pooled resources within a county to create a special district for the specific purpose of mosquito control, known as a mosquito control district. A common mission for many mosquito and vector control programs is to protect human health and well-being through a means of integrated vector management. Local health departments or state health departments often support vector control efforts through the monitoring of vector-borne diseases.

There are no nationwide mandates to make sure that a vector control program is in place. Many programs are quickly established or resurrected as a result of a zoonotic outbreak in absence of a standing program. However, being proactive rather than reactive can help prevent outbreaks in the first place, or make sure resources, infrastructure, and expertise are readily available to respond to outbreaks quickly. Effective vector control programs are an essential part of public health.

*\*As a note, while the term vector control is used, much of the information below, particularly the trap types ("entrees") will only apply to mosquito control.*



# Starters

## ***Do you have an expert in your program? If not, what resources can you use?***

### **American Mosquito Control Association (AMCA)**

- AMCA includes mosquito and vector control professionals from across the U.S. It is a membership organization that can provide many benefits to a mosquito control professional. An advantage to being a member of this association is you can connect with other mosquito and vector control professionals and access resources and educational materials on standard practices. Some resources and trainings are provided for free by AMCA and a variety of membership types are available.

### **AMCA Technical Advisor**

- The role of AMCA's Technical Advisor is to answer questions about mosquito and vector control programmatic structures, methodologies, and answer questions from media and public inquiries.

### **State entomologists**

- Find out if your state has a state entomologist or regional entomologists. They can recommend resources and be able to suggest improvements.

### **State organizations**

- Many states have a state association that is similar to the AMCA, but specific to your state. Being members of these organizations helps make connections at a local level. These state organizations may also know local state laws that apply to your specific area.

### **Vendors/industry**

- The people who are selling you the products you use are also very knowledgeable about the products they supply. If you have a specific issue, you can share your jurisdiction's specific needs or challenges with them and ask them to recommend which products to use and why.

### **Colleges**

- Professors who specialize in medical entomology or network with medical entomologists can helping you identify what your program needs.

### **Agriculture ("Ag") extension offices**

- These are offices that offer a coordinated extension of university experts, even if no local university is available in the area. These programs support education, research, and training primarily focused on agriculture, and can offer resources that may be relevant to vector control efforts in your area.



# Starters (Contd.)



## ***Do you have an expert in your program? If not, what resources can you use?***

### **Centers for Disease Control and Prevention (CDC)**

- The [CDC vector-borne disease webpages](#) are updated periodically and have resources for professionals, such as communications resources and resources for clinicians. In addition, the CDC has dedicated teams for studying and responding to vector-borne diseases, the [Division of Vector Borne Diseases](#) which includes the Arboviral Diseases Branch as well as the Bacterial Diseases Branch, Dengue Branch, and Rickettsial Zoonoses Branch.

### **Centers of Excellence (COE) in Vector-borne Diseases**

- There are regional [Centers of Excellence](#) around the United States established for the purpose of researching how to best prevent tick and mosquito bites, among other areas of research. You may consider exploring which one is closest to you (as of 2022 – 2027):
  1. [University of Massachusetts Amherst](#)
  2. [University of Florida](#)
  3. [University of California-Davis](#)
  4. [University of Wisconsin-Madison](#)

### **Regional Training and Evaluation Centers (TEC)**

- Similar to the COEs, the [Training and Evaluation Centers](#) were established to support and enhance vector control capacity. They focus on training, evaluation and partnerships. You may consider exploring which one is closest to you (as of 2023 – 2028):
  1. [Cornell University](#)
  2. [Pennsylvania State University](#)
  3. [Colorado State University](#)
  4. [City of New Orleans Termite and Rodent Control Board](#)
  5. [Puerto Rico Science, Technology and Research Trust](#)

### **Epidemiology and Laboratory Capacity (ELC) funding**

- [ELC funding](#) is available to state, large local, and U.S. territory and affiliate health departments and can be used to increase laboratory and epidemiologic capacity. This can improve vector-borne disease surveillance and help programs prevent and detect potential outbreaks.

### **Public Health Organizations**

- [National Association of County and City Health Officials \(NACCHO\)](#)
- [National Environmental Health Association \(NEHA\)](#)
- [Association of State and Territorial Health Organizations \(ASTHO\)](#)

# Specials

## ***Do you have a resource lab?***

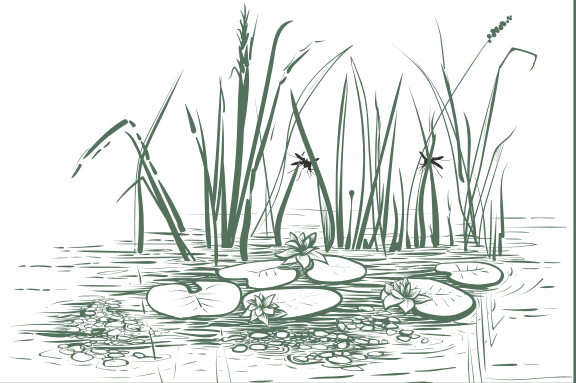
Laboratories are important resources for vector control programs. Laboratories can test samples for the presence of pathogens in and around your region. Detecting presence of an arthropod-borne disease agent is important for determining risk. It is critical that the vectors in your area are identified properly as well.

Proper identification of arthropod vectors of pathogens will help determine where and when proper treatment may take place. Consider asking **local universities** if they may have the capacity to identify arthropods and/or test field collected samples. **Vendors** may also be able to supply these services, as well as some **veterinary laboratories**. Some programs may do identification internally and then send the samples to an external laboratory for testing.

Sample testing for arthropod methods may include:

- Polymerase Chain Reaction (PCR) (preferred)
- Rapid Analyte Measurement Platform (RAMP)
- VecTest
- Enzyme-linked Immunosorbent Assay (ELISA)
- Hemagglutination Inhibition assay (HI)
- Viral culture

You may not need all of the services above. Focus on finding a laboratory partner that can perform the basic tests that your program needs. Consider the amount of time that labs may need to **sort, enumerate and prepare arthropod samples, and run the appropriate test**. It is best to get a timeline from the laboratory in advance to help you plan and prepare.



# Entrees

## What kind of traps should you set?

The most common type of vector control program monitors mosquitoes as vectors of pathogens that may cause diseases, and sometimes monitors the abundance of biting mosquitoes that are burdensome to residents. There are several different types of traps which are used to collect different types of mosquitoes for different scenarios. Traps should be set at fixed periods in fixed locations so that presence, abundance, and mosquito infection trends can be monitored over time.

Trap types include:

- Gravid traps – *Culex*-specific for West Nile virus surveillance, these capture egg-laying adult females
- CDC light traps – collect most types of mosquitoes and uses carbon dioxide (CO<sub>2</sub>) in the form of dry ice as an attractant
- BG Sentinel – specific to *Aedes aegypti* and *Aedes albopictus*, which are vectors of arboviruses such as Zika, chikungunya, and dengue
- New Jersey Light traps – for general and weekly monitoring, may collect many types of insects

Determining which trap to use should be based on which type of data should be collected. Data should be based on the overall goals of the vector program. Different programs may vary based on political, economic, and disease-risk needs.

These needs may include:

### **Nuisance abatement that may negatively affect the health and well-being of residents:**

- Tourist destinations
- Coastal regions
- Flood prone regions
- Areas which contribute to mosquito habitat like wetlands or agricultural irrigation
- Densely populated residential areas

### **Disease activity commonly including:**

- West Nile virus
- St. Louis encephalitis virus
- Eastern equine encephalitis virus
- Tickborne rickettsial diseases (ex. Lyme, anaplasmosis, ehrlichiosis)
- Flea-borne murine typhus, or plague
- Chagas (spread through contact with excretion from kissing bugs)



## Drinks



### ***How do you reach your constituents and what might you supply to the public?***

- Trifold pamphlets
- 3 x 5 cards
- One-page informational sheet
- Website
- Social media
- Testimonial videos
- Door hangers
- Coloring books
- Promotional items such as repellents (for example: DEET), DUNKS (a larvicidal product that can be used at home), bed nets, clothes, netting

CDC has resources you can [download and use](#) on their mosquito communications webpage.

### ***Do you have an educational campaign?***

- [Fight the Bite](#)
- [Mosquito Forecast](#)
- [Tip, Toss, Take Action](#)
- [Be Mosquito Free](#)

### ***Who needs to know about your work and whose work do you need to know about?***

#### **Internal:**

- Epidemiology
- Communications/Creative services
- Emergency preparedness
- Laboratory (if available)
- Environmental Health
- Storm water
- Code compliance and enforcement

#### **External:**

- State health department
- CDC
- Vendors/distributors
- Other local departments, such as Environmental Health Services or Department of Parks and Recreation
- Neighboring vector control programs

# Desserts



## ***What else should you consider?***

- Although it may be tempting to have one person who performs vector control as one of their many duties, **consider having a dedicated staff member who focuses on only vector surveillance and control**. Vector control duties include collecting data; knowing where problem areas may arise; keeping up with the latest changes in laws, regulations, and license requirements; and keeping up with modern technology and standards. **Vector control is a full-time job** and is best performed as such.
- Check your **state's public health and agricultural codes**. These codes can instruct you on how you may be able to use the law to make sure residents are not contributing to an issue. They may also instruct local governments on how to **establish or resurrect a local independent tax district** if needed or desired. If there is no statute, find a political advocate in your **state congress**. In the meantime, you may be able to **place a small charge on water or garbage bills** to help fund a needed program to make sure your constituents are protected.
- All treatments, whether larviciding or adulticiding, should be based on data you collect to establish a threshold. This may be **abundance data, disease-risk data, number of complaints data, or even landing rate counts** (how many mosquitoes are landing per minute). Treatment decisions should be made based on whether or not the established threshold has been met.
- Insecticide resistance testing is a key component of an effective vector control program. Mosquitoes can become resistant to insecticides over time. Some mosquito populations may already demonstrate resistance to certain chemical treatments, such as pyrethroids. Not all vector control programs will be able to set up an in-house insecticide resistance testing program, but partnerships including **partnerships with universities, support from external laboratories, or coordination with CDC** can support these efforts.