Practical Approaches for Zika Preparedness and Response

Lunch Webinar

July 27, 2016

Bio-Defense Network

Public Health Foundation

Bio-Defense Network

Public Health Foundation

Public Health Foundation

Strengthening the Quality and Performance of Public Health Practice

TRAIN Learning Network

A national learning network for professionals who protect and improve the public's health

- Over ONE MILLION registered learners
- Thousands of training opportunities

Performance Improvement Technical Assistance & Training

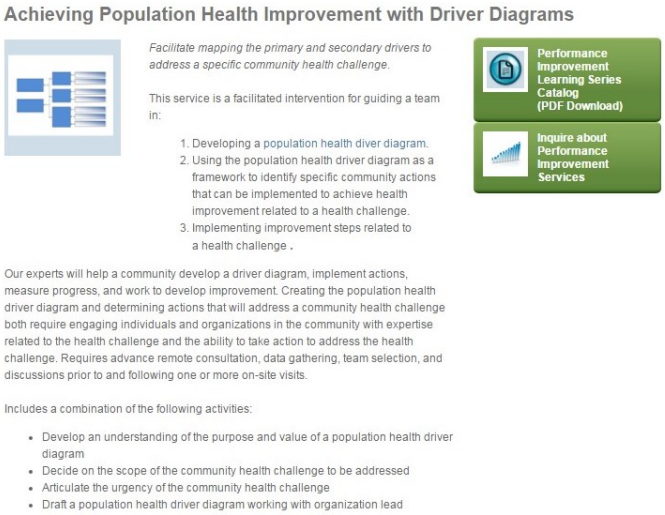
Performance management, quality improvement, and workforce development services facilitated on-site by PHF's experts

- Accreditation preparation and support, leadership and change management, and strategic planning
- Population health improvement solutions

Performance Management & Quality Improvement

Activates tools and techniques to achieve impact and outcomes in population health improvement

- Toolkits, case examples, articles, and papers
- Resources supporting performance improvement



Achieving Population Health Improvement with Driver Diagrams

Facilitate mapping the primary and secondary drivers to address a specific community health challenge.

This service is a facilitated intervention for guiding a team in:

1. Developing a population health diver diagram.
2. Using the population health driver diagram as a framework to identify specific community actions that can be implemented to achieve health improvement related to a health challenge.
3. Implementing improvement steps related to a health challenge .

Performance Improvement Learning Series Catalog (PDF Download)

Inquire about Performance Improvement Services

Our experts will help a community develop a driver diagram, implement actions, measure progress, and work to develop improvement. Creating the population health driver diagram and determining actions that will address a community health challenge both require engaging individuals and organizations in the community with expertise related to the health challenge and the ability to take action to address the health challenge. Requires advance remote consultation, data gathering, team selection, and discussions prior to and following one or more on-site visits.

Includes a combination of the following activities:

- Develop an understanding of the purpose and value of a population health driver diagram
- Decide on the scope of the community health challenge to be addressed
- Articulate the urgency of the community health challenge
- Draft a population health driver diagram working with organization lead

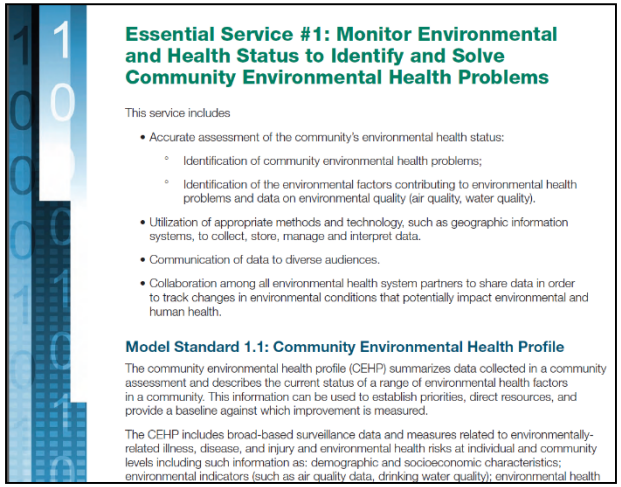
Vanessa Lamers
vlamers@phf.org
202-218-4412

www.phf.org

Public Health Foundation

Vector Control Program Improvement Resources

Environmental Public Health Performance Standards (EnvPHPS) Version 2.0



Essential Service #1: Monitor Environmental and Health Status to Identify and Solve Community Environmental Health Problems

This service includes

- Accurate assessment of the community's environmental health status:
  - Identification of community environmental health problems;
  - Identification of the environmental factors contributing to environmental health problems and data on environmental quality (air quality, water quality).
- Utilization of appropriate methods and technology, such as geographic information systems, to collect, store, manage and interpret data.
- Communication of data to diverse audiences.
- Collaboration among all environmental health system partners to share data in order to track changes in environmental conditions that potentially impact environmental and human health.

Model Standard 1.1: Community Environmental Health Profile

The community environmental health profile (CEHP) summarizes data collected in a community assessment and describes the current status of a range of environmental health factors in a community. This information can be used to establish priorities, direct resources, and provide a baseline against which improvement is measured.

The CEHP includes broad-based surveillance data and measures related to environmentally-related illness, disease, and injury and environmental health risks at individual and community levels including such information as: demographic and socioeconomic characteristics; environmental indicators (such as air quality data, drinking water quality); environmental health

10 Essential Environmental Public Health Services

Self-Assessment Instrument

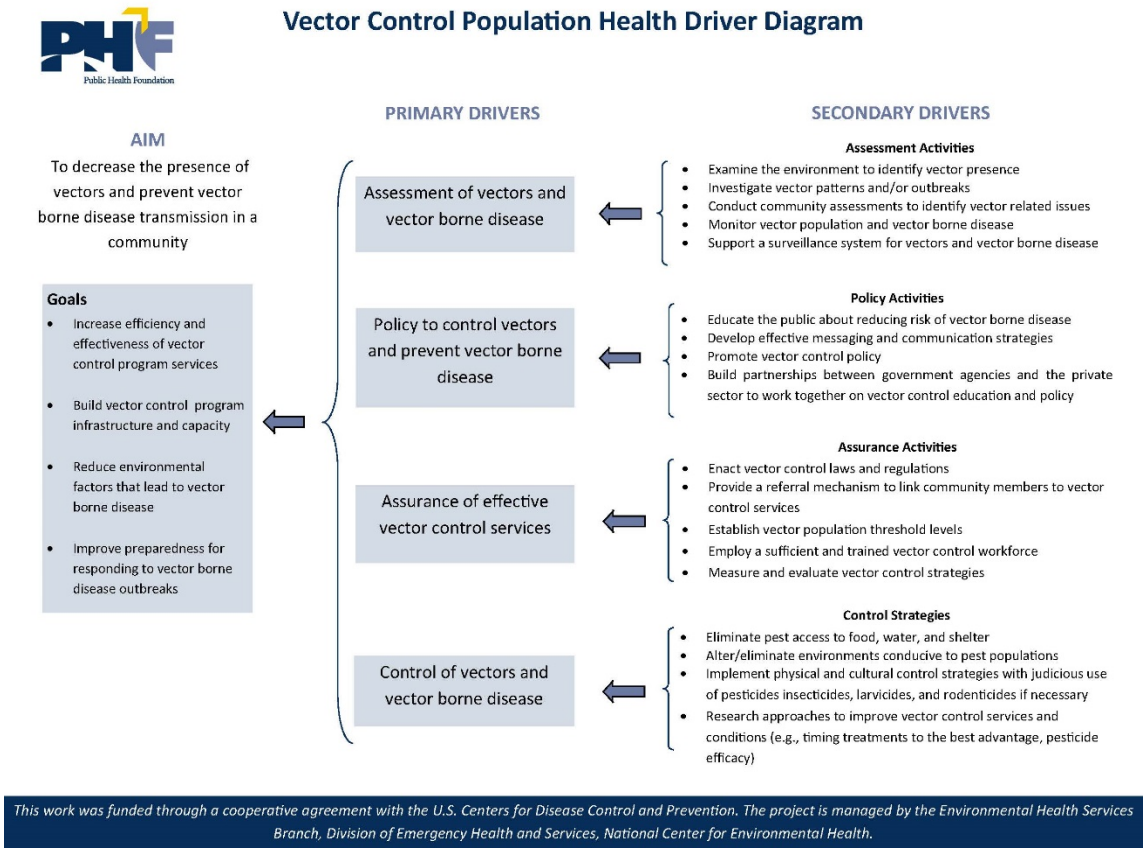
Essential Service #1: Monitor environmental and health status to identify and solve community environmental public health problems

Number	Measure	No=0 (0%)	Minimal=1 (>0%–25%)	Moderate=2 (>25%–50%)	Significant=3 (>50%–75%)	Optimal=4 (>75–100%)
1.1A	Has a community environmental health assessment been completed?	☐	☐	☐	☐	☐
1.1B	Is the community environmental health assessment updated at least every 3 years?	☐	☐	☐	☐	☐
1.1C	Are existing and potential environmental health trends identified by comparing analysis results to relevant benchmarks?	☐	☐	☐	☐	☐
1.1D	Have the data from the community environmental health assessment been compiled into an updated profile?	☐	☐	☐	☐	☐
1.1E	Are environmental health data prepared in a format that allows for the clear communication and interpretation by the public and policy makers?	☐	☐	☐	☐	☐
1.1F4	Is information about the community environmental health status easily available to individuals, community groups, and other organizations in a printed and web-based version?	☐	☐	☐	☐	☐
1.2A	Are appropriate tools, such as GIS, used to support the profile databases?	☐	☐	☐	☐	☐
1.3A	Are data collected from a range of sources involved in environmental and public health protection (e.g. epidemiology, disease registries, tracking partners, local and state departments of environmental quality)?	☐	☐	☐	☐	☐
1.3B	Have plans been made to address gaps in information and data needed?	☐	☐	☐	☐	☐

- ✓ Assess capacity of program, agency, and system to provide essential services

Public Health Foundation

Vector Control Program Improvement Resources



This work was funded through a cooperative agreement with the U.S. Centers for Disease Control and Prevention. The project is managed by the Environmental Health Services Branch, Division of Emergency Health and Services, National Center for Environmental Health.

Other Quality Improvement Tools for Vector Programs:

- **AIM Statements**
- **Force Field Analysis**
- **Gantt Charts**
- **Flow Charts**
- **Bow Tie Diagram (risk analysis)**
- **Plan-Do-Check-Act (PDCA)**

www.phf.org

For More Information

Environmental Health Insights

Environ Health Insights. 2016; 10: 113–118. PMCID: PMC4941868
Published online 2016 Jul 11. doi: 10.4137/EHI.S39805

A Performance Management Initiative for Local Health Department Vector Control Programs

Justin Gerding,[1] Micaela Kirshy,[2] John W. Moran,[2] Ron Bialek,[2] Vanessa Lamers,[2] and John Sarisky[1]

Abstract Go to:

Local health department (LHD) vector control programs have experienced reductions in funding and capacity. Acknowledging this situation and its potential effect on the ability to respond to vector-borne diseases, the U.S. Centers for Disease Control and Prevention and the Public Health Foundation partnered on a performance management initiative for LHD vector control programs. The initiative involved 14 programs that conducted a performance assessment using the Environmental Public Health Performance Standards. The programs, assisted by quality improvement (QI) experts, used the assessment results to prioritize improvement areas that were addressed with QI projects intended to increase effectiveness and efficiency in the delivery of services such as responding to mosquito complaints and educating the public about vector-borne disease prevention. This article describes the initiative as a process LHD vector control programs may adapt to meet their performance management needs. This study also reviews aggregate performance assessment results and QI projects, which may reveal common aspects of LHD vector control program performance and priority improvement areas. LHD vector control programs interested in performance assessment and improvement may benefit from

Zika Preparation Using Quality Improvement Tools and Processes

Related Categories: Quality Improvement
Topic: Performance Management and Quality Improvement
Author: Vanessa Lamers
Date: 5/16/2016

As the public health and healthcare communities prepare for the Zika Virus in the United States, quality improvement (QI) tools and techniques can be helpful for planning and responding to local transmission. QI's focus on systems and processes can help state, tribal, local, and territorial health departments prepare plans, designate point people, assess gaps, and implement and improve strategies. The Public Health Foundation (PHF) is working with five local health department vector control programs to refine and implement the Vector Control Population Health Driver Diagram. In collaboration with the Centers for Disease Control and Prevention (CDC), National Center for Environmental Health, PHF is providing on-site technical assistance and training with QI tools and techniques to increase vector control program efficiency and effectiveness.

Four of these local health departments have chosen to focus on preparation and response to Zika, using the 10 Essential Environmental Public Health Services as a guide to create interventions in their communities. Working with PHF Senior Quality Advisor Jack Moran, St. Louis County Department of Public Health (Missouri), Tulsa Health Department (Oklahoma), Madison County Health Department (Alabama), and New Hanover County Health Department (North Carolina) are focusing on mosquito control.

The Madison County Health Department and the New Hanover County Health Department are focused on the education and communication drivers of the Vector Control Population Health Driver Diagram. Both are partnering with local schools to build curriculum on vector control and create educational materials. New Hanover County has created a word search, a set of presentations, and a brochure on the *Aedes albopictus* mosquito (also known as the Asian Tiger mosquito) in English and Spanish. Madison County developed a Zika Guide for Environmentalists and a Zika Checklist of Common Mosquito Breeding Grounds. Madison County also collaborated with the Alabama State Health Department to create a Zika Coloring Book. The St. Louis County Department of Public Health and Tulsa Health Department vector control programs are focused on surveillance activities and building partnerships between government agencies.

well with the 10 Essential Environmental Public Health
. CDC is advising high-risk states to provide public
ı, prepare and conduct surveillance activities,
ith *Aedes aegypti* mosquitoes that also spread Dengue
Aedes albopictus has also been proven a competent
o-Check-Act (PDCA) cycle, and the Prioritization Matrix
th concerns.

Using a Population Health Driver Diagram to Support Health Care and Public Health Collaboration

Ron Bialek, Jack Moran, and Micaela Kirshy*

February 4, 2015

**The authors are participants in the activities of the Roundtable on Population Health Improvement*

The views expressed in this discussion paper are those of the authors and not necessarily of the authors' organization or of the Institute of Medicine. The paper is intended to help inform and stimulate discussion. It has not been subjected to the review procedures of the Institute of Medicine and is not a report of the Institute of Medicine or of the National Research Council.

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES
Advising the nation • Improving health

Vanessa Lamers
vlamers@phf.org
202-218-4412

phf.org/driverdiagrams
phf.org/vectorcontrol

PHF Public Health Foundation

Introductions

- Panelists:

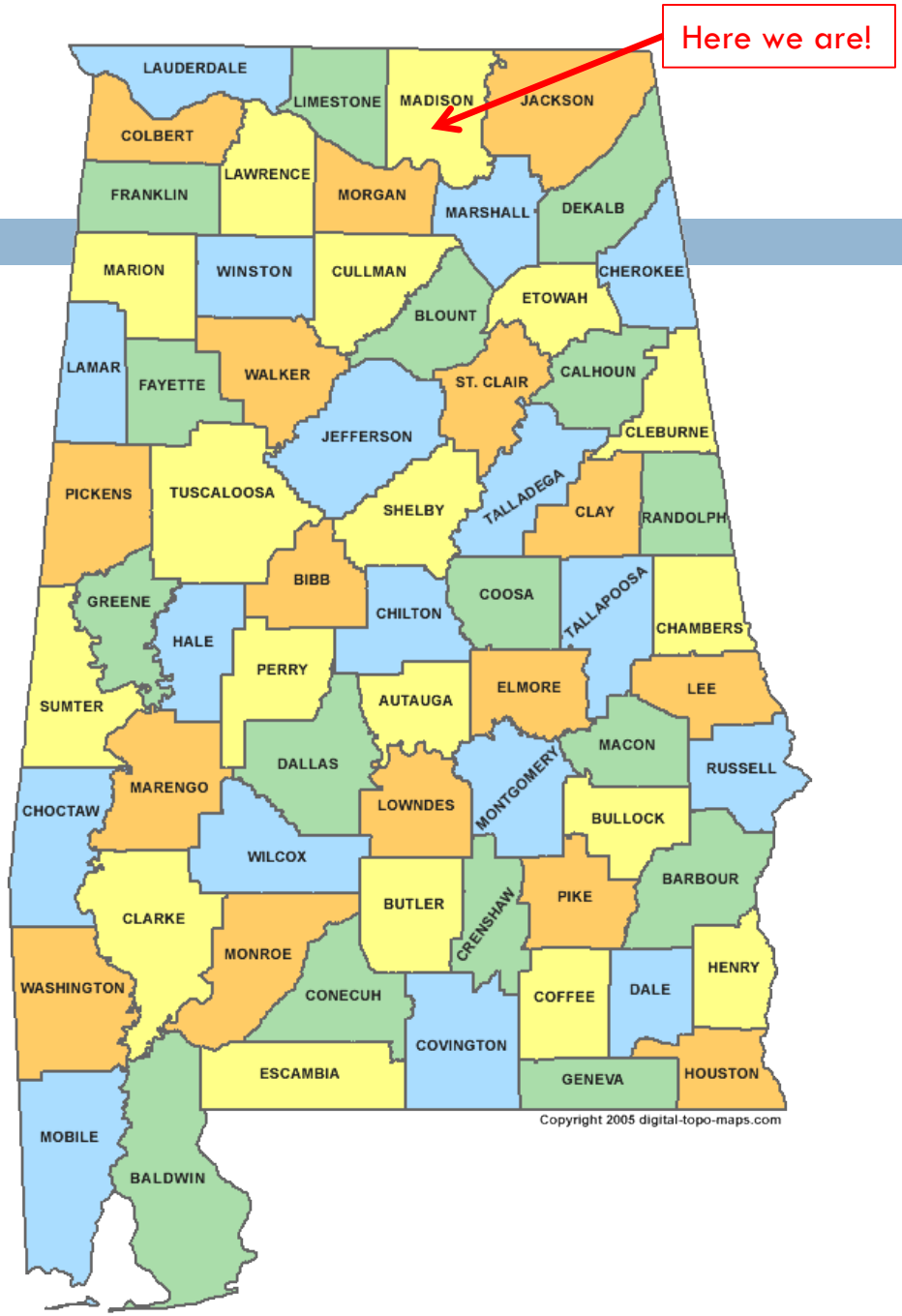
Cheryl Clay
Public Health Senior Environmentalist
Vector Control for City of Huntsville
Alabama Department of Public Health

James Sayers
Acting Supervisor – Vector Control
Saint Louis County Department of Public Health
Vector Control Program

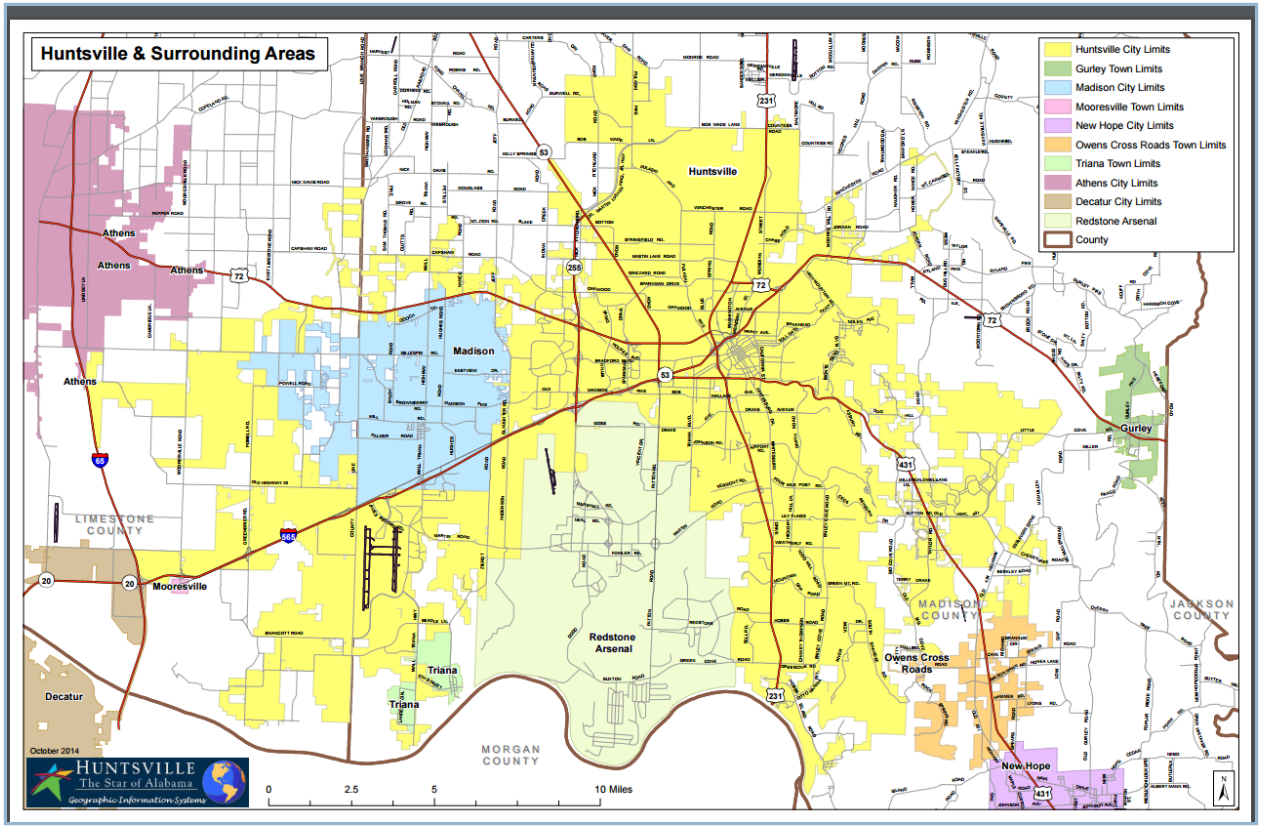
PRACTICAL APPROACHES TO ZIKA PREPAREDNESS AND RESPONSE

Madison County Health Department
Vector Control for City of Huntsville, AL

Huntsville, AL

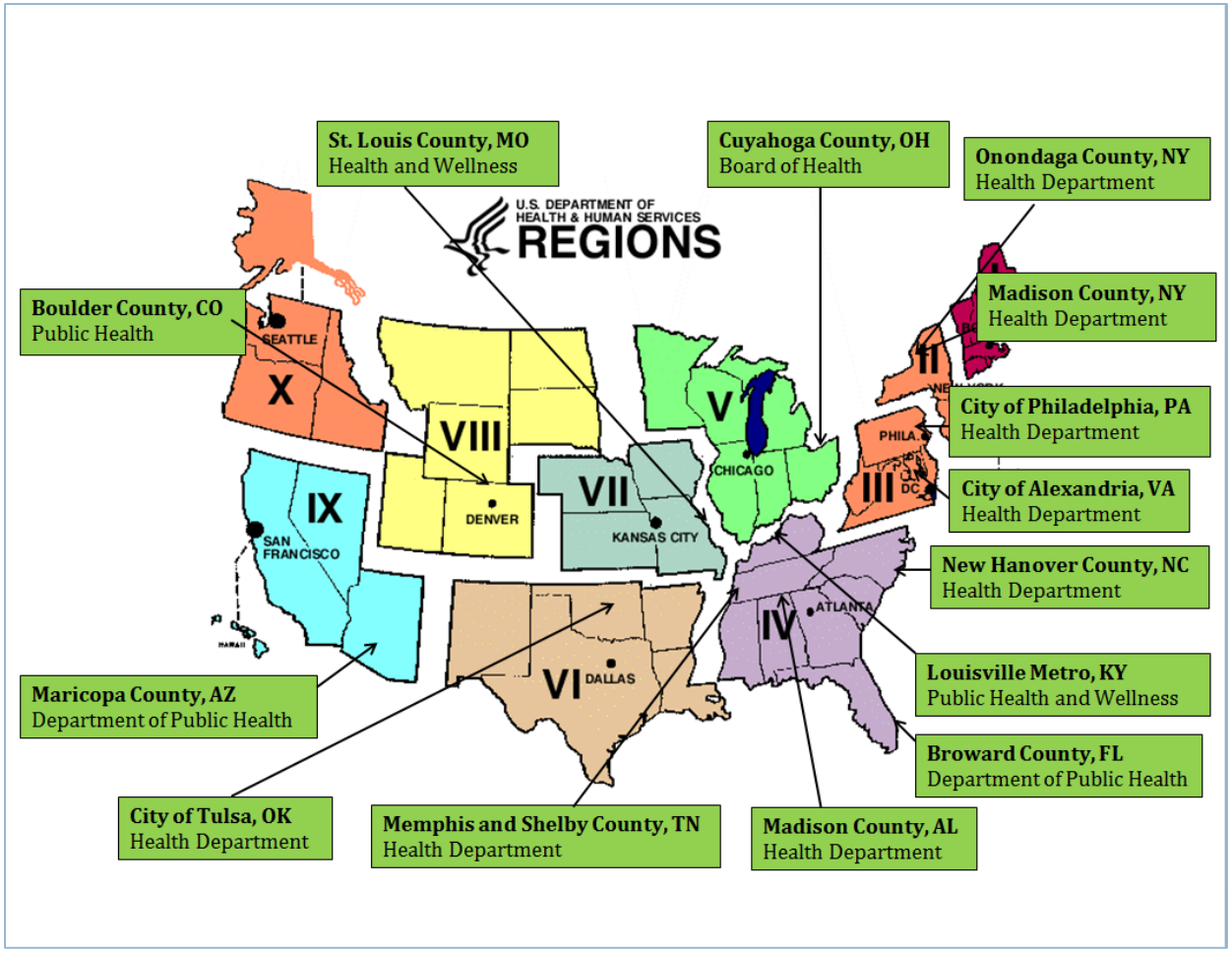


Huntsville, AL

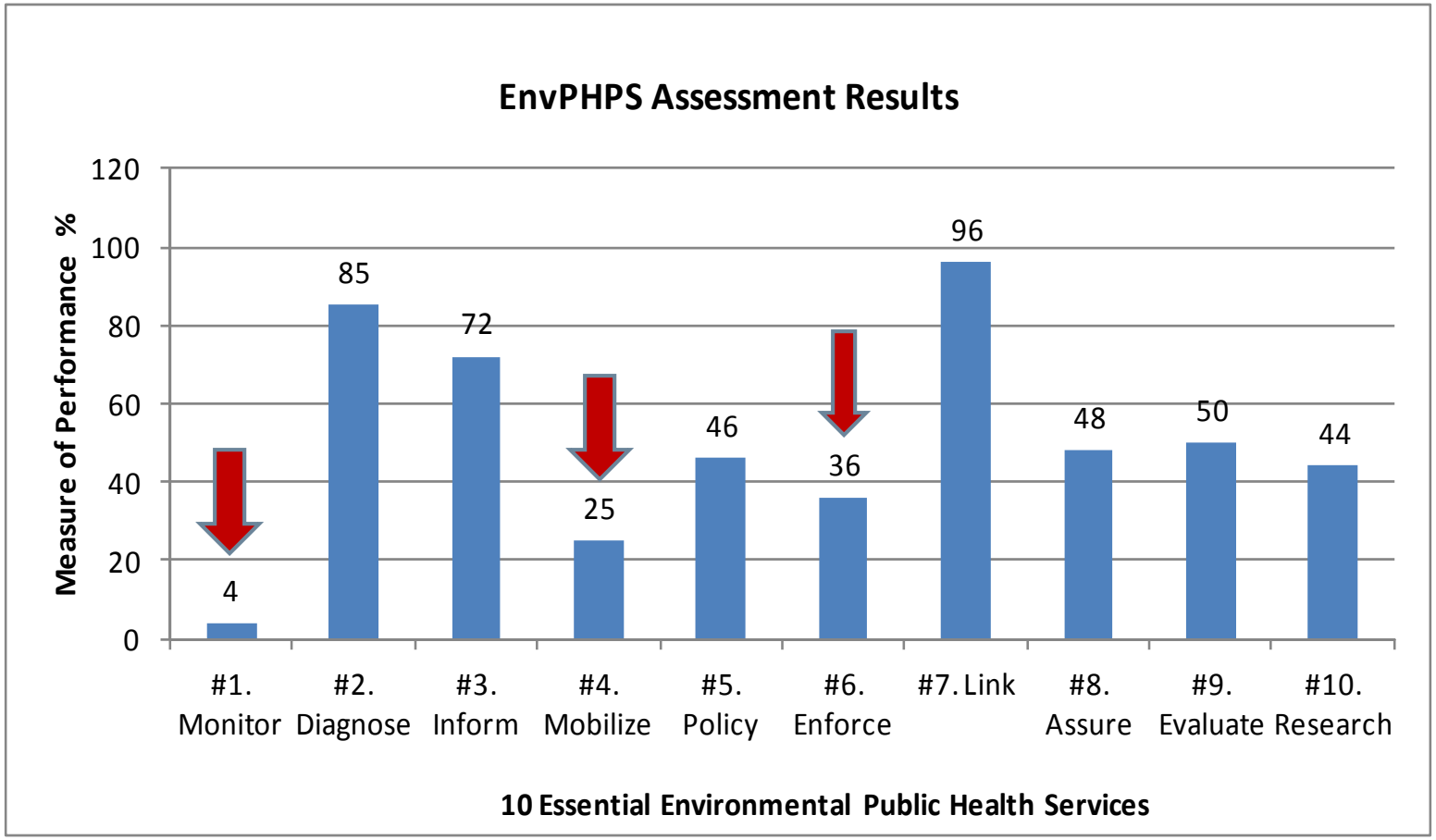


- 191,381 residents
- 214 mi^2

Vector Control Program Performance Assessment and Improvement Initiative



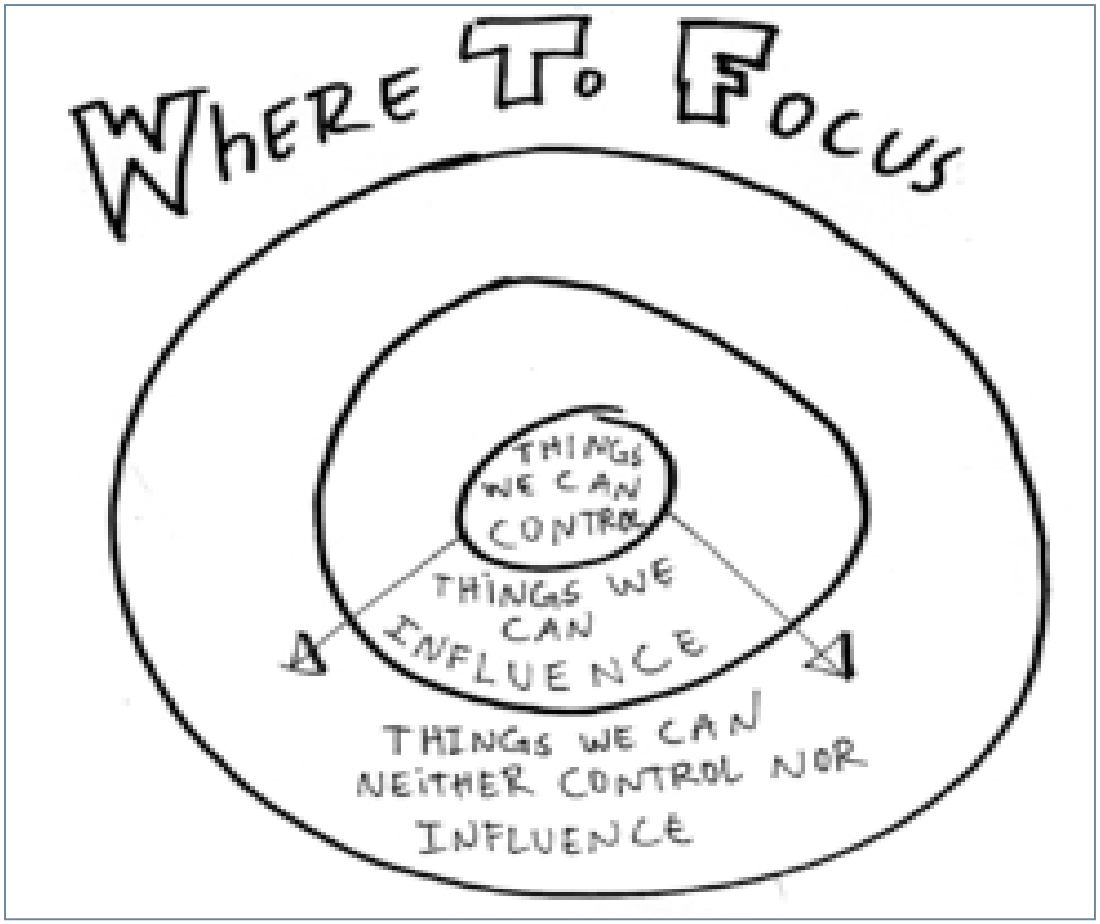
2014 Self-Assessment Results
Madison County Health Department




HEALTH DEPARTMENT
VECTOR CONTROL

Aedes albopictus

Our Project


WHERE TO FOCUS
THINGS WE CAN CONTROL
THINGS WE CAN INFLUENCE
THINGS WE CAN NEITHER CONTROL NOR INFLUENCE

Service #4

- *Mobilize community partnerships and actions to identify and solve environmental public health problems.*

- We felt this would have the greatest effect on our capacity to protect our residents from mosquito-borne diseases.

Project AIM Statement

- An opportunity exists to improve the vector capacity of the Vector Control Division of the Madison County Health Department regarding mosquito control by facilitating partnerships among groups and associations to assist in disseminating information to homeowners on mosquito population reduction by eliminating breeding environments.

The Project Focus

- By focusing on educating homeowners on eliminating areas on their property where mosquitoes can breed and develop, we would support our integrated pest management plan and provide a manageable project that could be completed by one person.

The Project Goal

- The goal was to create partnerships among community groups who would assist in distributing information or allow us to speak publicly in order to reach more people with our message regarding the removal of breeding environments.
- Focused on ways to maximize educational outreach with minimal time investment.
  - With community organization partnerships, we can quickly distribute timely and important information by email that will reach residents of those communities with minimal time input.

Community Partnership Network

- Email distribution list
  - Neighborhood Associations
  - Civic Groups
  - Government officials
  - News Media

Where to Start?

- Sent email to all city council members
- News release:
  - Television stations
  - Radio
  - County Commissioners
  - City of Huntsville Departments
  - Neighborhood Associations
  - Civic Organizations

Neighborhood Associations/Community Organizations

- Emailed associations on list provided by city.
- Complaints received resulted in partnerships.
- Formed 9 new partnerships:
  - Posted flyers in area businesses for us
  - Emailed flyer to members of community
  - Door hangers distributed by community watch organizations
  - NextDoor social media outlet
  - Neighborhood Association newsletters
  - Invited to community health fairs and community meetings

Program Web Page

Friday, June 3, 2016 - Text Only

Home :: About Huntsville :: Visitors :: Residents :: Businesses :: CONTACT

HUNTSVILLEAL.gov

Meeting & Public Notices:
City Council Work Sessions are held in the City Council Chambers of the Municipal Building on the 1st and 3rd Thursday of each month at 5:00 P.M.

E-mail Address GET UPDATES

Mayor Tommy Battle | Employment | Departments | I Want To... | City Government | For Residents | For Visitors | Election Information

MADISON COUNTY HEALTH DEPARTMENT : VECTOR CONTROL DIVISION

To learn more about the vector control program and Zika virus in our area, click here to watch "Inside Huntsville" interview, published April 7, 2016.

If you have any questions or are experiencing problems with rats or mosquitoes in your area, please call (256) 532-1915 or send an email to Cheryl.Clay@adph.state.al.us. Please provide your name, street address, and contact information.

Vector Control will begin citywide fogging: **May 18, 2016** Mosquito trucks operate weekdays from 7:00 p.m. to 12:00 a.m., except for state holidays. Trucks cannot operate during high wind, excessive heat, or when raining. Decisions regarding the expected locations of fog trucks will be posted by 5:00 p.m. on each fog day. Click here to enter your street address to see the last time your street was fogged and if the fog truck will be in your area this evening. Click on the map to see how many times your street has been fogged this year.

The Vector Control Division of the Madison County Health Department is responsible for mosquito and rat control in the areas of Huntsville that are located within Madison County. On August 25, 2015, our department will also begin operating mosquito fog trucks in subdivisions of Huntsville located in Limestone County. Vector Control follows an Integrated Pest Management (IPM) approach to managing the control of these pests. IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with pest control methods, is used to manage these pests by the most economical means with the least possible hazard to people and the environment. The cornerstone of any IPM program is prevention.

Mosquito Control

Asian Tiger Mosquito

The Vector Control Division strives to control the mosquito population in order to protect human health and to preserve the quality of life of the people by reducing the number of pestiferous and disease-carrying mosquitoes while maintaining the integrity of the environment.

Mosquitoes carry and transmit several diseases that infect humans and animals, such as birds and horses. In Alabama, mosquitoes transmit diseases including West Nile Virus, Eastern equine encephalitis, St. Louis encephalitis, and LaCross encephalitis.

Partnership with Local Government Channel

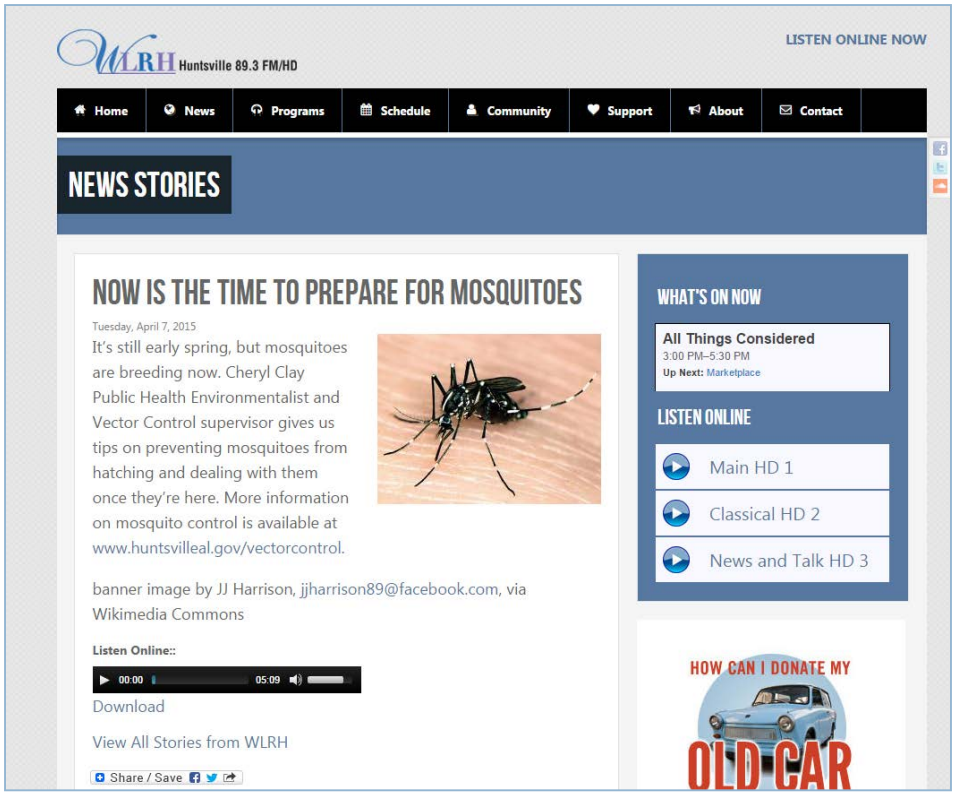
- *Inside Huntsville*
- Available on our web page
- Government channel regularly shows slides with important mosquito information.

Social Media

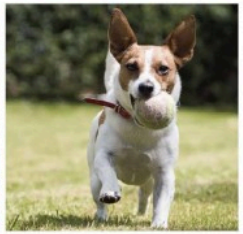
- Partnered with City of Huntsville
- 27,400 followers

NPR

WLRH Huntsville 89.3 FM/HD



Opening of New Dog Park



SOUTHSIDE PARK

OPENING MARCH 28, 2015

OPENING DAY EVENTS

8:00 a.m. - "Run for the River" 5K
11:00 a.m. - Ribbon Cutting Ceremony
11:30 a.m. - Parade of Pets featuring dogs in costume with celebrity judges and prizes.
Don't forget to bring your dog's favorite costume!
12:30 p.m. - Demonstrations begin

Dog Park events throughout the day (hosted by Huntsville South) include demonstrations from HEMSI Search & Rescue dogs, SouthEastern Search and Rescue, HPD K9 Unit and adoptable animals from local rescue groups. Discounted microchipping will be available thanks to Whitesburg Animal Hospital. Join us for a day of fun for the entire family, furry friends included. Event is free and open to the public.

Southside Park was made possible by Phil Riddick, Madison County Commissioner District 5 and the City of Huntsville.

www.facebook.com/SouthsideParkDogPark www.huntsvillesouth.org

Off of Chaney Thompson Road, Next to Aldridge Creek Huntsville AL

Earth Day 2015

Latino Community Outreach

Hoja informativa del virus del Nilo Occidental (VNO)

¿Qué es el virus del Nilo Occidental?

El virus del Nilo Occidental (VNO) causa una enfermedad potencialmente grave. Los expertos consideran que el virus del Nilo Occidental se ha convertido en una amenaza estacional en América del Norte, que se agrava en el verano y continúa hasta el otoño. Esta hoja informativa contiene información importante que puede ayudarle a reconocer y prevenir infeccion del virus del Nilo Occidental.

¿Qué puedo hacer para prevenir infección del por el virus del Nilo Occidental?

La mejor manera de evitar el virus del Nilo Occidental y la más sencilla es mediante la prevención de picaduras de mosquitos.

- Cuando esté al aire libre, utilice repelentes de insectos autorizados por la EPA. Siga las instrucciones del envase.
- Muchos mosquitos son más activos durante el atardecer y el amanecer. Asegúrese de usar un repelente de insectos y camisa de mangas largas y pantalones largos en esos momentos o de permanecer adentro durante esas horas.
- Asegúrese de tener buenos mosquiteros en las ventanas y puertas para impedir que entren los mosquitos.
- Elimine los sitios donde crecen los mosquitos al vaciar el agua estancada en las macetas, los baldes y los barriles. Cambie el agua de los recipientes para mascotas y el de las fuentes para pájaros una vez por semana. Realice perforaciones en las cubiertas utilizadas como hamacas para que el agua pueda drenarse. Mantenga las piscinas de los niños vacías y apoyadas de costado cuando no se encuentren en uso.

¿Cuáles son los síntomas causados por el virus del Nilo Occidental?

- **En pocas personas los síntomas son graves.** Cerca de una de cada 150 personas infectadas por el virus del Nilo Occidental se enfermará de manera grave. Los síntomas graves pueden incluir fiebre alta, dolor de cabeza, rigidez en el cuello, estupor, desorientación, coma, temblores, convulsiones, debilidad muscular, pérdida de la visión, entumecimiento y parálisis. Estos síntomas pueden durar varias semanas y los efectos neurológicos pueden ser permanentes.
- **Algunas personas presentan síntomas más leves.** Cerca del 20 por ciento de las personas infectadas presentarán síntomas leves, entre ellos, fiebre, dolor de cabeza, dolor en el cuerpo, náuseas y vómitos, ocasionalmente con hinchazón en las glándulas linfáticas o erupción cutánea en el pecho, el abdomen y la espalda. Los síntomas pueden durar tan solo unos cuantos días, aunque hay personas saludables que han estado enfermas por varias semanas.
- **La mayoría de las personas no presentan síntomas.** Aproximadamente el 80 por ciento de las personas (unas 4 de cada 5) que están infectadas por el virus del Nilo Occidental no presentará ningún síntoma en absoluto, pero no hay forma de saber con anticipación si se enfermará o no.

¿Cómo se transmite el virus del Nilo Occidental?

- **Mosquitos infectados.** Generalmente, el virus del Nilo Occidental se transmite por la picadura de un mosquito infectado. Los mosquitos se contagian cuando se alimentan de aves infectados. Los mosquitos infectados transmiten luego el virus del Nilo Occidental cuando pican a los seres humanos y a otros animales.
- **Transfusiones, trasplantes y transmisión materno-infantil.** En muy contados casos, el virus del Nilo Occidental también se ha transmitido por medio de transfusiones de sangre, trasplantes de órganos, lactancia materna y hasta durante el embarazo de madre a hijo.
- **No se transmite mediante el contacto físico.** El virus del Nilo Occidental no se propaga por el contacto casual, como tocar o besar a una persona con el virus.

¿Qué tan rápido se enferman las personas infectadas?

Las personas generalmente presentan los síntomas de 3 a 14 días después de haber sido picadas por el mosquito infectado.

¿Cómo se trata la infección por el virus del Nilo Occidental?

No hay un tratamiento específico para tratar la infección por el virus del Nilo Occidental. En los casos con síntomas más leves, las personas tienen síntomas como fiebre y dolores que desaparecen por sí solos, aunque la enfermedad podría durar semanas y meses aún en personas sanas. En los casos más graves, las personas usualmente necesitan ir al hospital para recibir tratamiento de apoyo que incluye, entre otros, líquidos intravenosos, ayuda con la respiración y cuidado de enfermería.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Vector-Borne Diseases

CDC

Tire Dealer Letters

March 31, 2015

To: All Dealers of New and Used Tires

Subject: Mosquito Breeding in Tires

The Vector Control Division of the Madison County Health Department would like to remind all tire dealers to store tires in a manner that does not collect water in order to prevent the breeding of mosquitoes. The Huntsville area has a large population of the "tiger" mosquito, which prefers to breed in containers, such as tires. Holding water in tires for even a few days can result in the emergence of adult mosquitoes.

Per Huntsville City Code of Ordinance, Section 14-32,

"It shall be unlawful for any person to have, keep, maintain, cause or permit within corporate limits of the city any collection of standing water or flowing water in which mosquitoes breed or are likely to breed unless such collection of water is treated so as to effectually prevent such breeding, or any high grass, shrubbery or weeds in which mosquitoes might harbor or shelter."

Vector Control personnel may conduct periodic inspections of tire dealers throughout the mosquito season. It is the intention of this department to eliminate breeding sources of mosquitoes and to reduce the mosquito population providing a healthier, safer environment in which to live. We request your assistance in accomplishing this goal for our community.

If you have any questions or concerns at any time, please call (256) 532-1915 or send an email to Cheryl.Clay@adph.state.al.us.

Sincerely,

Cheryl Clay
Public Health Senior Environmentalist
Vector Control Supervisor

Churches

May 26, 2015

Dear Community Partner:

Subject: Mosquito Information

The Vector Control Division of the Madison County Health Department is responsible for mosquito control in the City of Huntsville. We are working to establishment a group of community partners where we can distribute information regarding how the public can protect themselves from mosquito-borne disease. We are available to speak at meetings and have door hangers/brochures that can be given for distribution in neighborhoods. We would greatly appreciate it if you would share the enclosed flyer. For more information or to see the last time an area was fogged for mosquitoes, please visit: www.huntsvilleal.gov/vectorcontrol. If you have any questions at any time, please call (256) 532-1915.

Sincerely,

Cheryl Clay
Public Health Senior Environmentalist

Gantt Chart

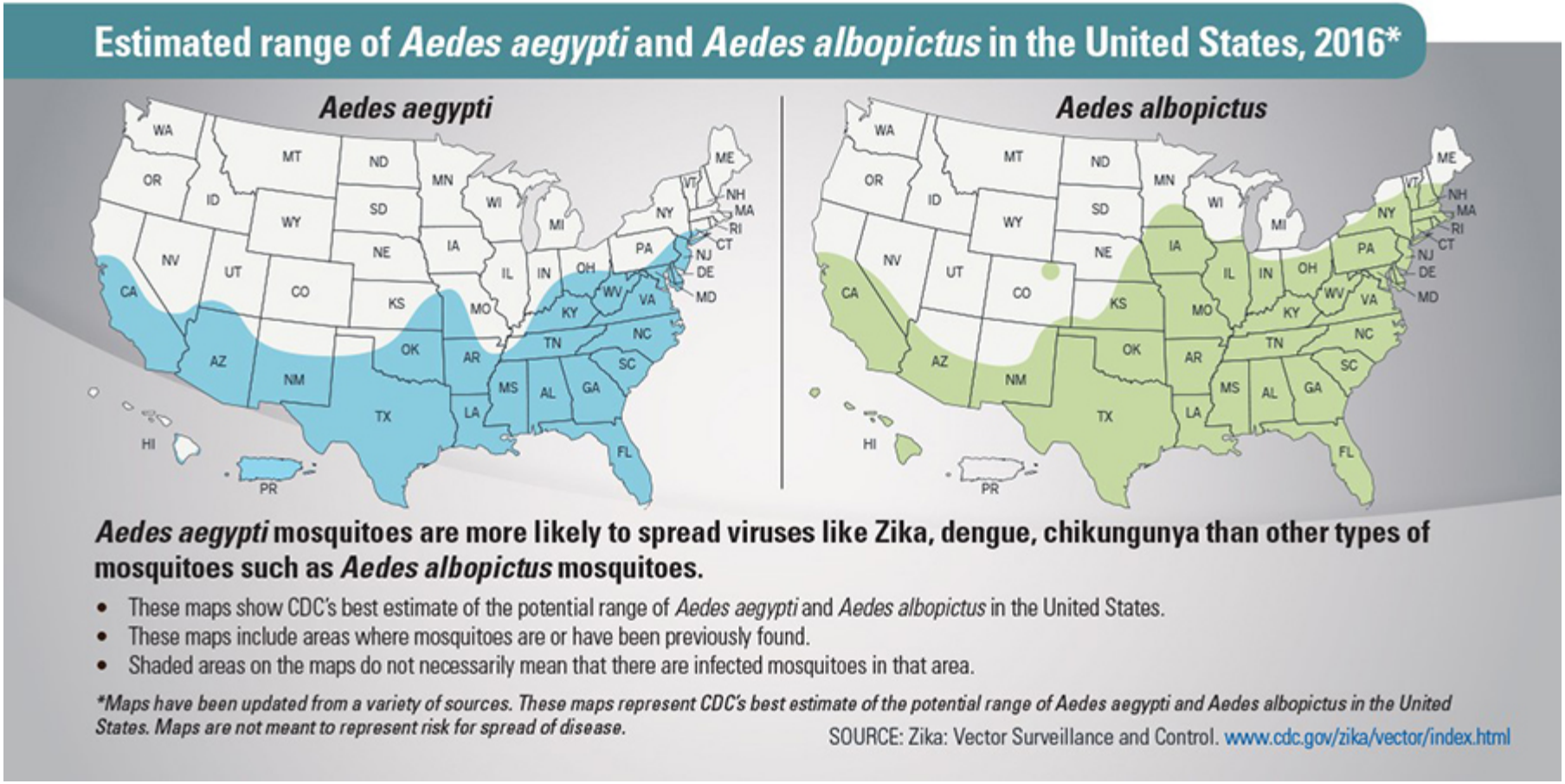
Task Number	Vector Control Division of the Madison County Health DepartmentVector Control Improvement Plan	January	February	March	April	May	June	July
1	Aim Statement - review and revise	Ongoing						
2	Determine Web hits to measure community checking website - monthly IT e-mail		Ongoing					
3	Review and revise educational materials		Start	Complete				
3a	Check on Availability of Spanish materials at CDC and other sites - e-mail Justin and Micaela		Complete					
3b	Develop Spanish materials for Madison County		Ongoing					
4	Develop list of potential partners		Complete					
4a	Prioritize list		Complete					
4b	Analyze mosquito complaints for 2012-2014 season to determine number per map area		Complete					
4c	**Contact potential partners and**		Ongoing					
	Mayors Office			Complete				
	City Council		Complete					
	Denise Taylor- Green Team- Earth Day Event- event date 4/18/15			Complete				
	Walt Hennessee- Huntsville South Civic Association- 3/25/15			Complete				
	Organizers of opening of south Huntsville dog park			Complete				
	Blake Hudson- City of Huntsville			Complete				
	Kelly Schrimsher- City of Huntsville- Director of Communications			Complete				
	Kenneth Anderson- City of Huntsville- Office of Multicultural Affairs- 3/25/15			Complete				
	Brenda Martin- City of Huntsville- *Inside Huntsville*- 3/25/15			Complete				
	Contacted WLRH- public radio 3/25/15			Complete				
	Bailey/Patton Estates Community Watch- will assist distributing brochures/door hangers (250 residents)			Complete				
	Partnership created with Al Herrera- Latino summer employee- he has agreed to be the bridge between our department and the Latino community regarding educational materials distribution and speaking events- 4/1/15				Complete			
	Community Associations- emailed 23 associations from list provided by Kenny Anderson- 4/29/15				Complete			
	Real Estate Agents							
	Churches					Complete		
	Water Pollution Control							
	Community Development							
	Senior Centers							
5	Pilot Elementary School presentation for 2016 launch							
6	**Presentations to Partners and request assistance**							

What did we learn?

- Our initial project with the Public Health Foundation helped us to recognize that even though we are a small staff, we can accomplish a great deal with community partners.
- As we increase our number of partners, we can work toward accomplishing our goal of educating all residents on how they can protect themselves from mosquito-borne disease.


ZIKA VIRUS

Potential Range (Past/Current?)



AL Bureau of Environmental Services

- 3 of 67 counties in AL have health department vector/mosquito control programs.
  - Most environmentalists do not have vector training.

- Focus on educating the public on removing mosquito breeding environments and methods of preventing mosquito bites.

Zika Virus: A Guide for Environmentalists

Zika Virus

Zika virus was first discovered in a monkey in the Zika Forest of Uganda in 1947. Before 2015, Zika virus outbreaks occurred in areas of Africa, Southeast Asia, and the Pacific Islands. Currently, outbreaks are occurring in many countries and territories (http://www.cdc.gov/zika). In December 2015, the Commonwealth of Puerto Rico, A United States territory, reported its first confirmed locally transmitted Zika virus case. Local transmission means that mosquitoes in the area have been infected with Zika virus and can spread it to people. Cases of local transmission have recently been confirmed in two other US territories, the United States Virgin Islands, and American Samoa.

On January 22, 2016 the CDC activated its Emergency Operations Center to respond to outbreaks of Zika occurring in the Americas and increased reports of birth defects and Guillain-Barre syndrome in areas affected by Zika.

Zika virus is spread to people primarily through the bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*). When feeding, a mosquito will pierce the skin and inject saliva into the person's skin. This allows the virus to enter the site. Additionally, a mother can pass Zika virus to her fetus during pregnancy. Although mosquito bites are the main way that Zika virus is spread, a man can sexually transmit the virus to his partner(s). There is also a strong possibility that the virus can be spread through blood transfusions.

The most common symptoms of Zika virus disease are:

- Fever
- Rash
- Joint pain
- Conjunctivitis (red eyes)

Other symptoms include:

- Muscle pain
- Headache

Four out of 5 people infected with Zika virus will not have any symptoms. The sickness is usually mild with symptoms lasting for several days to a week. People usually do not get sick enough to go to the hospital, and they rarely die of Zika.

At this time, Zika has not been spread by mosquitoes in the continental United States; however, cases have been reported in travelers returning to the United States, as well as cases of sexual transmission. The CDC monitors and reports cases of Zika, which will help improve our understanding of how and where Zika is spreading.

For Zika to cause an outbreak in the continental United States, all of the following must occur:

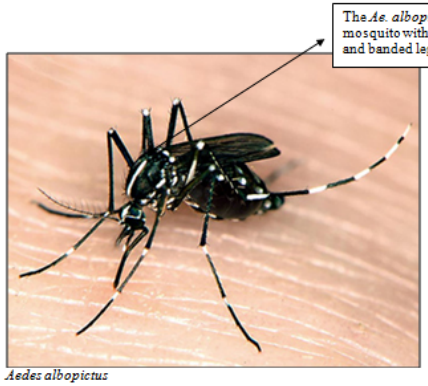
- People infected with the virus enter the United States.
- An *Aedes* mosquito in the United States bites the infected person during the relatively short time that the virus can be found in the person's blood.
- The infected mosquito lives long enough for the virus to multiply and for the mosquito to bite another person.

Zika Virus: A Guide for Environmentalists

***Aedes* Mosquitoes**

Mosquitoes have a complex life-cycle with dramatic changes in shape, function, and habitat. There are more than 3,500 known species of mosquitoes worldwide and there are about 60 different species in Alabama. Some mosquitoes are disease vectors, while others are just a nuisance.

The *Aedes aegypti* mosquito, commonly known as the yellow fever mosquito, used to be common in Alabama, but has mostly been displaced by the *Aedes albopictus*, commonly known as the Asian tiger mosquito. The *Ae. aegypti* is also the main carrier for the Zika virus, although *Ae. albopictus* can also be a carrier.

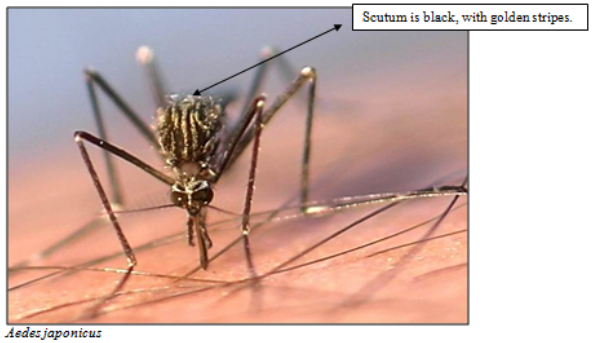


Aedes albopictus

Zika Virus: A Guide for Environmentalists

Aedes aegypti

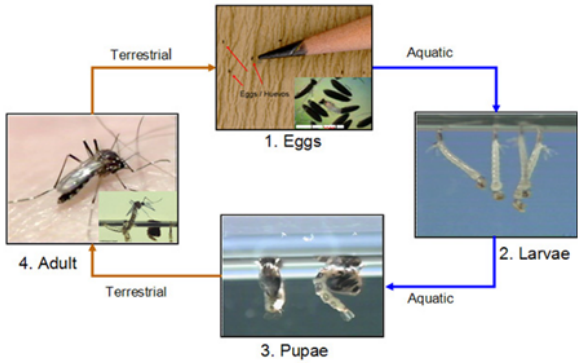
Aedes japonicus is often mistaken for *Ae. aegypti* because the scutum looks similar; however, *Ae. japonicus* has golden markings whereas *Ae. aegypti* has white. This species transmits the virus that causes Japanese encephalitis in its native area; however, since it was introduced to the United States in 1998, it is not known to be a disease vector here.



Aedes japonicus

Zika Virus: A Guide for Environmentalists

Mosquito Lifecycle



The lifecycle and biology is similar for both the *Ae. albopictus* and *Ae. aegypti*, but we will focus on *Ae. albopictus* since it is the common one of the two found in Alabama. In addition to Zika, this mosquito is also a vector for dengue, chikungunya, the dog heartworm parasite, and yellow fever in the tropics.

Life Stages of *Aedes* Mosquitoes

Eggs

- Adult, female mosquitoes lay their eggs on the inner, wet walls of containers with water, above the waterline.
- Mosquitoes generally lay 100 eggs at a time.
- Eggs are very hardy; they stick to the walls of a container like glue and can survive drying out for up to 8 months - even over the winter in the southern United States.
- It only takes a very small amount of water to attract a female mosquito (mosquitoes do not breed in flowing water).

Zika Virus: A Guide for Environmentalists

Breeding Environments

One of the best ways to avoid mosquito bites around the home is to not raise them. One water-filled can or bottle can be the hatching site for several thousand mosquitoes. Many residents are not aware that mosquitoes can breed in a very small amount of water. They commonly believe their mosquitoes are coming from a nearby ditch or a neighbor's old swimming pool. However, oftentimes, it is an area of their yard that they do not realize can cause a problem. *Ae. albopictus* have a short flight range (less than 200 meters), so egg production sites are likely to be close to where the mosquito is found. *Ae. albopictus* can use natural locations or habitats (for example treeholes and plants) and artificial containers with water to lay eggs.

Basically, anything that can hold a small amount of stagnant water for as little as a week can be a problem. Below are some examples of what to look for.

Flower pot dishes should either not be used during mosquito season or emptied and scrubbed out to remove eggs at least weekly. Also, it is very important that flower pots have drain holes to avoid over saturation of the soil. Overly saturated soil can breed mosquitoes. Additionally, small wading pools are commonly used as water bowls for pets. This can be a problem because they are typically too heavy to dump out the water. Residents just keep adding water as needed. This makes them an optimal breeding area because the eggs are never removed.

Tires are an ideal breeding environment for *Ae. albopictus*. They should be permanently removed or stored in a shed or garage so that they cannot collect water. It is nearly impossible to dump water out of a tire. Check with your local schools and see if they use tires for sports practice, such as football. Recommend that they drill holes in the tires so they cannot hold water or to store them in an area where they will not collect water when not in use.

Zika Virus: A Guide for Environmentalists

Rain barrels or buckets used for collecting water to reuse should be kept covered or have screening with holes too small for an adult mosquito to enter.

Children's toys are common mosquito breeders. Recycling bins can also breed mosquitoes if the drain holes are clogged with fallen leaves. Residents also use garbage cans to collect yard debris for curbside pickup. These cans should have holes drilled in the bottom to prevent collecting water.

Wheelbarrows should be stored inverted when not in use.

Found By Environmentalist During Septic System Inspection

Mosquito Breeding Environment Checklist for Environmentalists

ZIKA ENVIRONMENTALIST CHECKLIST

DATE:

ARTIFICIAL ENVIRONMENTS	Yes	No	N/A
Are gutters free of debris/unclogged/no standing water			
Is the bird bath emptied and scrubbed twice a week			
Are tires properly stored/not holding water			
Are corrugated pipes graded to drain/not holding water			
Are children's toys and pools scrubbed & emptied twice a week or properly stored			
Is swimming pool operating, properly covered to prevent the entry of adult mosquitoes, or treated with a larvicide (including skimmer)			
Are potted plants properly maintained/not overly saturated			
Are potted plant dishes emptied and scrubbed twice a week			
Are tarps properly used/stored to not hold water			
Are pet water bowls/animal troughs emptied and scrubbed twice a week			
Are recycling bins/garbage cans covered or have unblocked drain holes/not holding water			
Are wheelbarrows turned over			
Are watering cans stored to not collect rainwater			
Are rain barrels tightly covered or have screening small enough to exclude mosquitoes			
Are buckets stored inverted or covered			
Is septic tank in good repair (no cracks, vent pipes covered with mesh to exclude mosquitoes)			
Does storm shelter have tight-fitting door/no standing water			
Are boats/jet skis properly covered and free of standing water			
Are appliances (washers/dryers) free of standing water			
Are old vehicles free of standing water			
Is the water meter free of standing water			
Is air conditioner drainage area properly graded/free of standing water			
Is ornamental fish pond/fountain circulating and free of standing water			
Is area free of other items that can hold water (cans, bottles, bottle caps, trash, etc.)			
Are there storm water drains/catch basins nearby capable of holding standing water (may need to consult local public works)			
Are window/porch screens in good repair/screening small enough to exclude mosquitoes			
Are there cemetery vases in the area holding water			
NATURAL ENVIRONMENTS			
Is vegetation maintained to not attract/breed adult mosquitoes			
Is the area free of bamboo (mosquitoes can breed in internodes)			
Are treeholes free of standing water (if accessible)			
Does the yard properly drain after a rain event (no standing water after a few days)			
Are nearby ditches free of standing water/overgrown vegetation			

COMMENTS/RECOMMENDATIONS:

INSPECTION ADDRESS: _____

ENVIRONMENTALIST SIGNATURE: _____

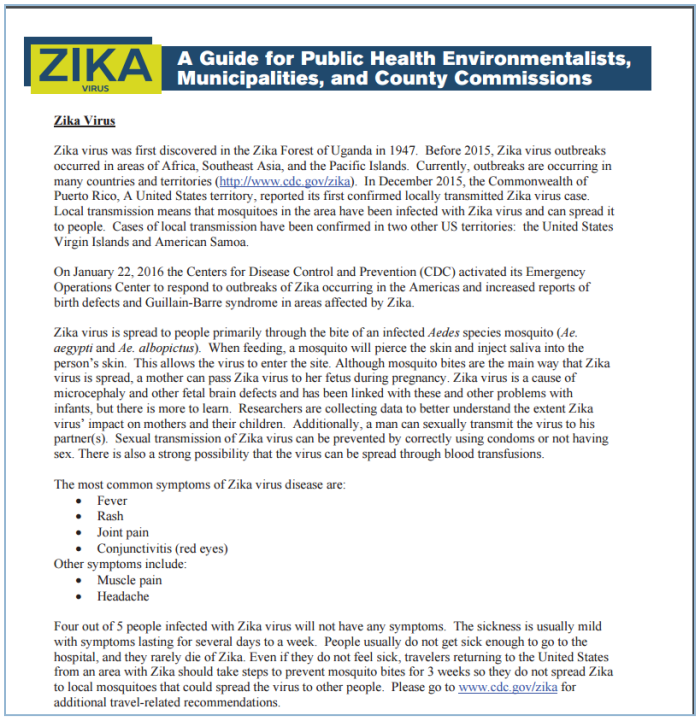
ALABAMA PUBLIC HEALTH

Residential Checklist

RESIDENTIAL CHECKLIST FOR MOSQUITO BREEDING SITES			
ARTIFICIAL ENVIRONMENTS	**Yes**	**No**	**N/A**
Are gutters free of debris/unclogged/no standing water			
Is the bird bath emptied and scrubbed twice a week			
Are tires properly stored/not holding water			
Are corrugated pipes graded to drain/not holding water			
Are children's toys and pools scrubbed & emptied twice a week or properly stored			
Is swimming pool operating, properly covered to prevent the entry of adult mosquitoes, or treated with a larvicide (including skimmer)			
Are potted plants properly maintained/not overly saturated			
Are potted plant dishes emptied and scrubbed twice a week			
Are tarps properly used/stored to not hold water			
Are pet water bowls/animal troughs emptied and scrubbed twice a week			
Are recycling bins/garbage cans covered or have unblocked drain holes/not holding water			
Are wheelbarrows turned over			
Are watering cans stored to not collect rainwater			
Are rain barrels tightly covered or have screening small enough to exclude mosquitoes			
Are buckets stored inverted or covered			
Is septic tank in good repair (no cracks, vent pipes covered with mesh to exclude mosquitoes)			
Does storm shelter have tight-fitting door/no standing water			
Are boats/jet skis properly covered and free of standing water			
Are appliances (washers/dryers) free of standing water			
Are old vehicles free of standing water			
Is the water meter free of standing water			
Is air conditioner drainage area properly graded/free of standing water			
Is ornamental fish pond/fountain circulating and free of standing water			
Is area free of other items that can hold water (cans, bottles, bottle caps, trash, etc.)			
Are there storm water drains/catch basins nearby capable of holding standing water (may need to consult local public works)			
Are window/porch screens in good repair/screening small enough to exclude mosquitoes			
Are there cemetery vases in the area holding water			
NATURAL ENVIRONMENTS			
Is vegetation maintained to not attract/breed adult mosquitoes			
Is the area free of bamboo (mosquitoes can breed in internodes)			
Are treeholes free of standing water (if accessible)			
Does the yard properly drain after a rain event (no standing water after a few days)			
Are nearby ditches free of standing water/overgrown vegetation			

Zika Guide

- Zika Virus: A Guide for Environmentalists, Municipalities, and County Commissions
  - Alabama League of Municipalities



ZIKA VIRUS

A Guide for Public Health Environmentalists, Municipalities, and County Commissions

Zika Virus

Zika virus was first discovered in the Zika Forest of Uganda in 1947. Before 2015, Zika virus outbreaks occurred in areas of Africa, Southeast Asia, and the Pacific Islands. Currently, outbreaks are occurring in many countries and territories (http://www.cdc.gov/zika). In December 2015, the Commonwealth of Puerto Rico, A United States territory, reported its first confirmed locally transmitted Zika virus case. Local transmission means that mosquitoes in the area have been infected with Zika virus and can spread it to people. Cases of local transmission have been confirmed in two other US territories: the United States Virgin Islands and American Samoa.

On January 22, 2016 the Centers for Disease Control and Prevention (CDC) activated its Emergency Operations Center to respond to outbreaks of Zika occurring in the Americas and increased reports of birth defects and Guillain-Barre syndrome in areas affected by Zika.

Zika virus is spread to people primarily through the bite of an infected *Aedes* species mosquito (*Ae. aegypti* and *Ae. albopictus*). When feeding, a mosquito will pierce the skin and inject saliva into the person's skin. This allows the virus to enter the site. Although mosquito bites are the main way that Zika virus is spread, a mother can pass Zika virus to her fetus during pregnancy. Zika virus is a cause of microcephaly and other fetal brain defects and has been linked with these and other problems with infants, but there is more to learn. Researchers are collecting data to better understand the extent Zika virus' impact on mothers and their children. Additionally, a man can sexually transmit the virus to his partner(s). Sexual transmission of Zika virus can be prevented by correctly using condoms or not having sex. There is also a strong possibility that the virus can be spread through blood transfusions.

The most common symptoms of Zika virus disease are:

- Fever
- Rash
- Joint pain
- Conjunctivitis (red eyes)

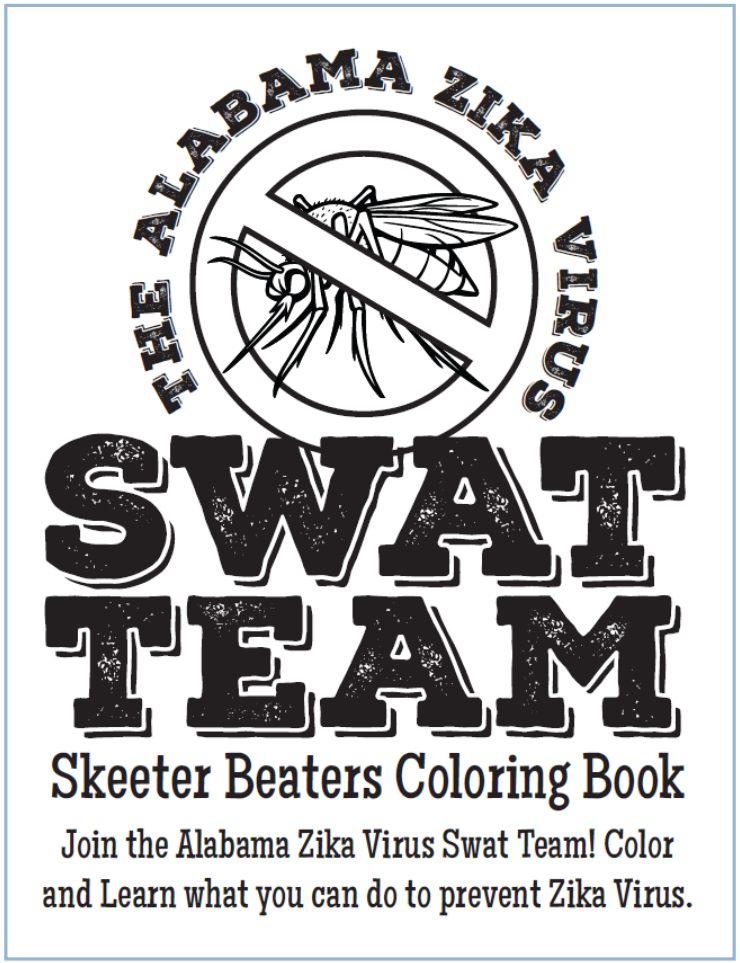
Other symptoms include:

- Muscle pain
- Headache

Four out of 5 people infected with Zika virus will not have any symptoms. The sickness is usually mild with symptoms lasting for several days to a week. People usually do not get sick enough to go to the hospital, and they rarely die of Zika. Even if they do not feel sick, travelers returning to the United States from an area with Zika should take steps to prevent mosquito bites for 3 weeks so they do not spread Zika to local mosquitoes that could spread the virus to other people. Please go to www.cdc.gov/zika for additional travel-related recommendations.

AL Bureau of Environmental Services

- Zika Coloring book distributed to pre-K through 3rd grade students in public schools statewide and other schools if requested.
- Spanish version available.
- Both versions are available on website.

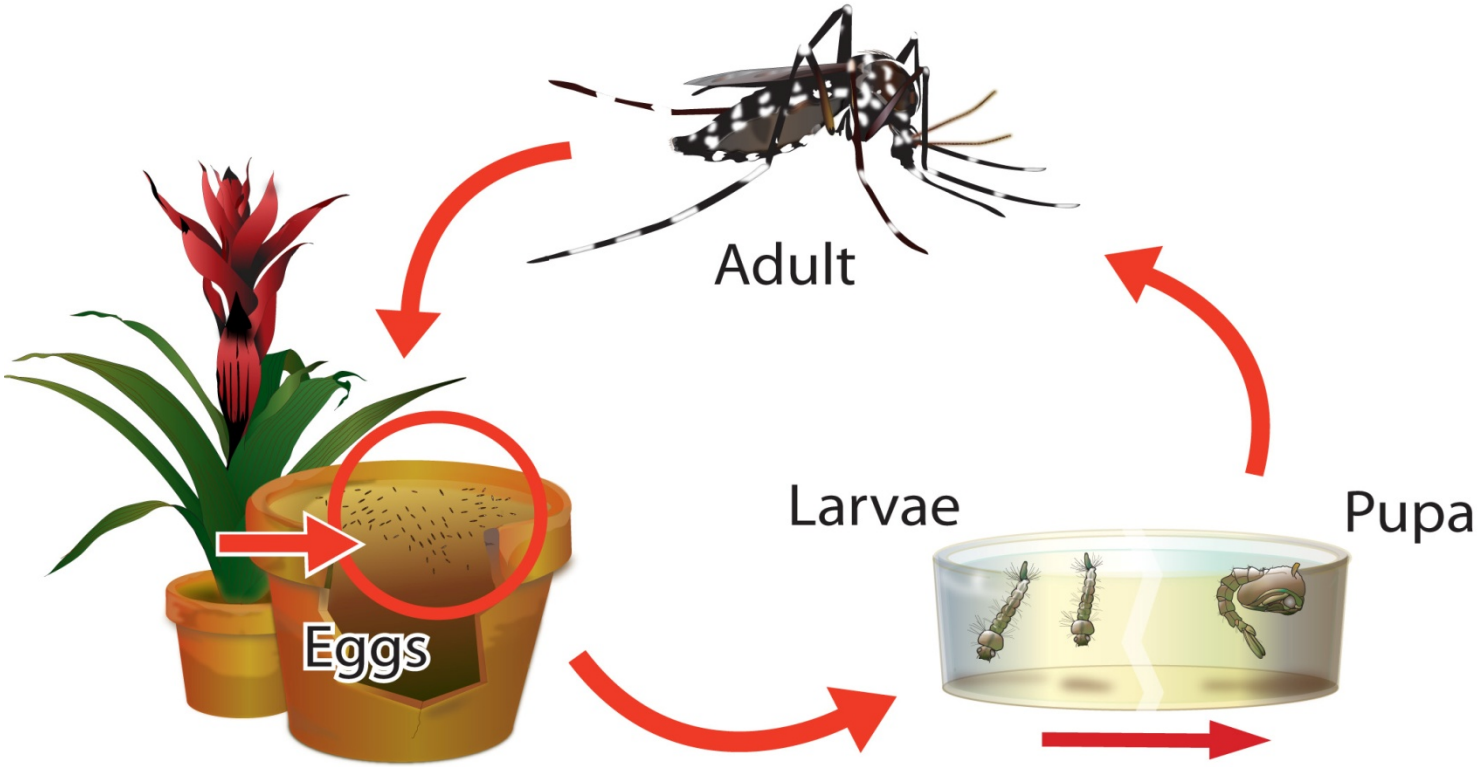


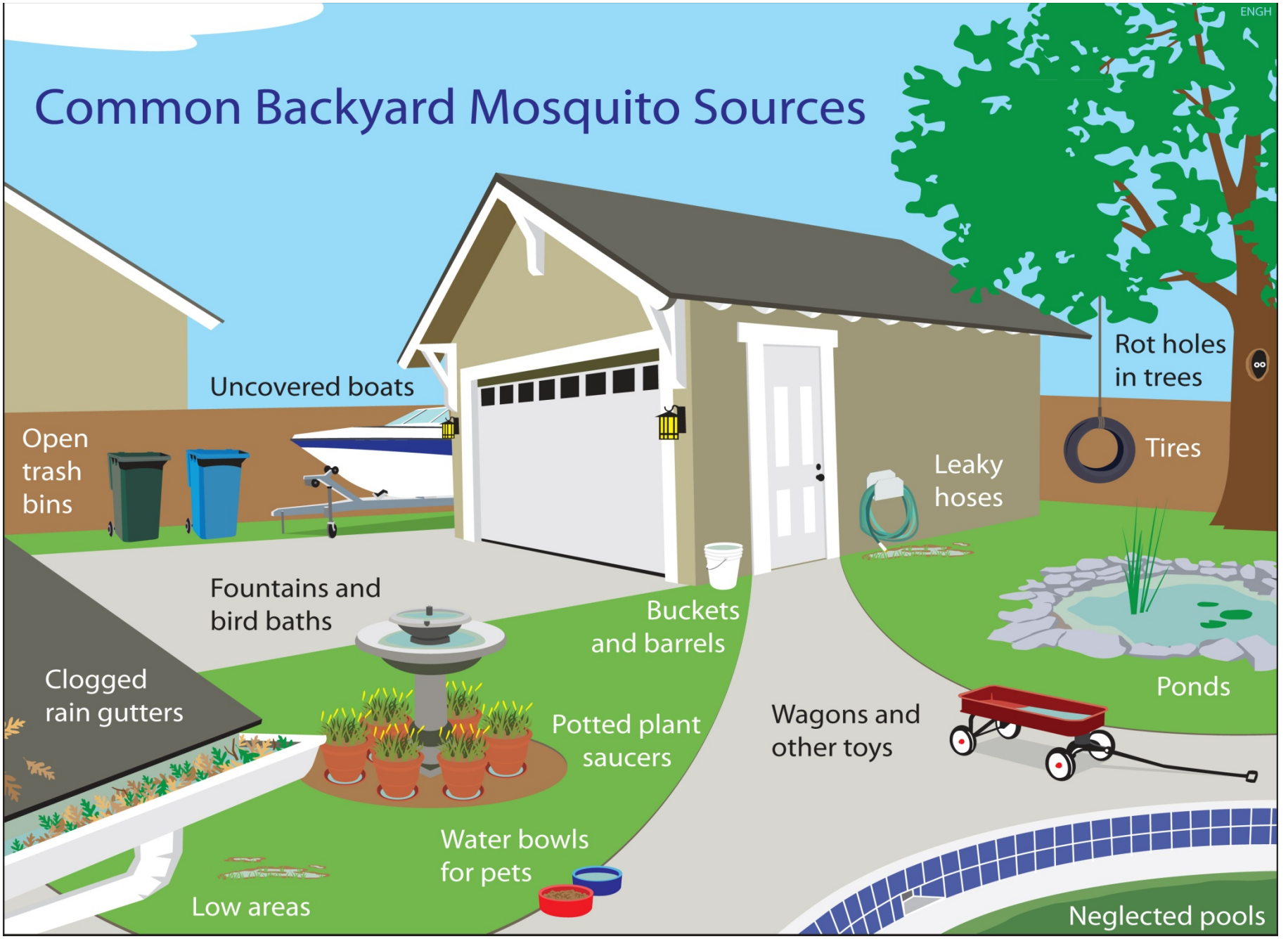
Video Contest

Local Response to Zika Virus

- Community Partners!
  - 3 local news releases to community partners
  - 14 local news interviews
  - Presented at town hall, neighborhood associations, and civic group meetings
  - Health Fairs
  - New partnership with Parks & Recreation
    - They have contacts in all neighborhoods!

Mosquito Lifecycle for Container Breeders




ENGH
Common Backyard Mosquito Sources
Uncovered boats
Open trash bins
Rot holes in trees
Tires
Leaky hoses
Fountains and bird baths
Buckets and barrels
Clogged rain gutters
Ponds
Potted plant saucers
Wagons and other toys
Water bowls for pets
Low areas
Neglected pools

You Can Protect Yourself: The 3 D's

- DRAIN
  - REMOVE POTENTIAL MOSQUITO BREEDING HABITATS!
- DRESS
  - Wear light-colored, tightly woven, loose-fitting clothing.
- DEFEND
  - Use insect repellent sprays with EPA-registered ingredients:
    - DEET
    - Picaridin
    - Oil of Lemon Eucalyptus
    - IR3535

Earth Day 2016

Elementary School Education Project

Public Health Foundation Project #2

- Mosquito Education Curriculum
  - 4th graders
  - Mosquito lifecycle, breeding environments, bite prevention

Ae. aegypti and *Ae. albopictus*

- Due to their flight behavior, mosquito fog trucks have limited effect on these species.
- This is why it is very important to remove breeding sources from around the home.

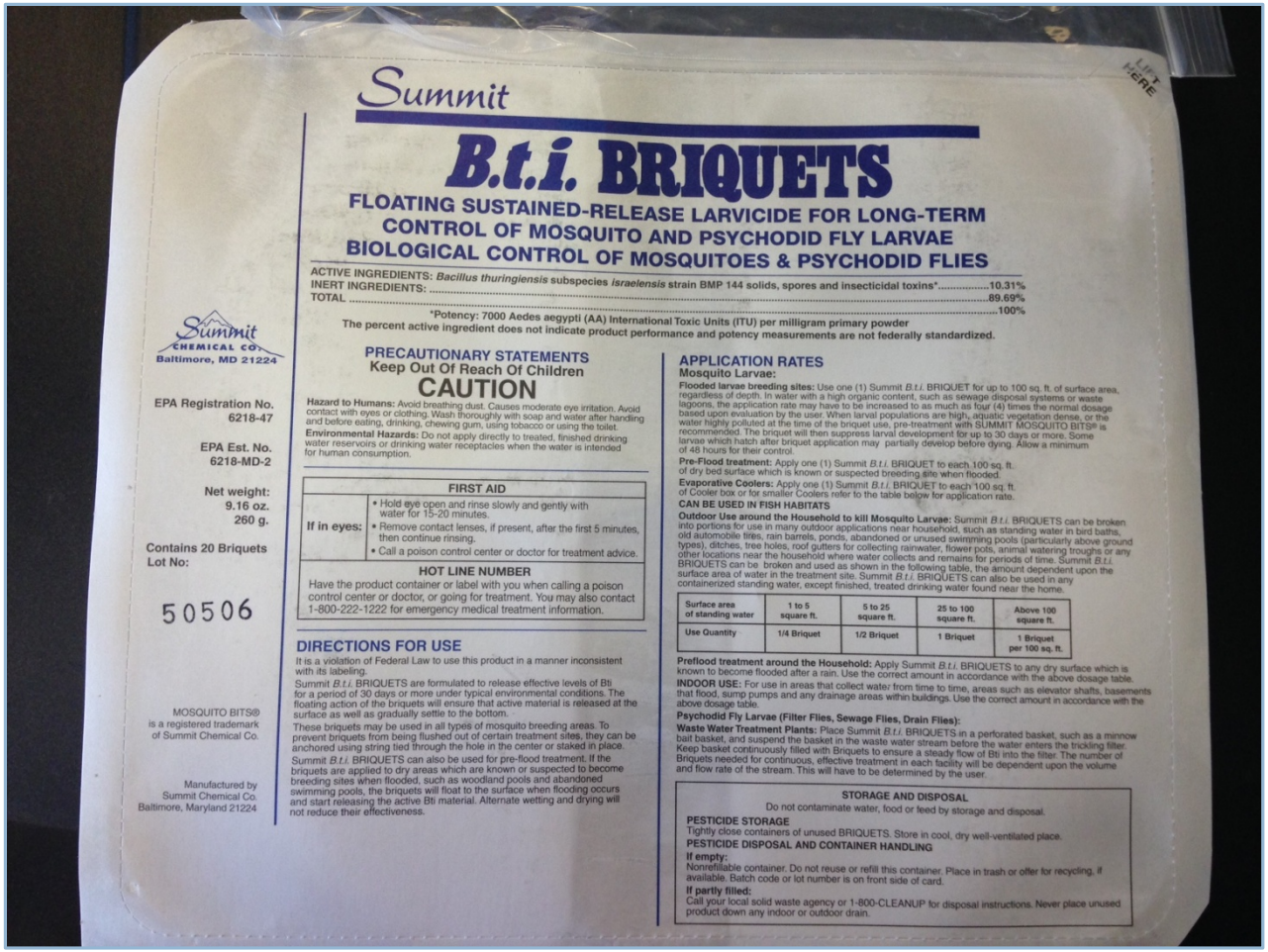
The best way to avoid mosquito bites around the home is to not raise them!

Top 10 Mosquito Love Nests

1) Bird baths
2) Old tires
3) Unused containers such as barrels.
4) Flower pot saucers
5) Swimming pool covers
6) Wading pools
7) Clogged gutters/eavestroughs
8) Clogged drainage ditches
9) Small containers such as cans or bottle tops
10) Unused children's toys or vehicles

Courtesy Yard Inspections

Free Mosquito Larvicide



Summit

B.t.i. BRIQUETS

FLOATING SUSTAINED-RELEASE LARVICIDE FOR LONG-TERM CONTROL OF MOSQUITO AND PSYCHODID FLY LARVAE
BIOLOGICAL CONTROL OF MOSQUITOES & PSYCHODID FLIES

ACTIVE INGREDIENTS: *Bacillus thuringiensis* subspecies *israelensis* strain BMP 144 solids, spores and insecticidal toxins*.....10.31%
INERT INGREDIENTS: 89.69%
TOTAL 100%

*Potency: 7000 Aedes aegypti (AA) International Toxic Units (ITU) per milligram primary powder
The percent active ingredient does not indicate product performance and potency measurements are not federally standardized.

Summit CHEMICAL CO.
Baltimore, MD 21224

EPA Registration No. 6218-47

EPA Est. No. 6218-MD-2

Net weight: 9.16 oz. 260 g.

Contains 20 Briquets
Lot No:

50506

MOSQUITO BITS® is a registered trademark of Summit Chemical Co.

Manufactured by Summit Chemical Co. Baltimore, Maryland 21224

PRECAUTIONARY STATEMENTS

Keep Out Of Reach Of Children

CAUTION

Hazard to Humans: Avoid breathing dust. Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.
Environmental Hazards: Do not apply directly to treated, finished drinking water reservoirs or drinking water receptacles when the water is intended for human consumption.

FIRST AID	
If in eyes:	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. • Call a poison control center or doctor for treatment advice.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-222-1222 for emergency medical treatment information.

DIRECTIONS FOR USE

It is a violation of Federal Law to use this product in a manner inconsistent with its labeling.

Summit *B.t.i.* BRIQUETS are formulated to release effective levels of Bti for a period of 30 days or more under typical environmental conditions. The floating action of the briquets will ensure that active material is released at the surface as well as gradually settle to the bottom.

These briquets may be used in all types of mosquito breeding areas. To prevent briquets from being flushed out of certain treatment sites, they can be anchored using string tied through the hole in the center or staked in place.

Summit *B.t.i.* BRIQUETS can also be used for pre-flood treatment. If the briquets are applied to dry areas which are known or suspected to become breeding sites when flooded, such as woodland pools and abandoned swimming pools, the briquets will float to the surface when flooding occurs and start releasing the active Bti material. Alternate wetting and drying will not reduce their effectiveness.

APPLICATION RATES

Mosquito Larvae:

Flooded larvae breeding sites: Use one (1) Summit *B.t.i.* BRIQUET for up to 100 sq. ft. of surface area, regardless of depth. In water with a high organic content, such as sewage disposal systems or waste lagoons, the application rate may have to be increased to as much as four (4) times the normal dosage based upon evaluation by the user. When larval populations are high, aquatic vegetation dense, or the water highly polluted at the time of the briquet use, pre-treatment with SUMMIT MOSQUITO BITS® is recommended. The briquet will then suppress larval development for up to 30 days or more. Some larvae which hatch after briquet application may partially develop before dying. Allow a minimum of 48 hours for their control.

Pre-Flood treatment: Apply one (1) Summit *B.t.i.* BRIQUET to each 100 sq. ft. of dry bed surface which is known or suspected breeding site when flooded.

Evaporative Coolers: Apply one (1) Summit *B.t.i.* BRIQUET to each 100 sq. ft. of Cooler box or for smaller Coolers refer to the table below for application rate.

CAN BE USED IN FISH HABITATS

Outdoor Use around the Household to kill Mosquito Larvae: Summit *B.t.i.* BRIQUETS can be broken into portions for use in many outdoor applications near household, such as standing water in bird baths, old automobile tires, rain barrels, ponds, abandoned or unused swimming pools (particularly above ground types), ditches, tree holes, roof gutters for collecting rainwater, flower pots, animal watering troughs or any other locations near the household where water collects and remains for periods of time. Summit *B.t.i.* BRIQUETS can be broken and used as shown in the following table, the amount dependent upon the surface area of water in the treatment site. Summit *B.t.i.* BRIQUETS can also be used in any containerized standing water, except finished, treated drinking water found near the home.

Surface area of standing water	1 to 5 square ft.	5 to 25 square ft.	25 to 100 square ft.	Above 100 square ft.
Use Quantity	1/4 Briquet	1/2 Briquet	1 Briquet	1 Briquet per 100 sq. ft.

Preflood treatment around the Household: Apply Summit *B.t.i.* BRIQUETS to any dry surface which is known to become flooded after a rain. Use the correct amount in accordance with the above dosage table.

INDOOR USE: For use in areas that collect water from time to time, areas such as elevator shafts, basements that flood, sump pumps and any drainage areas within buildings. Use the correct amount in accordance with the above dosage table.

Psychodid Fly Larvae (Filter Flies, Sewage Flies, Drain Flies):

Waste Water Treatment Plants: Place Summit *B.t.i.* BRIQUETS in a perforated basket, such as a minnow bait basket, and suspend the basket in the waste water stream before the water enters the trickling filter. Keep basket continuously filled with Briquets to ensure a steady flow of Bti into the filter. The number of Briquets needed for continuous, effective treatment in each facility will be dependent upon the volume and flow rate of the stream. This will have to be determined by the user.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage and disposal.

PESTICIDE STORAGE
Tightly close containers of unused BRIQUETS. Store in cool, dry well-ventilated place.

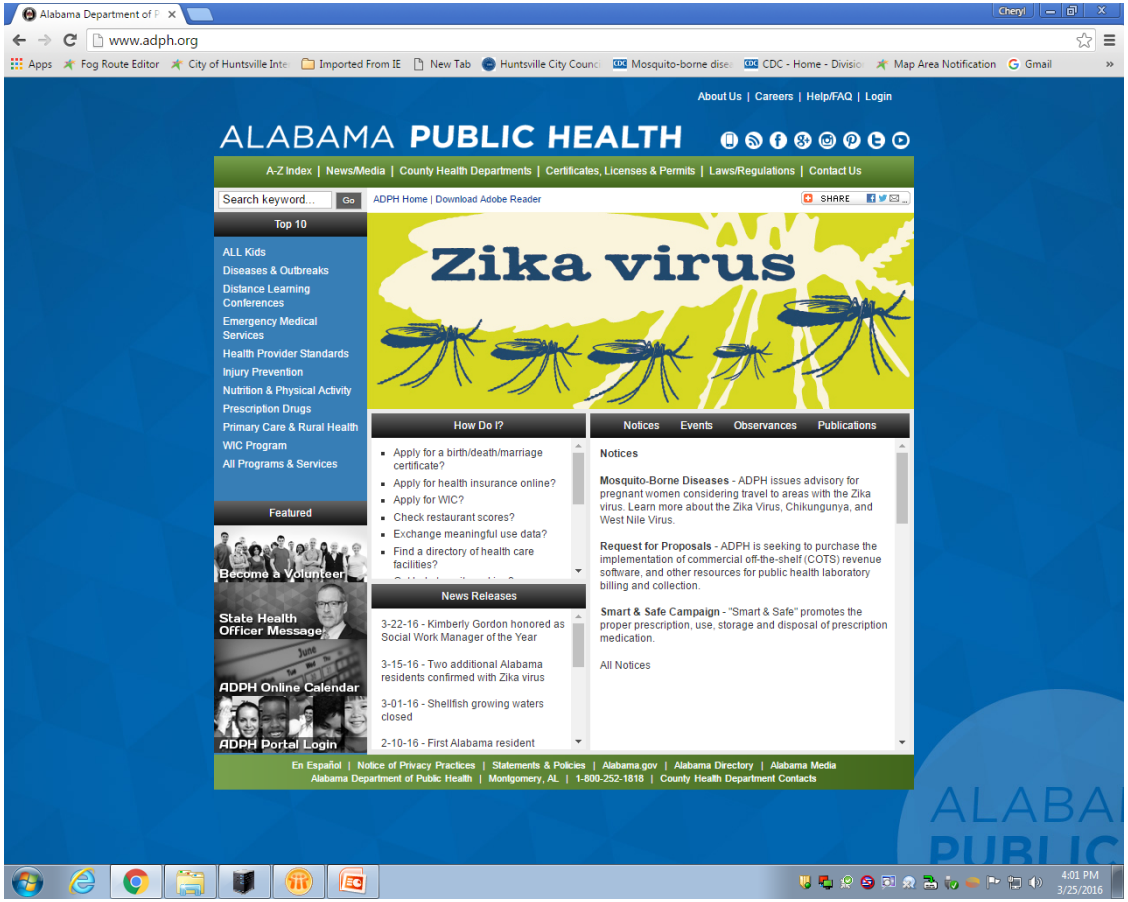
PESTICIDE DISPOSAL AND CONTAINER HANDLING

If empty:
Nonrefillable container. Do not reuse or refill this container. Place in trash or offer for recycling, if available. Batch code or lot number is on front side of card.

If partly filled:
Call your local solid waste agency or 1-800-CLEANUP for disposal instructions. Never place unused product down any indoor or outdoor drain.

Public Education

- Website
- Media interviews
- Distribute flyers
- Health Fairs
- Community Meetings



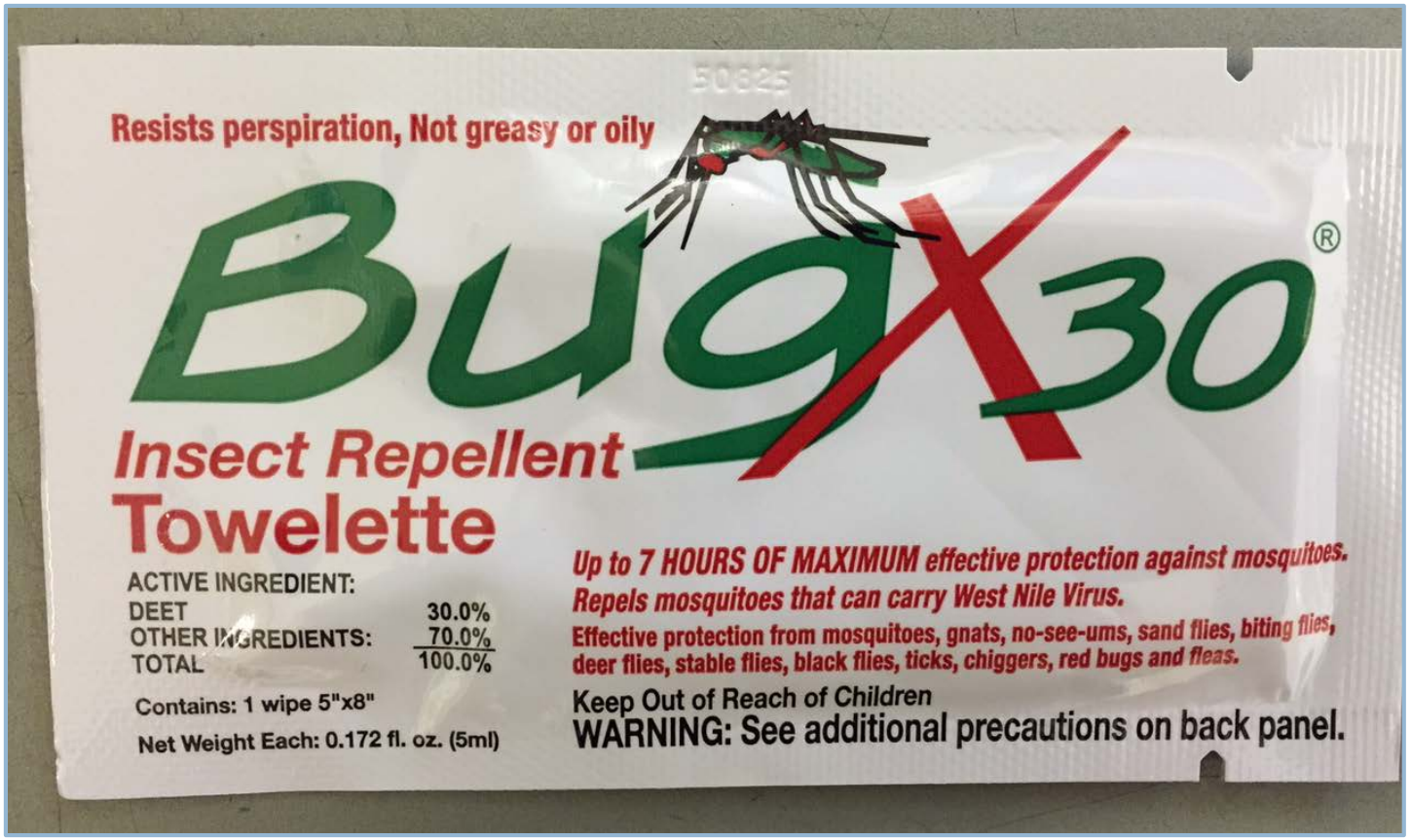
Door Hangers

- Summer temp has distributed over 2,000 door hangers in susceptible neighborhoods
- Includes mosquito brochure, Zika information, and residential checklist
  - Recommend cover letter briefly explaining why you are distributing information. Don't assume the residents will understand.

Door Hanger Cover Letter

- "The Vector Control Division of the Madison County Health Department is providing the enclosed information to help protect you and your family from diseases caused by mosquitoes. The residential checklist may assist you in finding areas where mosquitoes may be laying their eggs near your home. Mosquitoes can breed in as little as a teaspoon of standing water. If you are having a problem with mosquitoes, or have any questions or concerns at any time, you can reach me at (256) 532-1916 or at Cheryl.Clay@adph.state.al.us."

Free Insect Repellent



A Guide to Zika Virus for You and Your Family

A Guide to Zika Virus for You and Your Family

Zika Virus: Outbreak Summary

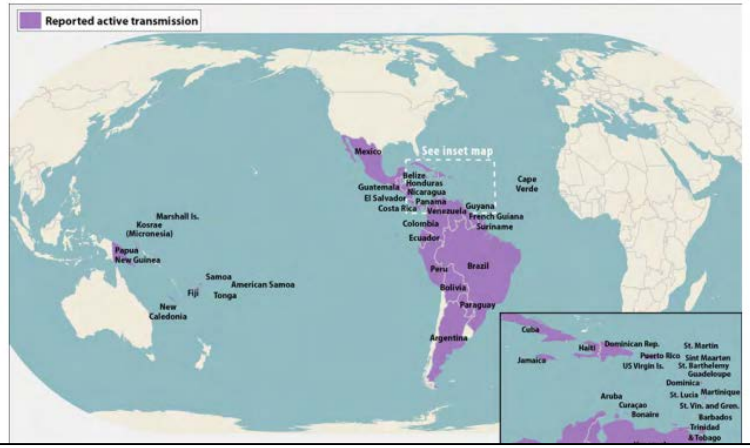
Zika virus was first discovered in the Zika Forest of Uganda in 1947. Before 2015, Zika virus outbreaks occurred in areas of Africa, Southeast Asia, and the Pacific Islands. In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infections in Brazil.

In December 2015, the Commonwealth of Puerto Rico, a United States territory, reported its first confirmed locally transmitted Zika virus case. Local transmission means that mosquitoes in the area have been infected with Zika virus and can spread it to people. Cases of local transmission have been confirmed in two other US territories: the United States Virgin Islands and American Samoa.

On January 22, 2016 the Centers for Disease Control and Prevention (CDC) activated its Emergency Operations Center to respond to outbreaks of Zika occurring in the Americas and increased reports of birth defects and Guillain-Barre syndrome (rare disorder where the body's immune system attacks nerves) in areas affected by Zika.

On February 1, 2016, the World Health Organization declared a Public Health Emergency of International Concern because of clusters of microcephaly, a birth defect, and other neurological disorders in some areas affected by Zika.

Currently, outbreaks are occurring in many countries and territories (http://www.cdc.gov/zika).

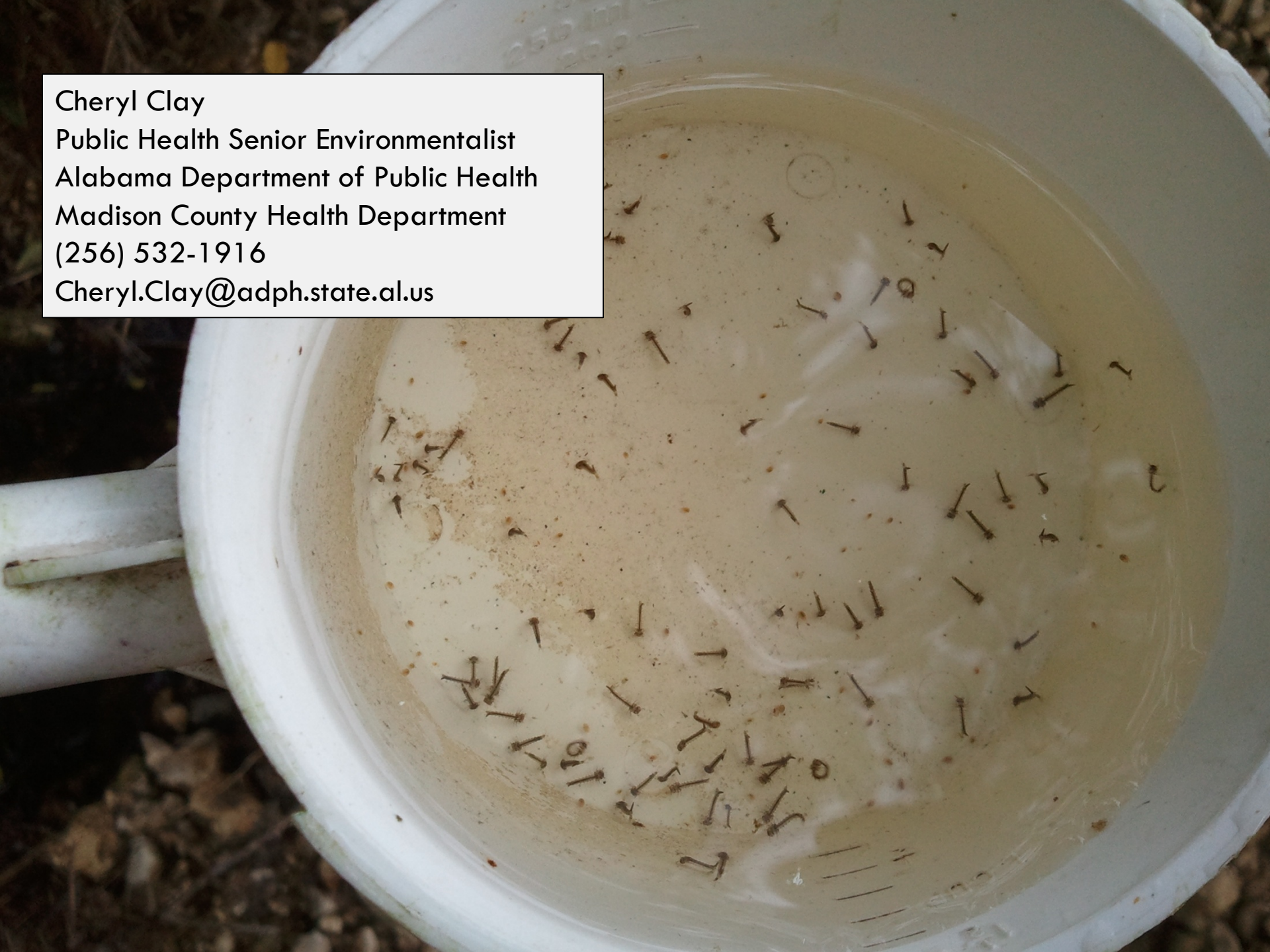


Resources

- Available at www.adph.org/mosquito
  - Zika Coloring Book in English and Spanish
  - *Zika Virus: A Guide for Environmentalists, Municipalities, and County Commissions*
  - Environmentalist Checklist & Residential Checklist
- Available at www.huntsvilleal.gov/vectorcontrol
  - *A Guide to Zika Virus for You and Your Family*

Zika Virus Education

- Don't waste a single opportunity!
  - One speaking engagement leads to another.
- Embrace the media.
  - A properly educated media can be a great ally.
- Turn a mosquito complaint into an educational opportunity.



Cheryl Clay
Public Health Senior Environmentalist
Alabama Department of Public Health
Madison County Health Department
(256) 532-1916
Cheryl.Clay@adph.state.al.us

Introductions

- **Panelists:**

Cheryl Clay
Public Health Senior Environmentalist
Vector Control for City of Huntsville
Alabama Department of Public Health

James Sayers
Acting Supervisor – Vector Control
Saint Louis County Department of Public Health
Vector Control Program

Saint Louis COUNTY PUBLIC HEALTH

Zika Preparedness 2016

James Sayers
Saint Louis County Vector Control

Zika Preparedness 2016

- Objectives
  - Background on our program
  - Discuss process by which St. Louis County is preparing for Zika and how we will respond to suspected cases
  - Talk about our Public Health Foundation project
    - Aedes Surveillance

St. Louis County Vector Control

- Background
  - Provide Vector Control services to:
    - All of unincorporated St. Louis County
    - Contract with the majority of municipalities
  - Service are covers almost all 532 Square miles of St. Louis County.
  - 4 Full Time Vector Control Specialists
  - 12 Seasonal Vector Control Assistants

St. Louis County Vector Control

- Services include:
  - Larviciding
    - 6000 Sites
  - ULV Spraying
    - 8 ULV Machines
  - Barrier Treatments
    - 150 Gallon Skid
    - A1 Mist Sprayer

St. Louis County Vector Control

- Services include:
  - Surveillance
    - 230 Trap Sites
  - WNV Testing
    - RAMP/ELISA
  - Rodent Control

Zika Virus in Saint Louis County

- What are we expecting?
  - Will probably see some travel associated cases
  - Not expecting local transmission, or may see very limited local transmission.
    - However, we are prepared to deal with local transmission should it occur.

Zika Virus: Vectors

- 2 Main Vectors:
  - Aedes aegypti
  - Aedes albopictus

Aedes aegypti

- Main Vector of Zika Virus
- Prefers to live near and feed on humans
- Has not been identified in St. Louis County

Aedes albopictus

- Container breeder
- Opportunistic feeder
- Arrived in St. Louis around the mid 1980's

- Now fairly common, especially during the months of July, August, and September.
- Primarily a nuisance mosquito…until now.

Our Approach To Zika Preparedness

- Communication was our first step:
  - Vector Control Staff
  - St. Louis County Communicable Disease Services
  - Other local Vector Control agencies
  - State Health Department
  - CDC

Communication – Vector Control

- How do we include Ae. albopictus in our control efforts?
- Researched effective methods to control Ae. albopictus
- Determined how we can respond effectively to Zika threat with our current resources.

Communication – CDCS Epi Staff

- St. Louis County Communicable Disease Control Services are some of the first notified of suspected arboviral human disease cases in our area.

- Met with CDCS staff to ensure that Vector Control would be alerted to possible Zika cases so that we could respond accordingly.

  - Established primary and secondary contacts in each department.

Communication – Local Partners

- Reached out to neighboring Vector Control divisions, Health Departments, and other government agencies.

- Cooperate and share information
  - Zika Outbreak Tabletop Exercise
    - St. Louis Co., St. Louis City, St. Charles Co., Jefferson Co.
    - Illinois: St. Claire, Madison Co.

- Offer any assistance we could possibly provide and determine if anyone could provide us with any resources we may be lacking.

Communication – Centers for Disease Control

CDC is a great resource for information regarding Zika and other Vector-borne diseases

- CDC Website
- Webinars
- Zika Summit
- Teleconferences
- Fact Sheets
- Email Updates

Putting Our Plan Together

- Gathered information and put together a preliminary Zika Action Plan.
  - Outlines the roles and responsibilities of all parties
  - Defines how everyone is to respond to suspected Travel Associated or Local transmission of Zika Virus.
  - Hold regular meetings to discuss, review, and improve response plans.

Zika Action Plan

- Plan defines Vector Control's normal operations and any additional actions we are taking in response to Zika (Per CDC Recommendations)

- Defines Vector Control's response to:

  - Suspected travel related Zika cases

  - Suspected local transmission of Zika Virus

Zika Action Plan

- Vector Control's Response
  - Suspected Travel Associated Cases
    - Verify that all known breeding sites have been treated and survey vicinity for any additional sites that may have been missed.
    - Conduct ULV treatment of the area surrounding the suspected case.
    - Patient consulted on mosquito control methods and preventing bites.

Zika Action Plan

- Suspected Local Transmission
  - In addition to actions taken in response to travel cases, Vector Control will:
    - Conduct intensive mosquito control activities within a 150 yard radius in and around the vicinity of the suspected case.
      - Surveillance for Aedes albopictus
      - Larviciding of breeding sites
      - Source reduction
      - ULV treatments: Handheld and truck mounted
      - Barrier Treatments

Zika Action Plan

- Defines what our normal operations include and anything that we are doing different due to Zika
  - Normal operations include:
    - Larviciding: Treatment of known breeding sites
    - Adulticiding: ULV Spraying/Barrier Treatments
    - Public Education
    - Surveillance: Trapping/Testing for disease

Vector Control's Response

- Larviciding
  - Re-evaluate current larvicide sites
    - Add additional sites when located
      - Field inspections
      - Service request/Standing water complaints
      - Instruct field staff to keep eye out for potential Ae. albopictus breeding sites or adults

Vector Control's Response

- ULV Adulticiding
  - Night time ULV is not an effective means of controlling Ae. albopictus.
    - Ae. albopictus active during the day.
      - Begin ULV a bit earlier, Early morning ULV
  - Some options with regards to ULV
    - Aqua-Duet (Benign Agitation)
- Barrier Treatments
  - Increased treatments
    - Parks, athletic fields, outdoor events

Vector Control's Response

- Public Education
  - Since Ae. albopictus is a container breeder and found in close association with humans, we felt increasing public education would be key in Zika prevention.
  - Make the public aware of the importance of eliminating standing water and how to prevent mosquitoes on private property.
  - Accomplished this through:
    - Media Interviews: TV, Local Papers, Radio
    - Provide free inspections/consultations for residents

Vector Control's Response

- Surveillance
  - Up until now, focused on Culex/WNV
- Expand our surveillance efforts to include Aedes
  - Additional trap types
  - Set at different locations and times of day
- Public Health Foundation
  - Quality Improvement Project
    - Expanding mosquito surveillance = good fit for the project.

Public Health Foundation

- Quality Improvement Project
  - Identify an area within our program that we felt needed improvement.
  - PHF provided guidance and Quality Improvement tools for us to develop and implement our Quality Improvement Project.
    - Informational webinars
    - Site Visits with PHF consultant (Jack Moran)
    - Monthly check-ins/reports
    - Tools such as: AIM Statement, Population Health Driver Diagram, and Gantt Chart

Project Overview

- Why we chose to trap for Aedes Mosquitoes.
  - Zika threat
  - Needed to gain a better understanding of the presence and distribution of different Aedes mosquitoes (and other species).
  - Data collected will help prepare us to effectively target and control Ae. albopictus, should an outbreak occur.

AIM Statement

- AIM statement
  - Tool to restrict a problem statement to a discrete issue on which the team will focus.

- Our AIM Statement
  - Need to determine the presence and distribution of Aedes albopictus in St. Louis County and report surveillance data to CDCS and the Missouri Dept. of Health and Senior Services.

AIM Statement

AIM/Opportunity Statement

An opportunity exists to improve the surveillance capabilities of St. Louis County Vector Control by determining the presence and distribution of Aedes sp. within St. Louis County.

The goal is to include targeted surveillance for Aedes sp. in our current surveillance program. We will move forward from a starting point of zero traps targeting Aedes sp. to an end point of 5 B&G Sentinel Traps and 5 B&G GAT Traps being utilized in our surveillance program for the 2016 mosquito season.

This effort will improve our ability to respond to current and emerging arboviral disease threats by identifying the presence and distribution of the mosquito vectors that have been associated with human transmission of diseases such as Zika and Chikungunya.

This process is important to work on now due to the emerging threat of Zika and Chikungunya. In the past Aedes mosquitoes in St. Louis County have been classified as nuisance mosquitoes. Since Aedes have not been implicated as major vectors of human disease in our area, they have not been directly targeted for surveillance and control within the county. With the recent emergence of Zika and Chikungunya in the Americas, it will be beneficial to have a greater understanding as to the presence and distribution of the mosquitoes implicated in the transmission of these diseases. With this information, we will be more prepared to protect the public in the event of any possible travel-related or local outbreaks of these arboviral diseases.

Baseline measurement is defined as the following metric:

Determine an effective number of trap locations to provide adequate data pertaining to the presence and distribution of Aedes sp. within St. Louis County. Establish trapping protocols needed to deploy Sentinel traps targeting Aedes sp. Use this information to increase surveillance for Aedes sp. from zero to deployment of B&G Sentinel Traps and 5 B&G GAT Traps a minimum of 3 days per week. Data collected will be reported to St. Louis County CDCS and the State of Missouri.

Gantt Chart

- Tool that lists all activities required to complete a project and provides a timeline to complete each step

Project Gantt Chart

Vector Improvement Project Year 2

St. Louis County Health Dept of Public H Legend: Green X done, Yellow X - in progress, and Red X - behind schedule
Vector Control Black x - not started

Project Lead: James Sayers
AIM: To determine the presence and distribution of Aedes albopictus in St. Louis County and report surveillance data to CDCS and the state of MO.
Target: Conduct surveillance activities for Aedes sp. 3 nights per week utilizing 5 BG Sentinel Traps and 5 BG GAT Traps.
Community Partner: St. Louis County Dept. of Public Health CDCS and Missouri Dept. of Health and Senior Services-Vectorborne Disease Surveillance Coc
Primary Driver Addressed: Asses **Secondary Driver Addressed:** Examine environment to identify vector presence
Primary Driver Addressed: Polic **Secondary Driver Addressed:** Educate the public about reducing risk of vector b
Primary Driver Addressed: Polic **Secondary Driver Addressed:** Build partnerships between government agencies
Primary Driver Addressed: Assur **Secondary Driver Addressed:** Provide referral method to link community vector control serv
Primary Driver Addressed: Cont **Secondary Driver Addressed:** Implement physical and cultural control strategies
Primary Driver Addressed: Cont **Secondary Driver Addressed:** Research approaches to improve vector control services and

Activity	Feb	March	April	May	June	July	Aug	Sept	Oct
1. Identify opportunity for improvement	X								
2. Complete AIM Statement		X							
3. Research Aedes surveillance		X							
4. Identify equipment/supplies needed		X							
5. Order equipment/supplies			X						
6. Identify trap locations			X						
7. Establish Aedes surveillance			X						
8. Establish data collection protocol			X						
9. Determine how to best utilize data			X						
10. Identify intersted partners			X						
11. Establish start date			X						
12. Press Release/Media Interviews			X						
13. Start Aedes sp. surveillance				X					
14. Re-evaluate/adjust protocol				X	X	X	X	X	X
15. Provide trap data to partners				X	X	X	X	X	X
16. Monthly Reports	X	X	X	X	X	X	X	X	
17. Final Report due to PHF								X	
18. Re-evaluate project for 2017									X

Steps To Implement Aedes Surveillance

- Researched effective trapping methods
- Determine what supplies/equipment we need
- Identify trap locations
- Establish trapping protocols
- How do we want to utilize the data

Aedes Trapping Methods

- Sentinel 2 Trap
- Gravid Autocidal Trap (GAT)
- CDC Light Trap
- CDC Gravid Trap (normally set for Culex)

Sentinel 2 Trap

Sentinel 2 Trap

- Developed to trap questing Aedes aegypti and Aedes Albopictus
- Uses chemical attractants
  - Human Skin Lure
  - Octenol Lure
  - Carbon Dioxide
- Easy to deploy and collect
- Requires an external power source

GAT Trap


MOSQUITO
SURVEILLANCE
St. Louis County
Dept. of Public Health
Vector Control
(314) 615-0680

GAT (Gravid Autocidal Trap)

- Designed to collect gravid Aedes mosquitoes seeking a place to lay their eggs.
- Simple to deploy and collect.
- Retains dead mosquitoes without damage.
- Can also be used as a means of control.
  - Kills gravid female mosquitoes

GAT (Gravid Autocidal Trap)

- Does not require a power source.
  - Does require Hay infusion as attractant
- Can be left in the field for longer period of time.
- Very inexpensive compared to other traps

CDC Light Trap

CDC Light Trap

- Attract many different species of mosquitoes
- Uses light bulb or black light as attractant
  - Also tend to catch a lot of non-mosquitoes
- Use in conjunction with CO_2 to increase catch
- Requires a power source

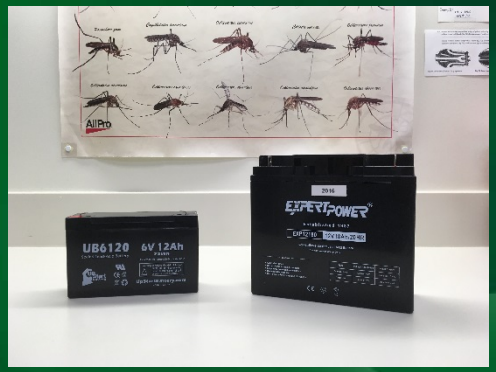
CDC Gravid Trap

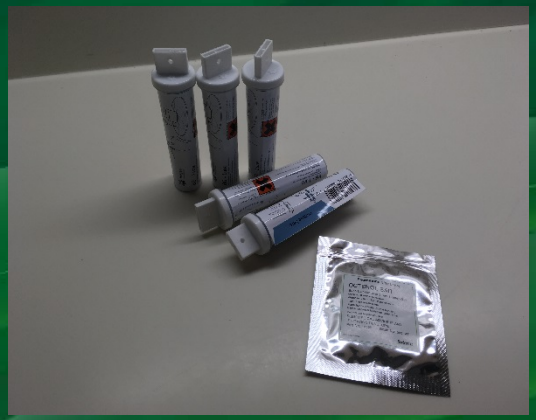
CDC Gravid Trap

- Typically used to trap gravid Culex mosquitoes
- We also tend to catch a few non-Culex species in our gravid traps
  - Decided to include non-Culex mosquitoes collected from these traps in our data
- Requires a power source
- Requires a Hay/Grass/Chicken Manure Infusion

Additional Supplies/Equipment

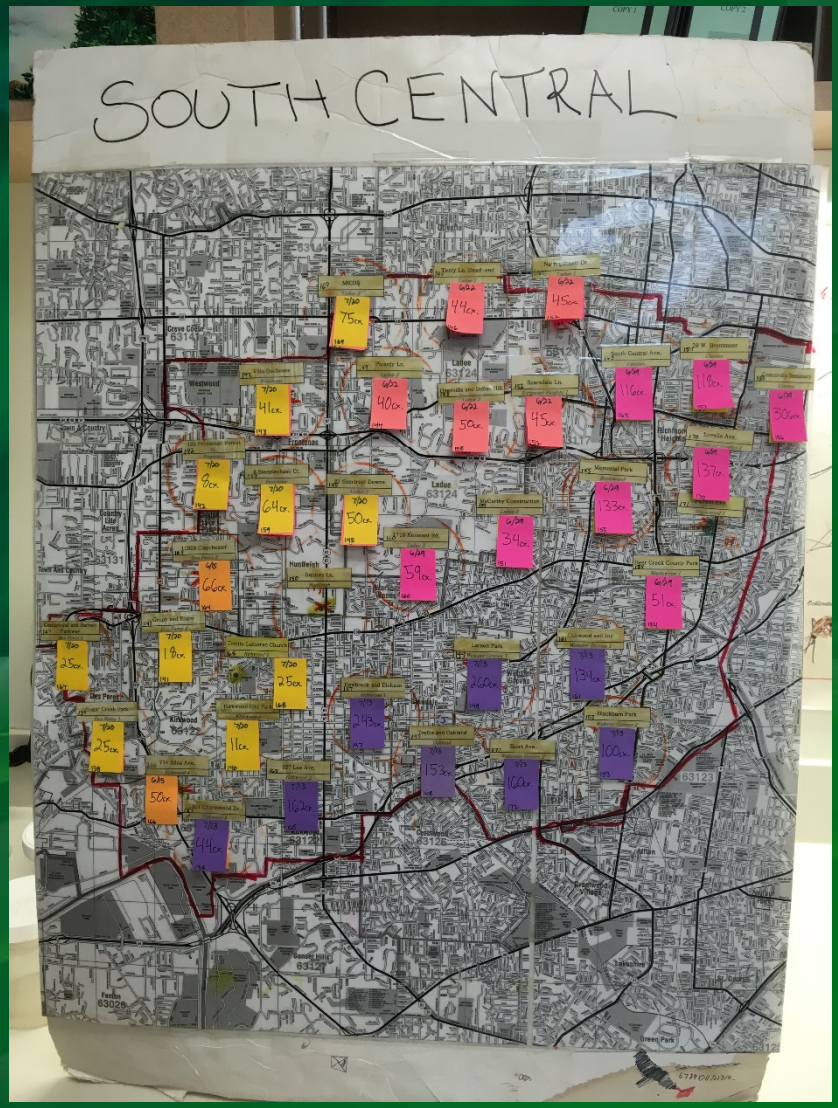
- Traps
- Trap Batteries
- Spare Nets
- Chemical Lures
- Dry Ice
- Hay infusion for Gravid/GAT Traps





Determining Trap Locations

- Utilize existing trap sites
- Concentrate on sites where we have previously identified Ae. albopictus
- Add new trap sites in areas where Ae. albopictus had been noted in the past



Establish Trapping Protocols

- How are trap sites determined and by who?
- Who will set and retrieve traps?
- When will the traps be set and retrieved?
- How long are the traps to remain in the field?

Establish Trapping Protocols

- CDC Gravid/Sentinel 2/CDC Light Traps
  - Vector Control Assistants set early afternoon and retrieve before noon the following day
    - Remain in field for just under 24 hours
- GAT Traps
  - Vector Control Assistants set GAT traps on Monday afternoons and retrieve them before noon the following Friday
    - Remain in field for about 5 days

How do we utilize the data?

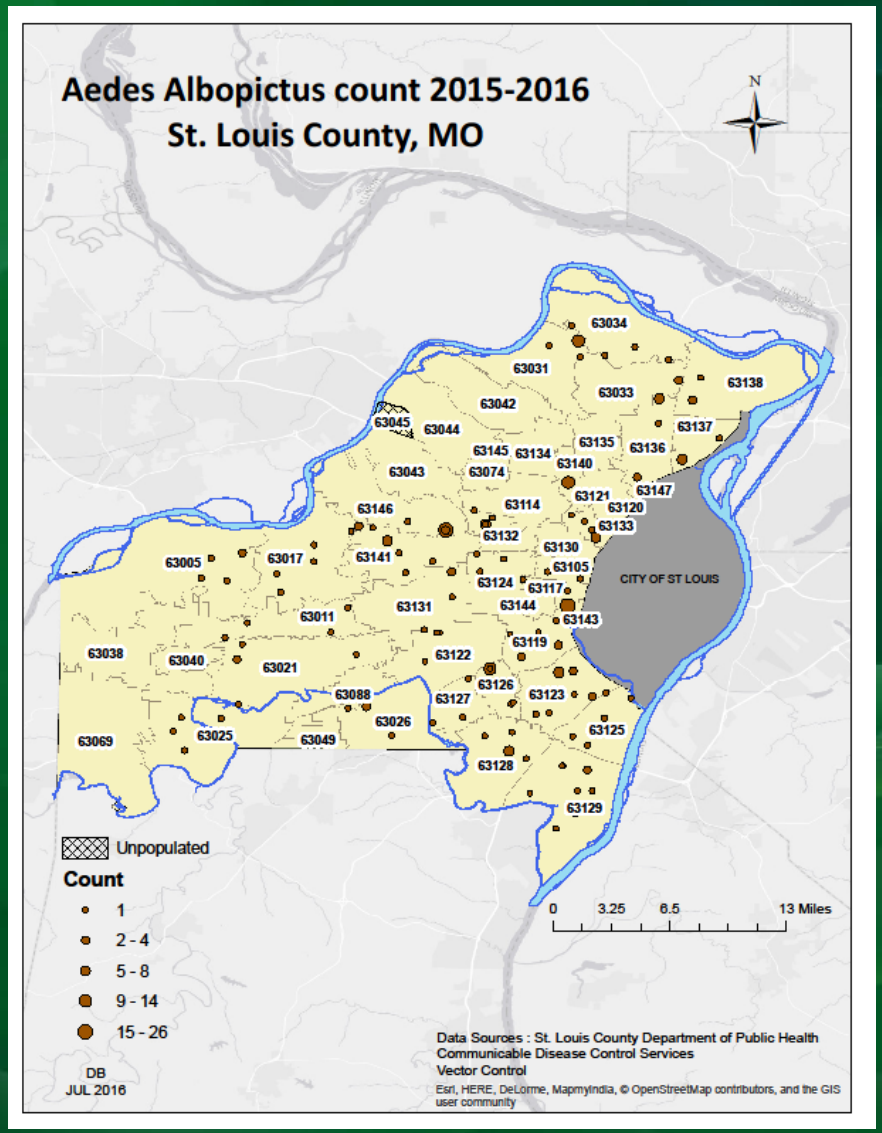
- Map areas where Aedes albopictus are present
- Share our findings with other agencies
  - Provide updated trap results to state and county CDCS every Friday
- Increase control efforts/public education in areas with higher abundance of Ae. albopictus

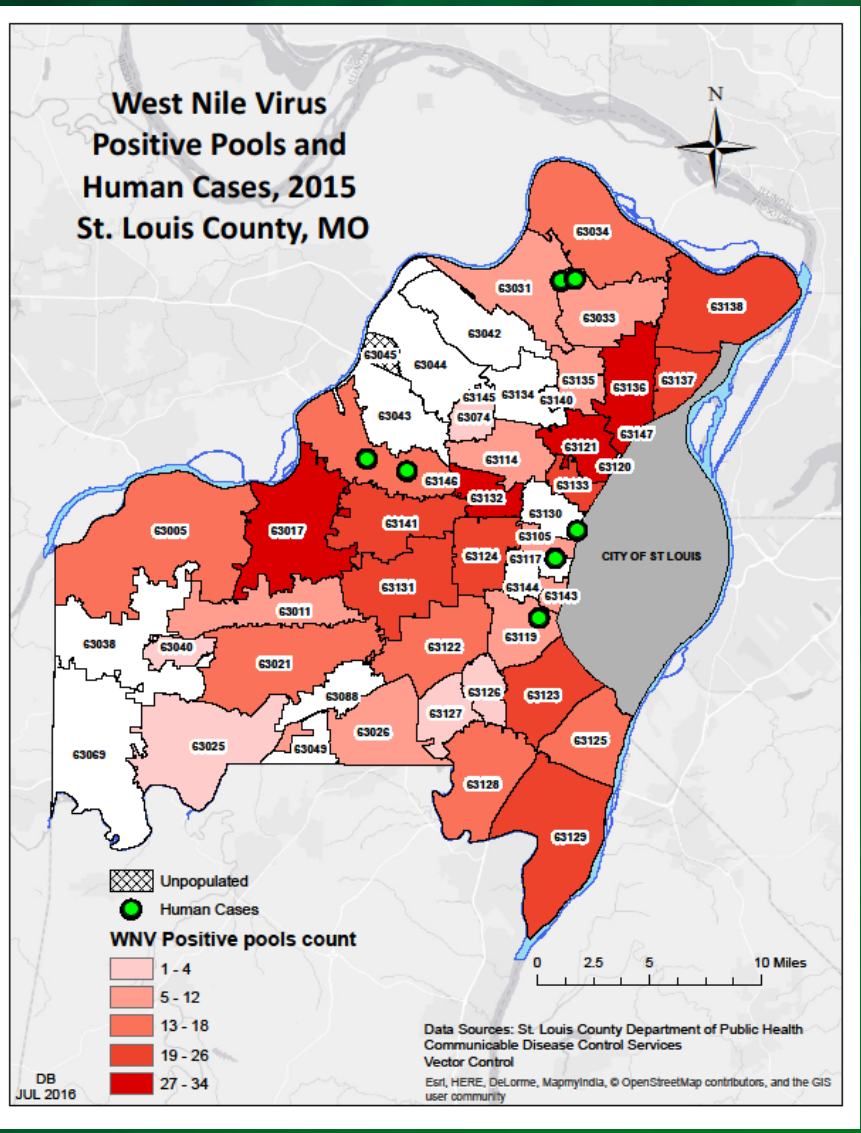
Data Collected

- Species Identified
  - Aedes albopictus
  - Aedes vexans
  - An. punctipennis
  - An. quadrimaculatus
  - Oc. japonicus
  - Oc. triseriatus
  - Oc. trivittatus
  - Or. signifera
  - Ps. ciliata
  - Ps. ferox
  - Urotania

Location	Municipality/Route	Type of Trap	Species	# in Tra	Date Collecte	Trap Site #	Area
Crest Industrial	OCA Affton 1	sentinel	Ae. albopictus	14	7/19/2016	212	South
Crest Industrial	OCA Affton 1	sentinel	male Ae. albopictus	9	7/19/2016	212	South
Crest Industrial	OCA Affton 1	sentinel	males		7/19/2016	212	South
Crest Industrial	OCA Affton 1	sentinel	Ps. ferox	1	7/19/2016	212	South
Evandale and Cantwell	OCA Affton 3	gravid	Ae. albopictus	1	7/19/2016	219	South
Ohlendorf County Park	OCA Affton 4	gravid	Ae. albopictus	4	7/19/2016	204	South
Ohlendorf County Park	OCA Affton 4	sentinel	Ae. albopictus	10	7/19/2016	204	South
Ohlendorf County Park	OCA Affton 4	sentinel	Ae. vexans	3	7/19/2016	204	South
Bayless and I-55	OCA Lemay 1	gravid	Ae. albopictus	3	7/19/2016	203	South
Lemay Park	OCA Lemay 2	gravid	Ae. albopictus	4	7/19/2016	179	South
River City Casino	Casino	gravid	Ae. albopictus	2	7/19/2016	225	South
River City Casino	Casino	gravid	Ae. vexans	1	7/19/2016	225	South
Villa Duchesne	Frontenac	gravid	Or. signifera	1	7/20/2016	143	S. Central
21 Somerset Downs	Ladue 3	gravid	Ae. albopictus	1	7/20/2016	145	S. Central
Marquette High School	Clarkson Valley	gravid	Ae. albopictus	1	7/21/2016	94	West
2500 Silvermill Ct.	Wildwood 6	gravid	Ae. vexans	1	7/21/2016	98	West
2500 Silvermill Ct.	Wildwood 6	gravid	Ae. albopictus	2	7/21/2016	98	West
Shepard and Panorama	Wildwood 6	gravid	An. punctipennis	1	7/21/2016	82	West
Sleigh Run and Christmas Valley	Wildwood 6	gravid	Oc. triseriatus	1	7/21/2016	113	West
Sleigh Run and Christmas Valley	Wildwood 6	gravid	Ae. albopictus	2	7/21/2016	113	West

Mapping


Aedes Albopictus count 2015-2016
St. Louis County, MO
N
63034
63031
63033
63138
63042
63045
63044
63137
63145
63134
63135
63136
63043
63074
63140
63147
63146
63114
63121
63120
63133
63132
63130
63005
63017
63141
63105
63124
63117
CITY OF ST LOUIS
63131
63144
63143
63011
63119
63038
63040
63122
63021
63126
63088
63127
63123
63026
63125
63069
63025
63049
63128
63129
Unpopulated
Count
1
2 - 4
5 - 8
9 - 14
15 - 26
0
3.25
6.5
13 Miles
Data Sources : St. Louis County Department of Public Health
Communicable Disease Control Services
Vector Control
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
DB
JUL 2016


West Nile Virus
Positive Pools and
Human Cases, 2015
St. Louis County, MO
N
63034
63031
63033
63138
63042
63045
63044
63135
63136
63137
63145
63134
63140
63043
63074
63147
63121
63114
63120
63146
63133
63132
63130
63005
63017
63141
63105
63124
63117
CITY OF ST LOUIS
63131
63144
63143
63011
63119
63038
63040
63122
63021
63088
63126
63123
63127
63026
63125
63069
63025
63049
63128
63129
Unpopulated
Human Cases
WNV Positive pools count
1 - 4
5 - 12
13 - 18
19 - 26
27 - 34
0
2.5
5
10 Miles
Data Sources: St. Louis County Department of Public Health
Communicable Disease Control Services
Vector Control
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
DB
JUL 2016

Thank You!

- Bio-Defense Network
  - David Reddick
  - Harlan Dolgin
- Public Health Foundation
  - Jack Moran
  - Vanessa Lamers

Questions?

Contact Information

Vanessa Lamers – PHF, Washington, DC
202.218.4412
vlamers@phf.org

Cheryl Clay – Huntsville, AL
256.532.1916
Cheryl.Clay@adph.state.al.us

James Sayers – St. Louis, MO
314.615.0671
jsayers@stlouisco.com

Bio-Defense Network

Public Health Foundation