

COMMONWEALTH OF VIRGINIA



Zika Virus Disease Response

**July 2016
Version 3.0**

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Record of Changes

Change #	Date	Description of Change	Page #	Initials
1	3/16/2016	Completed Draft Zika Virus Disease Response Annex	All	DSC
2	3/23/2016	Added roles and responsibilities for DEQ and VDACS	14	DSC
3	3/24/2016	Added Appendix C – Mosquito Response Plan for Zika Virus	24-34	DSC
4	3/28/2016	Added planning assumption referring to NACR study on risk for summertime Zika outbreaks	10	DSC
5	3/28/2016	Added Epi/Surveillance tasks to Roles & Responsibilities and CONOPS	13-15, 15-22	DSC
6	3/28/2016	Added cover picture	Cover	DSC
7	3/28/2016	Added Appendix for Materials for Public Education and Outreach for Zika Virus Disease	36-37	DSC
8	3/28/2016	Added Appendix E – Resources and References for Zika Public Education and Outreach	38-39	DSC
9	3/28/2016	Added Zika risk graphic to Appendix C	25	DSC
10	3/28/2016	Updated communications information in CONOPS	15-22	DSC
11	3/30/2016	Accepted track changes from Chief Deputy Commissioner	All	DSC
12	3/30/2016	Added Epi activities to CONOPS	15-25	DSC
13	3/30/2016	Added Blood Safety activities to CONOPS	15-25	DSC
14	4/20-25/16	Incorporated revisions and suggestions from partners	All	JRM, DSC

Promulgation Statement

Virginia Zika Task Force was established in February 2016 to meet the dynamic and potentially dangerous threat of Zika virus disease (Zika) in Virginia. Confirmed travel-related cases of Zika in Virginia, and the possibility of local, autochthonous transmission demonstrate the need to develop strategies to keep Virginians healthy throughout mosquito season by preventing or mitigating the transmission of Zika.

This Annex is the official response plan for Virginia Zika Task Force and supersedes previous versions. All agencies and organizations mentioned in this annex have the authority, either through the *Code of Virginia* or through this Annex, to conduct all of the tasks outlined herein.

All agencies and organizations with roles and responsibilities for Zika preparedness and response are expected to update, maintain, and train to their policies, plans, and procedures to ensure their ability to prepare for and respond to local transmission of Zika in Virginia.

Virginia Zika Task Force remains committed to meeting this challenging threat. The Virginia Department of Health Director of the Office of Emergency Preparedness and/or his or her designee has the authority to update and maintain this Annex.

Signed:

Marissa Levine, MD, MPH, FAAFP
State Health Commissioner

Date

Lead Agency

Virginia Department of Health (VDH)

Support Agencies and Organizations

- Virginia Department of Emergency Management (VDEM)
- Virginia Department of Agriculture and Consumer Services (VDACS)
- Virginia Department of Behavioral Health and Developmental Services (DBHDS)
- Virginia Department of Conservation and Recreation (DCR)
- State Council of Higher Education for Virginia (SCHEV)
- Virginia Department of Education (DOE)
- Virginia Department of Environmental Quality (DEQ)
- Virginia Department of Forestry (VDOF)

**Support Agencies and Organizations
(continued)**

- Virginia Department of Game and Inland Fisheries (DGIF)
- Virginia Department of General Services (DGS) Division of Consolidated Laboratory Services (DCLS)
- Virginia Department of Health Professions (DHP)
- All departments and agencies of the Commonwealth of Virginia
- Virginia Hospital and Healthcare Association (VHHA) and Regional Healthcare Coordination Centers (RHCC)
- Local Health Districts
- Local governments and privately-owned organizations performing mosquito control activities
- American Red Cross, INOVA Blood Services, and Virginia Blood Services
- Other local and federal partners

Purpose

Zika virus disease (Zika) is a disease that is spread primarily through the bite of an infected *Aedes* species mosquito. Cases of sexual transmission and maternal-fetal transmission have also been reported. Though the illness is usually mild, and many people will show no symptoms at all, Zika is known to be linked to microcephaly and investigators continue to research the link between Zika and Guillain-Barré syndrome. These are serious conditions that are contributing to significant public anxiety and could have adverse, long-term effects on individuals, health systems, and public health as the number of cases increases.

On February 26, 2016 Governor Terry McAuliffe announced the creation of the Virginia Zika Task Force to coordinate the Commonwealth's efforts to prepare for and respond to locally transmitted cases of Zika in Virginia. This coordinated effort will require sustainable strategies for communication and sharing information; surveillance and investigation; laboratory testing; vector control; outreach to pregnant women; and safety of the blood supply. The success of the Commonwealth of Virginia in responding to Zika requires that these capabilities be flexible, robust, and sustainable over the long term.

This Annex addresses how the Virginia Zika Task Force, led by Virginia Department of Health (VDH), will leverage the powers of state, local, and federal government and the

private and non-profit sectors to meet public health needs in response to the dynamic and evolving threat of Zika in Virginia.

Scope & Applicability

This Annex outlines coordinated public health preparedness and response actions within the Commonwealth of Virginia, and accounts for cooperation and coordination with the other jurisdictions in Department of Health and Human Services (HHS) Region III: Delaware, Maryland, Pennsylvania, West Virginia, and Washington, D.C. In addition, the Annex will help the Virginia Zika Task Force facilitate coordination among other partners, such as federal and local authorities, hospitals, blood supply services, and mosquito control organizations. This Annex will be utilized in concert with the Commonwealth of Virginia Emergency Operations Plan (COVEOP), as needed, to facilitate and enhance state-level coordination.

Public outreach and education, as well as surveillance and epidemiological investigation, will be among the most important strategies for preventing or mitigating the spread of Zika. Other activities may require large-scale efforts and may involve multiple Emergency Support Functions (ESFs). Activities that may be implemented during Zika response include but are not limited to:

- Coordination with federal, state, and local entities, as well as blood collection centers and mosquito control organizations;
- Epidemiological surveillance, investigation, and laboratory testing;
- Coordination of Virginia submissions to the US Zika Pregnancy Registry;
- Mosquito surveillance and control as outlined in an Appendix of this Annex;
- Analysis of Zika surveillance data to inform the development of objectives and strategies;
- Development and dissemination of guidance information for the medical community, responders, schools, special populations, public safety officials, and the general public;
- Designation of “Areas of Active Zika Transmission,” if necessary;
- Coordination of community clean-up events to reduce mosquito habitats or breeding sites.

Situation Overview

Description of the Disease

Zika virus disease is a disease caused by Zika virus that is spread primarily through the bite of an infected *Aedes* species mosquito. Because the virus is spread through the bite of an arthropod, it is a member of a group of conditions known as arboviral diseases. Zika can also be transmitted sexually and from mother to fetus. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis. Symptoms typically start between three and 14 days after being bitten by an infected mosquito and last between several days to a week. The symptoms of Zika are similar to symptoms of other arboviral diseases. Testing for Zika may be necessary to rule out differential diagnoses that include dengue and Chikungunya.

There is, at present, no known cure or vaccine for Zika. Treatment consists mainly of supportive care to relieve symptoms. A commercial assay for the qualitative detection of Zika virus RNA in acute serum samples is available through some commercial labs. Vaccines for Zika are under development.

Transmission

Zika virus is transmitted from an infected person to an uninfected person primarily through the bites of infected mosquitoes, specifically the *Aedes aegypti* (Yellow Fever mosquito) and the *Aedes albopictus* (Asian tiger mosquito). Zika is also transmitted via sexual contact from a man infected with Zika to his sexual partners. It can also be transmitted from a pregnant woman to her fetus during pregnancy or birth.

The Zika virus typically remains in the blood of an infected person for one week. To reduce the risk of infecting others, individuals infected with Zika should avoid mosquito bites by remaining indoors or wearing protective, permethrin-treated clothing and mosquito repellent for the first week after the onset of symptoms. Individuals infected with Zika should, if possible, use air conditioning or window and door screens to keep mosquitoes outside. Asymptomatic individuals returning from travel to Zika affected areas should avoid mosquito bites for three weeks. In addition, everyone including non-infected individuals should eliminate standing water from containers around their property, including bird baths, flower pots, used tires, and buckets to reduce mosquito breeding and habitat sites.

Cases of sexual transmission of Zika have been confirmed by Centers for Disease Control and Prevention (CDC). To date, it is not known how long the virus can stay in semen. There is still more to be learned regarding sexual transmission of Zika. Sexual partners can protect each other by using condoms correctly and consistently during sexual intercourse. In addition, men who reside in or have traveled to an area with Zika virus who have a pregnant partner should abstain from sexual activity or correctly and consistently use condoms during vaginal, anal, or oral sex for the duration of the pregnancy.

At this time, there is no evidence that Zika can be transmitted from animals to humans.

Zika is rarely fatal and usually mild. There is a suspected link between Zika and serious health conditions, such as microcephaly and Guillain-Barré syndrome. Zika may cause other health problems as well. Knowledge of Zika continues to improve and may prompt the Virginia Zika Task Force to update or change strategies. In the meantime, methods for preventing the transmission of Zika should be shared with the public on an ongoing basis.

Description of the Jurisdiction

The Commonwealth of Virginia covers 42,767 square miles and is comprised of 95 counties and 38 independent cities. The Commonwealth's population exceeded 8 million in 2010, with the majority of residents living in the eastern portion of the state. The population continues to increase annually in most areas of the state.

The *Aedes albopictus* (Asian tiger mosquito) is the most common nuisance mosquito in Virginia, and is capable of transmitting Zika to humans. Zika is most commonly transmitted by the *Aedes aegypti* (Yellow Fever mosquito), which is also present, though less common, in Virginia. Mosquito season in Virginia typically lasts from May 1 – October 31.

Healthcare and Public Health Preparedness Regions

There are six healthcare regions closely aligned with five public health preparedness regions in Virginia. (As depicted in Figure 1 below, the Western Public Health Region coordinates with both Near Southwest and Far Southwest Healthcare Preparedness Regions).

Each Public Health Region has a Regional Emergency Health Coordinator who provides technical assistance and coordination for public health emergency preparedness and response within their region.

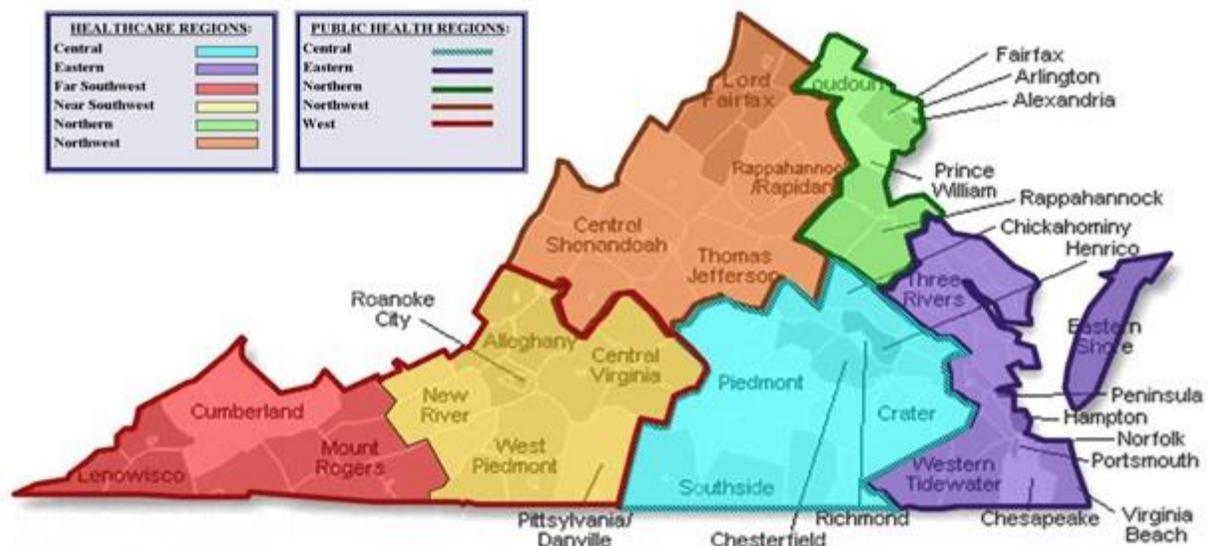


Figure 1. Public Health and Healthcare Regions

Planning Assumptions

- Knowledge of Zika is improving over time. Guidance and recommendations from CDC will change as more is learned about Zika.

Scientists at the Centers for Disease Control and Prevention (CDC) have concluded, after careful review of existing evidence, that Zika virus is a cause of microcephaly and other adverse pregnancy outcomes.

- Pregnant women represent a highly vulnerable population with special needs.

- There is a possibility that Zika can be spread through blood transfusion. Zika virus currently poses a low risk to the blood supply in the US.
- Virginia is at risk for local transmission of Zika virus by the *Aedes aegypti* mosquito (Yellow Fever mosquito) and the *Aedes albopictus* (Asian tiger mosquito). Both are competent vectors for Zika virus transmission, though transmission by the *Aedes albopictus* (Asian tiger mosquito) may be more limited than transmission by the *Aedes aegypti* mosquito (Yellow Fever mosquito).
- The City of Richmond and Washington, D.C. have been identified as cities at moderate risk for summertime Zika outbreaks by estimates produced by the National Center for Atmospheric Research.
- The number of imported cases among travelers visiting or returning to the US will likely increase. These imported cases could result in local spread of the virus in some areas of the US.
- CDC is investigating the link between Zika and Guillain-Barré syndrome (GBS), a serious health condition in which an individual's own immune system damages the nerve cells, causing muscle weakness and sometimes paralysis. Symptoms of GBS can last a few weeks or several months. Although most people fully recover from GBS, some people have permanent damage, and people have died in one out of 20 cases.
- Beginning in May 2015, Zika outbreaks occurred in Brazil. On February 1, 2016, the World Health Organization (WHO) declared Zika virus a public health emergency of international concern. Local transmission has been reported in many other countries and territories. It is likely that Zika virus will continue to spread to new areas.
- Virginia may have to stand up a Unified Command structure to coordinate the Commonwealth's response to Zika.
- Mosquito control programs in Virginia are locally funded and are limited to some of Virginia's most heavily populated jurisdictions in Northern, Central, and Eastern Virginia. Mosquito control can be guided by surveillance for arboviral disease in humans, mosquito surveillance and arboviral testing of mosquitoes, or by mosquito surveillance only.
- Military installations in Virginia that have mosquito control programs are Fort Belvoir, Fort Eustis, Langley Air Force Base, Fort Myers, and the Pentagon.
- The *Aedes albopictus* (Asian tiger mosquito) will not be vulnerable to broad area aerosol spraying. Therefore, surveillance and public outreach will be the most effective tools for preventing or mitigating the spread of Zika.
- The public may utilize private mosquito control companies to apply mosquito barrier applications around their property. Therefore, it will be important to integrate mosquito

control companies, to the extent possible, into Virginia's prevention and mitigation strategies.

- Prevention and mitigation strategies should be part of an integrated mosquito management approach, including public education and outreach, mosquito habitat control, and use of environmentally-friendly larvicide when appropriate and resources permit.
- The use of pesticides and other agents to control mosquito populations may cause concern about potential damage to the environment or harm to other species.

Local health districts response efforts will include conducting human disease surveillance, conducting public outreach and education, approving and coordinating human testing, and further investigating identified cases. As commercial tests become more available and affordable, there may be less need for local health districts to coordinate testing.

- Local governments have the primary responsibility to provide initial emergency response and emergency management services within their jurisdictions.
- Hospitals and providers in Virginia can expect an influx of potential Zika cases to clinics and emergency departments due to high level of public anxiety.
- Pre-event planning is critical to ensure a prompt and effective response to any confirmed locally-transmitted Zika case to prevent or mitigate the spread of the disease.
- State government may provide and/or augment emergency response services that exceed the capabilities of local governments pursuant to the COVEOP.
- In preparation for or in response to one or more confirmed cases of locally-transmitted Zika, the Governor of Virginia may order implementation of the COVEOP and activation of Unified Command.
- The State Health Commissioner will announce the first confirmed case of locally-transmitted Zika in Virginia. In addition, a Declaration of Emergency by the Governor will be considered if Zika presents a major threat to the public.
- There will be enormous public interest and concern should one or more confirmed locally-transmitted cases of Zika appear or have the potential to appear in Virginia.
- Regardless of the presence or absence of Zika in Virginia, there will be increased public interest in mosquitoes and mosquito control this year.

Policies

All departments and agencies assigned responsibilities within this Annex will develop and maintain the necessary plans, standard operating procedures, mutual aid agreements, and model contracts to successfully accomplish their tasks.

Organizational Structure

The lead agency for the Virginia Zika Task Force is Virginia Department of Health (VDH).

Support agencies and organizations for Zika prevention, mitigation, and response include: Virginia Department of Emergency Management (VDEM); Virginia Department of Agriculture and Consumer Services (VDACS); Virginia Department of Behavioral Health and Developmental Services (DBHDS); Virginia Department of Conservation and Recreation (DCR); State Council of Higher Education for Virginia (SCHEV); Virginia Department of Education (DOE); Virginia Department of Forestry (VDOP); Virginia Department of Game and Inland Fisheries (DGIF); Virginia Department of General Services (DGS); Division of Consolidated Laboratory Services (DCLS); Virginia Department of Health Professions (DHP); all departments and agencies of the Commonwealth of Virginia; Virginia Hospital and Healthcare Association (VHHA) and Regional Healthcare Coordination Centers (RHCC); local health districts; local public works; privately-owned mosquito control organizations; American Red Cross; INOVA Blood Services; Virginia Blood Services; and other local and federal partners. See Figure 2 below.

Due to the potential complexity of a Zika outbreak in Virginia, a Unified Command (UC) structure consistent with the National Incident Management System (NIMS) may be created to enhance coordination of the Commonwealth's prevention, response, and mitigation activities. A Unified Command organization chart is included as an appendix to this document.

The Virginia Emergency Operations Center (VEOC) will be augmented to the level necessary to manage one or more confirmed locally-transmitted Zika cases or Zika outbreaks in Virginia. If deemed necessary by Unified Command, a Joint Information Center (JIC) will be activated to provide timely release of accurate information. Requests for assistance from localities and appropriate state agencies will be facilitated via WebEOC per standard operating procedure. If necessary, the Virginia Emergency Support Team (VEST) and associated Emergency Support Functions will coordinate response operations through integration with the VDH Incident Management Team (IMT) and Regional Hospital Coordinating Centers (RHCCs).

Virginia Zika Task Force Org Chart
 March 31, 2016

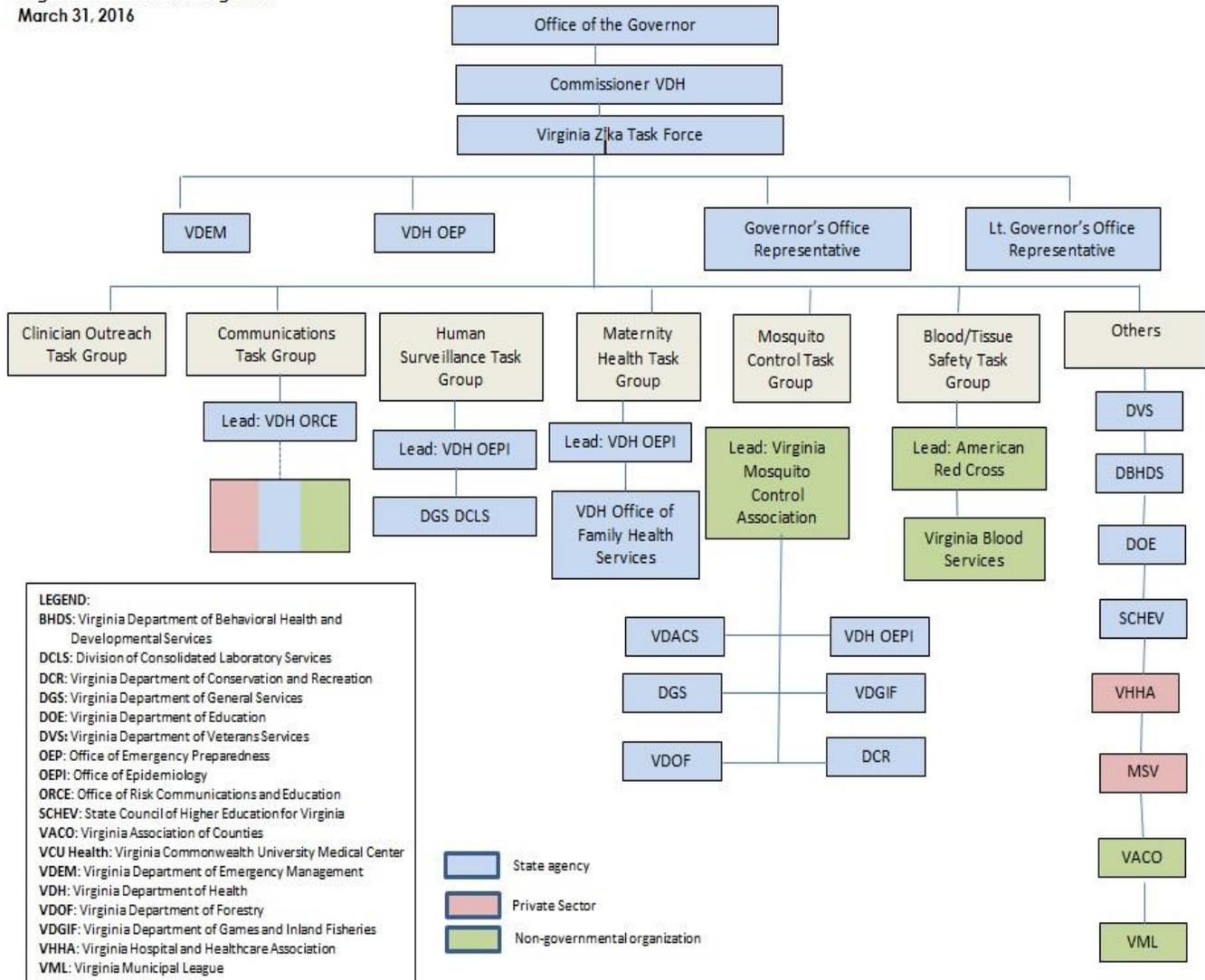


Figure 2. Virginia Zika Task Force Organization Chart

Roles and Responsibilities

Virginia Department of Health (VDH) Central Office

- Support protection of public health and safety and support the provision of assistance to governments, businesses, and individuals during a Zika outbreak (e.g., one or more confirmed locally-transmitted cases).
- Support epidemiological investigations of suspected travel-related and locally-transmitted cases of Zika.
- Communicate with local health districts, the state laboratory, and neighboring state health departments to ensure coordinated epidemiological operations.
- Establish Zika testing approval criteria and procedures.
- Provide specific guidelines for data management and communication of test approvals and results reporting.
- Track and report confirmed travel-related and locally-transmitted cases of Zika in Virginia.
- Provide guidance and updated information to local health departments, healthcare facilities, providers, and public health partners using established protocols and the Health Alert Network (HAN).
- Lead the development of messaging to address the current status of Zika in the Commonwealth.
- Develop and, as necessary, implement plans that address potential scenarios that pose the risk of further spread of Zika.
- Ensure that accurate situational awareness regarding Zika activity in the Commonwealth is maintained, while at the same time ensuring that any information shared complies with applicable laws, regulations, and policies regarding the protection of the confidentiality of personal health information.

VDH Local Health Districts

- Coordinate the submission of Zika-related specimens to DCLS for testing, as needed, and provide guidance to healthcare providers.
- Conduct epidemiological investigations related to Zika when a case is identified, implementing public health actions to minimize the risk of disease spread.
- Share relevant information with VDH Central Office, local partners (e.g., local governments, local mosquito control programs, etc.) and/or Virginia Zika Task Force or Unified Command partners, as appropriate.
- Serve as resource for local governments, local hospitals, providers, emergency responders, and the public with questions about Zika.
- Manage Medical Reserve Corps (MRC) volunteers.

Virginia Department of Emergency Management (VDEM)

- Share information to determine a common operating picture with VDH.
- Issue mission assignments to ESF primary or support agencies for Zika response and mitigation, as needed.

- Assist VDH with development of incident specific contingency plans.
- Gather information to build situational awareness.
- Coordinate volunteer and donation efforts in partnership with local health districts.
- Assist VDH, as necessary, in the procurement of supplies to assist with prevention, mitigation, and response activities.
- Assist VDH in the establishment and management of a Joint Information Center (JIC), if needed.
- Continue regional coordination efforts.

Virginia Department of Agriculture and Consumer Services (VDACS)

- VDACS Office of Pesticide Services has primacy for pesticide regulation in Virginia.
- Provide information/messaging about pesticides and their use for mosquito control.
- Provide training to pesticide businesses in keeping with the Virginia Pesticide Control Act and Regulations.

Virginia Department of Behavioral Health and Developmental Services (DBHDS)

- Provide behavioral health assistance and support to the index patients, his/her contacts, and their families and neighbors, as needed.
- Serve as the behavioral health subject matter experts for ESF-6 and ESF-8.
- Support the Joint Information Center (JIC) and Public Information Officer (PIO), as needed, by reviewing and/or creating messaging sensitive to behavioral health.
- Work with Community Services Boards (CSBs) to develop an action plan to address all appropriate services and supports.
- Work with the FEMA Region III Individual Assistance Coordinator and Behavioral Health Coordinator to assure DBHDS plans will mesh with adjacent state plans and services.
- Provide shift or daily situation reports to ESF-8 as needed.
- Activate Disaster Response Team (DRT) as necessary.

Virginia Department of Conservation and Recreation (DCR)

- Mosquito Control Task Group Member.

Virginia Department of Education (DOE), State Council of Higher Education for Virginia (SCHEV) and Virginia Community College System (VCCS)

- Support Virginia Zika Task Force as needed

Virginia Department of Environmental Quality (DEQ)

- Mosquito Control Task Group Member.
- Provide oversight of pesticide applications that result in pesticides being applied to or over 'waters of the state'.

Virginia Department of Forestry (VDOF)

- Mosquito Control Task Group Member.

Virginia Department of Game and Inland Fisheries (DGIF)

- Mosquito Control Task Group Member

Virginia Department of General Services (DGS) – Division of Consolidated Laboratory Services (DCLS)

- Provide guidance to local health departments, hospital laboratories, and providers on the handling, packaging, and shipping of clinical samples collected from persons under investigation for Zika.
- Provide information to local health department, hospital laboratories and providers regarding laboratory testing availability.
- Conduct testing for Zika virus, as requested and approved by VDH.
- Notify providers and VDH of presumptive, inconclusive, and confirmed Zika virus test results.
- Provide laboratory test result interpretation and work with VDH to provide guidance for additional laboratory testing.

Virginia Department of Health Professions (DHP)

- Support Virginia Zika Task Force as needed.

Virginia Hospital and Healthcare Association (VHHA)

- Support Virginia Zika Task Force as needed.

Regional Healthcare Coordination Centers (RHCCs)

- Support the Commonwealth's Zika prevention, response, and mitigation activities by sharing Zika-related information with appropriate partners, as needed.
- Coordinate resource needs within the region and the state.

American Red Cross, INOVA Blood Services, and Virginia Blood Services

- Ensure the safety of the blood supply

Concept of Operations

Intent

The Commonwealth of Virginia will prevent or mitigate the local transmission of Zika virus disease in Virginia.

Zika-related prevention, response, and mitigation actions addressed in this Annex will occur in five risk-based phases corresponding to categories of risk identified by CDC, as follows::

- Phase 0 Preparedness;
- Phase 1 Mosquito season;
- Phase 2 Limited Local Confirmed Transmission; Phase 3 Widespread Local Transmission
- Phase 4 Widespread multi-jurisdictional transmission

Virginia will continue to prepare for one or more cases of confirmed locally-transmitted Zika in the Commonwealth by coordinating statewide activities through the Virginia Zika Task Force or, if necessary, Unified Command.

Prevention, response, and mitigation activities will occur throughout each phase in the following areas:

- Communication
- Surveillance and Investigation
- Laboratory testing
- Mosquito control
- Coordination with Healthcare Providers
- Outreach to Pregnant women
- Blood safety

Activities in each phase will build on and may occur concurrently with activities in subsequent phases. In addition to activities included in the categories listed above, administrative activities, training, and exercises may occur throughout each phase as well.

Virginia's response to one or more cases of confirmed locally-transmitted Zika in the Commonwealth may include, but may not be limited to:

- Tracking and reporting to appropriate partners the number of confirmed cases of travel-related or locally-transmitted Zika;
- Sharing information and making appropriate notifications;
- Confirming the presence of Zika through laboratory testing;
- Conducting enhanced surveillance for Zika;
- Conducting or supporting public education and outreach events;
- Providing timely and accurate information to the public through a virtual Joint Information Center (JIC), if necessary;
- Supporting localized or community property inspection or cleanup efforts, as appropriate;
- Engaging in behavioral health efforts to support families and communities affected by Zika;

- Enacting appropriate disease intervention measures, if necessary.

Phase 0: Preparedness

Prior to mosquito season, most Zika-related activities will be preventive or in preparation for confirmed locally-transmitted cases.

Communication

Public Education and Outreach

VDH will work with Virginia Zika Task Force partners to prepare a communication campaign for pregnant women, travelers, healthcare providers, and the general public to raise awareness of Zika virus. Public messaging will include information on the risk of sexual transmission and steps individuals can take to prevent it, as well as information on:

- General prevention;
- Pregnancy and Zika;
- Pre- and post- travel to Zika-affected areas;
- Up-to-date information on Zika-affected areas (international and within United States);
- Mosquito bite prevention;
- Mosquito control;
- Pesticide use; and
- Other topics as they arise.

Virginia Zika Task Force multimedia campaign will include:

- Multiple key messages and message maps;
- Social media posts;
- Public service announcements (audio and audiovisual);
- Door hangers;
- Fliers and posters; and
- Letters to clinicians

VDH will work to update scripts for Virginia 211 to include Zika messaging and will update Frequently Asked Questions (FAQs) and other resource materials on the VDH website.

Virginia Zika Task Force will initiate statewide and/or support local public information campaigns encouraging yard and personal property clean-up to reduce or eliminate mosquito habitats, to include draining, covering, or treating containers of water; use of mosquito repellent; use of air conditioning, if available; use of window and door screens, if possible; wearing long, light-colored clothing; and other tips for preventing mosquito bites.

Surveillance and Investigation

VDH will conduct surveillance for cases of Zika virus disease, to include travel-associated cases, locally acquired cases, and cases of maternal-fetal transmission. Travel-associated cases include those travelers returning from affected areas, their sexual contacts, or infants infected in utero. Existing surveillance and testing algorithms will continue to evolve as more information becomes available during mosquito season, with the goal of promptly identifying locally transmitted cases when possible.

VDH will provide up-to-date guidance to healthcare providers regarding testing and clinical management.

Guidance from VDH Central Office to local health districts will include specific guidelines for data management and communication of test approvals and results reporting.

VDH DSI will continue to publish weekly Zika case reports.

Pregnancy Registry

VDH Central Office and local health districts will work with health care providers of pregnant women who are infected with Zika to enroll eligible women into the CDC US Zika Pregnancy Registry for future monitoring and follow-up of birth outcomes.

Laboratory Testing

Coordinating Testing of At-Risk Individuals for Zika

VDH will establish and share with local health districts and clinicians across the state Zika testing approval criteria and procedures. Health providers will assess their patients' risk for Zika infection based on travel history, sexual partner's travel history, presence of clinical symptoms, history of mosquito bite exposures, and whether the patient is pregnant or trying to become pregnant. Patients who meet the criteria for testing will work with their clinician and the local public health department, with assistance from VDH Central Office if needed, to assess each patient recommended for testing to determine if travel history, exposures, symptoms, and/or pregnancy status qualify for public health testing, and coordinate the collection and delivery of the approved sample types (i.e. Blood sample in a serum separator tube, urine sample, etc.) to DCLS for testing, follow-up with the providers, and conduct further investigation if a case is suspected and/or confirmed.

As commercial tests for Zika virus become more available, VDH will continue to provide technical assistance regarding the interpretation of laboratory results upon request from health care providers.

Mosquito Control

Virginia Zika Task Force will review local mosquito control programs to assess their capacity and capabilities. The Task Force will also assist localities with reviewing mosquito surveillance activities to assess whether historical maps of *Aedes aegypti* (Yellow Fever mosquito) and *Aedes albopictus* (Asian tiger mosquito) distribution are accurate. Additionally, the Task Force will work to develop a communication network to ensure timely exchange of information. Public education campaigns will include not only information on personal protective measures, but also how citizens can reduce/eliminate breeding sites for *Aedes aegypti* and *Aedes albopictus*.

Virginia Zika Task Force will plan statewide or support local activities to prevent or mitigate transmission of Zika by mosquitoes, to include:

- Reducing *Aedes* mosquito habitats on or around personal or public property;
- Reducing potential breeding sites on or around personal or public property; and
- Initiating community clean-up efforts.

Plans for the systematic collection and analysis of vector distribution and resistance testing methods can be found in the **Virginia Mosquito Response Plan Appendix**.

Coordination with Healthcare Providers

VDH, coordinating through a clinical advisory group to the Virginia Zika Task Force, will plan and prepare for a potential demand for care for clinically challenging cases. This work will include convening a Zika Clinical Advisory Group consisting of experts in maternal health (OB/Gyn), pediatrics, neurology, and infectious disease practice. This group will work to identify resources and health care providers that can provide services for infected pregnant women with signs of congenital infection, and their infants that may need specialty care after birth.

Outreach to Pregnant Women

VDH will continue routine surveillance for suspected Zika virus infections, including for pregnant women through OB/GYN clinics and other providers.

Virginia Zika Task Force will identify resources that could be used to educate pregnant women regarding the prevention of Zika virus. This may include products to develop Zika prevention kits for pregnant women and resources for public education and outreach campaigns. Materials and information will include travel advisories, mosquito prevention tips, and information about preventing sexual transmission of Zika. Some strategies to distribute these educational resources include but are not limited to posting on the VDH website, Dear Clinician letters, clinical websites, and locations in the community such as daycares, OB/Gyn clinics, public libraries, doctors' offices, and worksites.

Local health districts will work with health care providers of pregnant women who are infected with Zika to enroll eligible women into the CDC US Zika Pregnancy Registry for future monitoring and follow-up of birth outcomes.

Blood Safety

Virginia Zika Task Force will consult with local blood collection centers on blood safety contingency plans.

American Red Cross, INOVA Blood Services, and Virginia Blood Services will continue to comply with FDA and American Association of Blood Banks (AABB) guidance regarding the screening of potential donors who may have travelled to an area that has active transmission of the Zika virus or who have had sexual intercourse with a male with recent travel history to a Zika area.

Virginia Zika Task Force will review CDC toolkit for investigation of transfusion-transmitted infection.

Virginia Zika Task Force/Unified Command Schedule and Accounting Procedures

Virginia Zika Task Force will continue to hold regular meetings and will confer regularly with HHS Region III states.

- *Finance/Administration:* Virginia Zika Task Force/Unified Command partners will track expenses related to supporting, responding, and providing services to Zika-related incidents. Expenses will be documented on standardized expense spreadsheets, and other data capture formats, as approved by Virginia Zika Task Force/Unified Command. Instructions for submittal of expense documentation and determination of qualifying expenses for reimbursement will be provided by the Finance and Administration Section in Unified Command.

Training and Exercises

Virginia Zika Task Force/Unified Command will participate in and support Zika-related training and exercises, as appropriate, in order to identify best practices, lessons learned, and areas for improvement. Training and exercise activities will occur throughout each phase of operations, if possible.

Phase 1: Mosquito Season

This phase of prevention, response, and mitigation activities coincides with biting activity of *Aedes aegypti* (Yellow Fever mosquito) or *Aedes albopictus* (Asian tiger mosquito).

Mosquito season in Virginia typically lasts from May 1 through October 31. Activities from Phase 1 will continue during this phase.

Communication

Virginia Zika Task Force will continue a statewide communications campaign, with primary messaging focusing on awareness, personal protection against mosquitoes, and residential mosquito habitat and breeding site reduction.

Public education and outreach activities during this phase will include:

- Continuing dissemination of messages and products via social media and paid advertising on relevant websites;
- Setting up news and social media monitoring via alerts;
- Working with airport authorities to display Zika-related signage and/or run public service announcements;
- Running animated videos in movie theatres for eight weeks; and
- Partnering with radio and television meteorologists to share messages related to mosquito-breeding weather conditions.

Virginia Zika Task Force will deploy messages encouraging travelers returning from areas with Zika transmission to take precautions to prevent mosquito bites for at least three weeks for asymptomatic travelers and one week for symptomatic travelers to reduce the risk of infecting local mosquitoes.

Local health districts will work with healthcare providers to counsel their patients with Zika virus disease to take precautions to avoid exposure to local mosquito populations by: removing potential mosquito habitats and breeding sites from their personal property to include draining, covering, or treating containers of water; using mosquito repellent; using air conditioning, if available; using window and door screens, if possible; and wearing long, light-colored clothing. These patients should also receive counseling regarding the prevention of sexually transmitted Zika virus as appropriate.

Surveillance and Investigation

VDH will work with healthcare providers to establish a process for assessment and testing of suspected locally-transmitted cases, to include establishing:

- Symptom and potential exposure history;
- Assessment of history of travel, transfusion or transplantation, and illness in sexual contacts, with suspicion of local transmission increasing if none is identified in a person with symptoms compatible with Zika;
- Patient's likely geographic area of risk for exposure (home, work, public space, or other area).

Enhanced surveillance strategies to identify cases of local transmission may include surveillance around travel-associated cases (household contacts, sexual partners, etc.); investigations of unusual clusters of rash illness; and implementation of expanded testing criteria for clinically compatible cases with no known exposure.

VDH will maintain updated internal guidelines, procedures, and data management activities as well as external communications conducted through the VDH website.

Laboratory Testing

DCLS and local health districts will continue to offer appropriate laboratory testing to those that meet testing criteria, based on the most recent CDC guidance.

Local health districts will continue to collect data on all persons approved for testing and for whom testing indicates Zika virus infection, and identify exposure risks.

Virginia Zika Task Force will continually assess the ongoing status of DCLS' preparedness for a potential surge in requests for laboratory testing for Zika virus.

VDH and local health districts will continue to assess cases and make recommendation for laboratory testing for pregnant women and other at risk individuals based on the most recent CDC guidance.

DCLS will continue to provide updated guidance and instructions to clinical laboratories regarding Zika specimen collection, specimen submission, testing capabilities at DCLS and the CDC, and interpretation of test results through a variety of communications (fax, email, website updates).

Mosquito Surveillance and Control

Virginia Zika Task Force will leverage partnerships with local governments and private sector and non-profit organizations to disrupt mosquito breeding grounds. Further, the Virginia Zika Task Force Mosquito Control Task Group will:

- Initiate surveys in targeted areas for *Aedes albopictus* (Asian tiger mosquito) to determine abundance and distribution (via a combination of pre-existing mosquito surveillance programs and a seasonal VDH-DEE mosquito surveillance program intended to help serve localities without this capability);
- Support the development of distribution maps and the evaluation of the efficacy of source reduction strategies;
- Support or initiate adult mosquito sampling in targeted communities; and
- Support or initiate preventive adult mosquito control to reduce adult mosquito populations, when appropriate and resources permit;
- Conduct rapid insecticide resistance testing for local mosquito populations, if resources and technical expertise permits;
- Actively engage community through communications products that promote personal protection and risk avoidance measures;

VDH will assist with planning and implementing local and state mosquito surveillance and control procedures surrounding patients who are deemed appropriate for “targeted” mosquito surveillance and control measures as outlined in the **Virginia Mosquito Response Plan Appendix**.

In addition to routine mosquito surveillance and control actions, “targeted” mosquito surveillance and control activities, within an approximate 150 meter radius around the individual’s home may be considered as resources permit. Particular attention should be paid to ensuring the confidentiality of the affected individual. Details and procedures regarding these activities can be found in the **Virginia Mosquito Response Plan Appendix**.

Internal procedures for local health department staff, including guidance for sharing information with local mosquito control programs, can be found in the Virginia Mosquito Response Plan and the Virginia Disease Control Manual (DCM), an internal VDH document.

Outreach to Pregnant Women

Virginia Zika Task Force will continue to support outreach and educational messaging regarding prevention of mosquito bites and prevention of sexual transmission of Zika.

VDH Central Office and local health districts will continue outreach to healthcare providers that care for pregnant women.

Virginia Zika Task Force/Unified Command Schedule

Virginia Zika Task Force will engage and hold regular meetings with state mosquito control partners to discuss plans and progress.

Virginia Zika Task Force will continue to hold regular meetings and will confer regularly with HHS Region III states.

Phase 2: Confirmed Limited Local Transmission

Prevention, response, and mitigation activities in this phase occur when one or more cases of locally-transmitted Zika virus disease in Virginia have been confirmed. Cases may occur in a single household or may be clustered in a neighborhood, community, or local jurisdiction. Activities from Phase 1 and Phase 2 will continue during this phase. Virginia Unified Command may be established during this phase, if necessary.

Communication

Virginia Zika Task Force/Unified Command JIC will issue a press release to inform the public of confirmed local transmission of Zika. Press releases and talking points will be

developed by the Office of Risk Communication and Education (ORCE). See Communications Plan Appendix for more information.

Virginia Zika Task Force/Unified Command JIC will work with local governments and local health districts to intensify public outreach and education activities in and around the affected area to promote protection against mosquito bites. Methods of communication may include, but are not limited to:

- Fliers and posters;
- News releases/media statements/tele-briefings, as appropriate;
- Statements or addresses from community leaders; Formalized news and social media monitoring to counter incorrect information; identify new or specific message needs; and make adjustments to communications plans as needed;
- Targeted messages for pregnant women.

Virginia Zika Task Force/Unified Command JIC will work with local public relations departments and local or regional virtual operations support teams (VOSTs) to monitor local news stories and social media postings to determine accuracy of information, identify messaging gaps, and make adjustments to communications as needed.

Surveillance and Investigation

VDH Central Office and local health districts will continue surveillance, including strategies such as assessing for illness among household members and sexual partners of cases.

VDH Central Office and local health districts will communicate with healthcare providers to increase awareness and recognition of persons with Zika-compatible symptoms.

Local health districts will consider working with local partners to conduct household and door-to-door surveillance to identify clinically compatible cases.

Local health districts will work with healthcare providers to counsel individuals with locally-transmitted Zika to take precautions to avoid exposure to local mosquito populations by: regularly removing potential mosquito habitats and breeding sites from their personal property; using mosquito repellent; using air conditioning, if available; using window and door screens, if possible; and wearing long, light-colored clothing.

VDH DSI will enhance local surveillance for human cases, to include, for example, conducting local clinician outreach and syndromic surveillance in nearby hospitals and urgent care centers.

Laboratory Testing

VDH and local health districts will continue to work in collaboration with DCLS to provide laboratory testing to pregnant women and/or their sexual partners or other at-risk individuals based on the most recent CDC guidance.

Mosquito Control

Virginia Zika Task Force/Unified Command will work with local governments, local public works, and private sector mosquito control organizations to conduct intensified larval and adult mosquito control in a 150 meter radius (or other boundary, as deemed appropriate) around the home of a patient with confirmed locally-transmitted Zika as appropriate. Mosquito control activities around other areas where individuals spend a considerable amount of time and have mosquito exposure of viremic or potentially viremic patients as recommended below may also be considered and should include site assessment.

Mosquito control activities may include, but are not limited to residential mosquito habitat and breeding ground reduction, outdoor space spraying, and indoor residual spraying, if needed and resources permit. Abiding by all applicable laws including those pertaining to accessing private property is important. Localities without existing mosquito control programs should consider plans to implement these measures; planning options to consider are outlined in the Mosquito Response Plan.

If funding allows, VDH will support efforts to conduct rapid insecticide resistance study for local mosquito populations.

Outdoor space spraying will be conducted in a manner that is least harmful to the environment and does not result in buildup of immunity in local mosquito populations.

Outreach to Pregnant Women

Virginia Zika Task Force/Unified Command will support targeted communication and surveillance for pregnant women. Communications and outreach to healthcare providers will continue, with particular focus on maternal-child healthcare providers.

VDH and local health districts will continue to collect case information on cases of Zika virus disease in pregnant women, for inclusion in CDC's US Zika Pregnancy Registry.

Blood Safety

Virginia Zika Task Force/Unified Command will notify local blood collection agencies of the presence of confirmed locally-transmitted Zika.

Virginia-based blood collectors will continue to comply with FDA, CDC, AABB, and Commonwealth of Virginia guidance regarding the collection of blood in the area with active transmission of Zika.

AABB Task Force contingency plans include:

- Public messaging;
- Recalls of previously collected blood products (based on FDA/CDC/AABB guidance);
- Suspension of blood collections in the affected jurisdictions(s); and
- Importation of blood products from unaffected areas of Virginia and the US, as necessary.

Virginia Zika Task Force/Unified Command Schedule

The Governor of Virginia or State Coordinator of Emergency Management will activate Virginia Zika Unified Command for Zika during this phase, if necessary.

Unified Command will determine if there is a need for assistance from a CDC Field Team, such as Epi Aid or a rapid response team, to provide vector control, risk communication, technical, and/or logistical support.

Unified Command will continue to hold regular meetings and will confer regularly with HHS Region III states. VDH DSI will continue to publish weekly Zika case reports. Unified Command will publish weekly situation reports.

Phase 3/4: Widespread Local Transmission/Phase 4 Widespread Multijurisdictional Transmission

Prevention, response, and mitigation activities in this phase occur when one or more cases of locally-transmitted Zika virus disease have been confirmed in multiple jurisdictions in Virginia. Within each jurisdiction, there may be individual cases or case clusters in a single household, neighborhoods or communities. Activities from Phases 1-3 will continue during this phase.

Communication

Virginia Unified Command will intensify public education and outreach activities in and around the affected jurisdictions. Social media posts and tweets, targeted media monitoring, and specific messaging for pregnant women will increase in frequency.

VDH will determine if a call center should be stood up based on the number of calls being received.

Surveillance and Investigation

VDH will continue surveillance for human cases in the affected jurisdictions to include clinician outreach and syndromic surveillance as described in previous phases.

If conditions are met (2 + cases within an appropriate area and time frame) this information will be shared with partners, including the CDC, to designate an affected area and generate maps of the affected area.

Mosquito Control

Virginia Unified Command will work with local governments, local public works, and private sector mosquito control organizations to conduct larval and adult mosquito control. Recommendations for the scope of such control will be informed by Division of Environmental Epidemiology (DEE) in consultation with Unified Command.

Control plans should be tailored to meet the needs of the jurisdiction(s) and will be part of an integrated mosquito management approach. Mosquito control activities should be repeated as necessary to achieve adequate control. Community clean-up activities will continue as outlined in previous phases.

Outbreak areas will be divided into operational areas where control measures can be effectively applied. Door-to-door inspections and mosquito control in these operational areas will be considered, where resources permit.

Outdoor space spraying will be conducted in a manner that is least harmful to the environment, is consistent with integrated mosquito management, and minimizes the risk of the buildup of immunity in local mosquito populations.

For areas where air conditioning and screens are not widely available, Virginia Unified Command will consider conducting indoor residual spraying in at-risk homes. Interventions for high-risk populations, including pregnant women, include mosquito-proofing homes through installation of screens and air conditioning, if necessary.

Virginia Unified Command will support local governments and local public works in monitoring effectiveness of vector control efforts through mosquito trapping surveillance.

Outreach to Pregnant Women

Virginia Unified Command JIC will work with local governments and local health districts to:

- Provide up-to-date public health recommendations to pregnant women regarding travel to the affected jurisdiction(s) in Virginia ;

- Advise men in the affected jurisdictions to use condoms correctly and consistently or abstain from sexual contact with pregnant women and other men;
- Implement intervention plans for at-risk pregnant women in affected jurisdictions, such as mosquito-proofing homes and providing additional materials such as insect repellent, larvicide, and educational materials;
- Revise procedures for the testing of asymptomatic pregnant women in affected jurisdictions; and
- Conduct retrospective enhanced surveillance in healthcare facilities to establish the earliest known date of local human infection to guide decisions on counseling/testing of asymptomatic pregnant women.

Blood Safety

The American Red Cross, INOVA Blood Services and Virginia Blood Services will comply with all FDA/CDC/AABB guidance regarding the collection of blood in an area of active transmission. Importation of blood to the areas with active transmission will be coordinated with the AABB, the FDA and CDC and the Commonwealth of Virginia.

Blood centers located in other areas in the US will comply with the FDA/CDC/AABB guidance regarding the deferral of recent travelers to areas with active transmission.

Virginia Zika Task Force/Unified Command Schedule

Virginia Unified Command will determine the geographic boundaries that will be used for aggressive response efforts.

The Governor of Virginia or State Health Commissioner will designate the affected jurisdiction(s) as Areas of Active Zika Transmission.

Virginia Unified Command will notify CDC of designated Areas of Active Zika Transmission by calling 770-488-7100.

Unified Command will continue to provide situational awareness to partners by holding regular meetings and conferring regularly with HHS Region III states. VDH DSI will publish regular Zika case reports. Unified Command will publish daily situation reports.

Critical Information Requirements

Timely and accurate information is critical to Virginia's successful response to one or more cases of confirmed locally-transmitted Zika. The following list includes information that must be reported to Virginia Zika Task Force/Unified Command or other partners in order to facilitate a timely and proper response:

- Providers will notify local health departments of suspected or confirmed cases of Zika virus disease;
- DCLS notifies submitters and DSI of presumptive and confirmed test results;
- Local health departments notify DSI of probable/confirmed Zika cases;
- Virginia Zika Task Force/Unified Command informs CDC of designation of Areas of Active Zika Transmission;
- Known locations of Zika transmission should be shared with appropriate local partners, if consent is given and/or approved by VDH Central Office;
- Any gaps in Virginia Zika Task Force/Unified Command planning.

Authorities

- Commonwealth of Virginia Emergency Operations Plan (COVEOP).
- Reporting of Diseases (§32.1-35; 32.1-36; 32.1-37, Code of Virginia), as amended.
- Investigation of Disease (§32.1-39, Code of Virginia), as amended.
- Emergency Orders and Regulations (§32.1-13; 32.1-42; 32.1-20, Code of Virginia), as amended.
- Disease Control Measures (§32.1-43; 32.1-47; 32.1-48, Code of Virginia), as amended.
- Isolated or Quarantined Persons (§32.1-44, Code of Virginia), as amended.
- Isolation or Quarantine of Persons with Communicable Disease of Public Health (§32.1-48.05 through 32.1-48.017, Code of Virginia), as amended.

References

- [CDC Guidelines for Development of State and Local Risk-Based Zika Action Plans](#), March 8, 2016
- CDC Zika Virus Disease information:
 - <http://www.cdc.gov/zika/about/index.html>
- OSHA Interim Guidance for Protecting Workers from Occupational Exposure to Zika Virus
 - http://www.cdc.gov/niosh/topics/outdoor/mosquito-borne/pdfs/osha-niosh_fs-3855_zika_virus_04-2016.pdf#page=1
- Summary of National Center for Atmospheric Research study on risk of summertime Zika outbreaks:
 - http://www.eurekalert.org/pub_releases/2016-03/ncfa-pzv031516.php
- VDH Zika Virus Disease Information:
 - <http://www.vdh.state.va.us/epidemiology/Zika/index.htm>

Appendix A – Zika Task Force / Task Group Membership

No.	Agency / Organization	Representative	Contact Info
1.	Department of Health	Marissa Levine, Commissioner Dave Trump, Chief Deputy Laurie Forlano, State Epi David Gaines, Entomology Bob Mauskapf, Emergency Prep. Suzi Silverstein, Ed and Training Maribeth Brewster, Comms Jennifer MacDonald, Fam Health Lilian Peake, Dep Comm Karen Reed Minority Health	Marissa.levine@vdh.virginia.gov David.trump@vdh.virginia.gov Laurie.forlano@vdh.virginia.gov David.Gaines@vdh.virginia.gov Bob.mauskapf@vdh.virginia.gov Suzi.silverstein@vdh.virginia.gov Maribeth.brewster@vdh.virginia.gov Jennifer.Macdonald@vdh.virginia.gov lilian.peake@vdh.virginia.gov Karen.reed@vdh.virginia.gov
2.	Governor's Office, Deputy Chief of Staff	Suzette Denslow	Suzette.Denslow@governor.virginia.gov
3.	Virginia Municipal League	Janet Areson	jareson@vml.org 804-523-8522
4.	Secretary Veterans' and Military Affairs	Deputy, Jaime Areizaga-Soto	Jaime.Areizaga@governor.virginia.gov O: 804-225-3826 (ext. 2) C: 804-971-8517
5.	Department of General Services / DCLS	Denise M. Toney, Ph.D., HCLD (ABB)	Denise.Toney@dgs.virginia.gov 804-648-4480 ext. 282
6.	Department of Health Professions	Jay Douglas, Executive Director of the Virginia Board of Nursing	Jay.Douglas@dhp.virginia.gov 804-367-4623
7.	Department of Inland Game and Fisheries	Veterinarian, Dr. Megan Kirchgessner	megan.kirchgessner@dgif.virginia.gov 804-837-5666
8.	Virginia Mosquito Control Association / Prince William County Mosquito and Gypsy Moth Control Program	Tim McGonegal, Branch Chief	TMcGonegal@pwcgov.org 703-792-5730
8a.	Virginia Mosquito Control Association / Chesapeake Mosquito Control Commission	Dreda Symonds, Director	dsymonds@cityofchesapeake.net 757-663-0086 / 757-966-5158
9.	Department of Conservation and Recreation	Rochelle Altholz, Deputy Director of Administration and Finance	Rochelle.Altholz@dcr.virginia.gov 804-371-7483
10.	VA Hospital and Healthcare Association	Dr. Tom Ryan, Senior Medical Advisor	tryan@vhha.com
10a.	VA Hospital and Healthcare Association	Morris Reece, Technical Advisor to VHHA for Emergency Preparedness	mreece@vaems.org 540-400-1144
11.	Department of Forestry	Lori Chamberlin Forest Health Manager	O:434-220-9026 / C:434-326-7279 lori.chamberlin@dof.virginia.gov
12.	Virginia Association of Counties	Phyllis Errico, General Counsel	perrico@vaco.org 804-343-2509
13.	Department of Education	Tia Campbell	Tia.Campbell@doe.virginia.gov 804-786-8671
14.	Department of Behavioral Health and Developmental Services	Dawn Adams	Dawn.adams@dbhds.virginia.gov
15.	Department of Agriculture and Consumer Services	Liza Fleeson Trossbach, Program Manager, Office of Pesticide Services	Liza.Fleeson@vdacs.virginia.gov 804-371-6559
16.	Department of Environmental Quality	James Golden	James.Golden@deq.virginia.gov 804-698-4220
17.	American Red Cross	Bill FitzGerald, Senior Advisor	William.FitzGerald@redcross.org

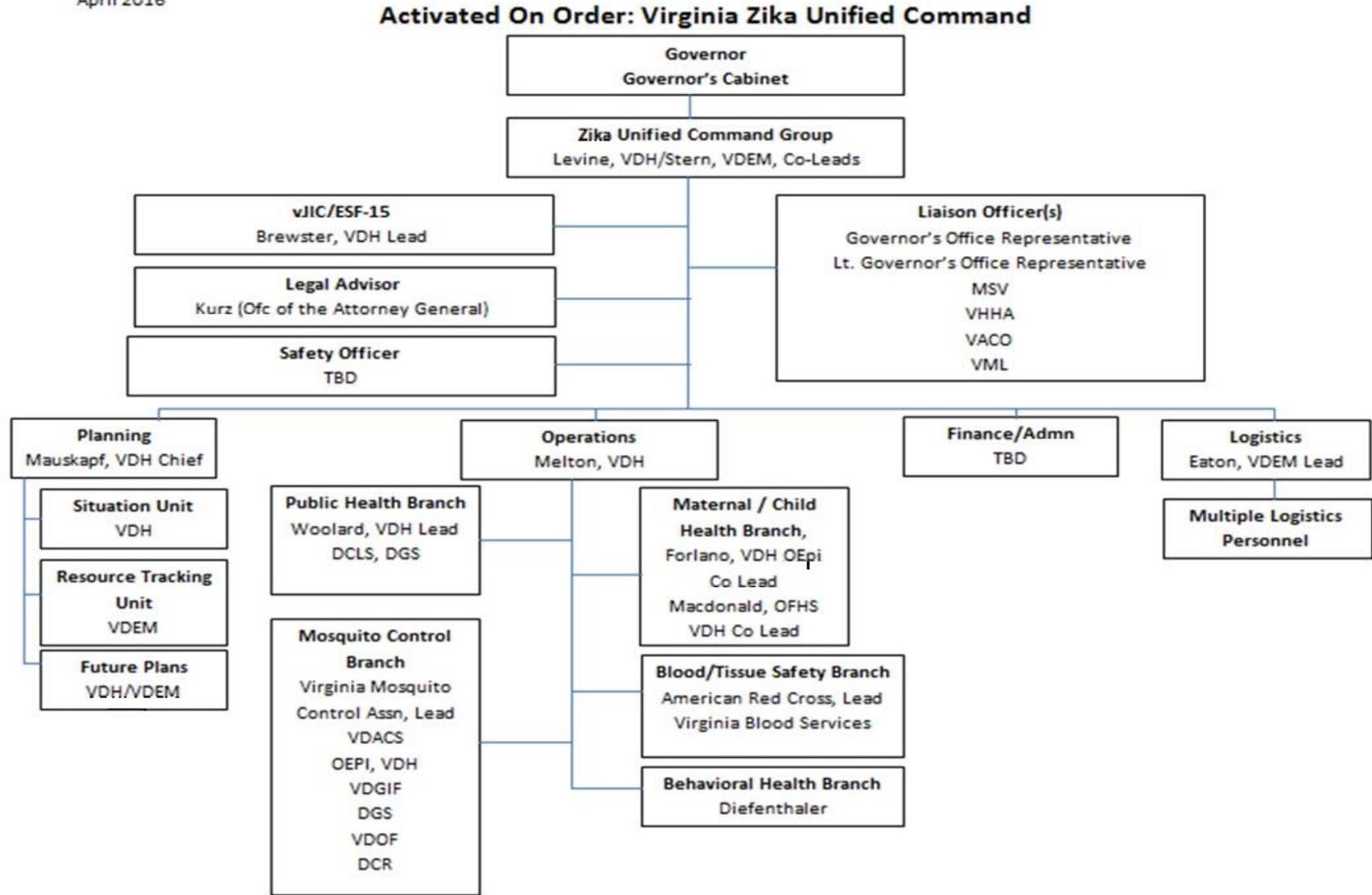
		Corrine Goldberg	Corinne.Goldberg@redcross.org
18.	Department of Emergency Management	Brett Burdick Deputy State Coordinator	Brett.burdick@vdem.virginia.gov 804-874-2400
19.	Virginia Blood Services	Chelsea Sheppard, Med Director	O: 804-213-4115 C: 804-387-8495 csheppard@vablood.org
20.	Medical Society of Virginia	Melina Davis-Martin Lauren Bates-Rowe Senior Director of Health Policy	mdavis-martin@msv.org lbates-rowe@msv.org 804-377-1032
21.	State Council of Higher Education for Virginia	Alan Edwards	alanedwards@schev.edu 804-225-3189
22.	Department of Transportation	John Scrivani	John.scrivani@vdot.virginia.gov
23.	NAVENPVNTMEDU TWO VA	Yans, Matthew W LT USN	matthew.w.yans.mil@mail.mil
24.	Lt. Gov's Office	Rodgers, Alexis	Alexsis.Rodgers@ltGov.virginia.gov

Functional Task Groups

- Mosquito Control Task Group
 - Virginia Mosquito Control Association, Dreda Symonds Lead
 - VDH, David Gaines
 - Department of Agriculture and Consumer Services
 - Department of Environmental Quality
 - Secretary Veterans' and Military Affairs (Coordinate w/ DOD Installations)
 - Department of Conservation and Recreation
 - Department of Inland Game and Fisheries
 - Department of Forestry
 - Department of Agriculture and Consumer Services
 - Department of General Services
 - Department of Transportation
- Blood Supply Security Task group
 - American Red Cross
 - VDH Office of Epidemiology
- External Communications Task Group
 - VDH PIO, Maribeth Brewster, Lead
 - All TF agencies and Task Groups

Appendix B – Virginia Zika Unified Command Organization Chart

April 2016



Appendix C – Virginia Mosquito Response Plan for Zika Virus

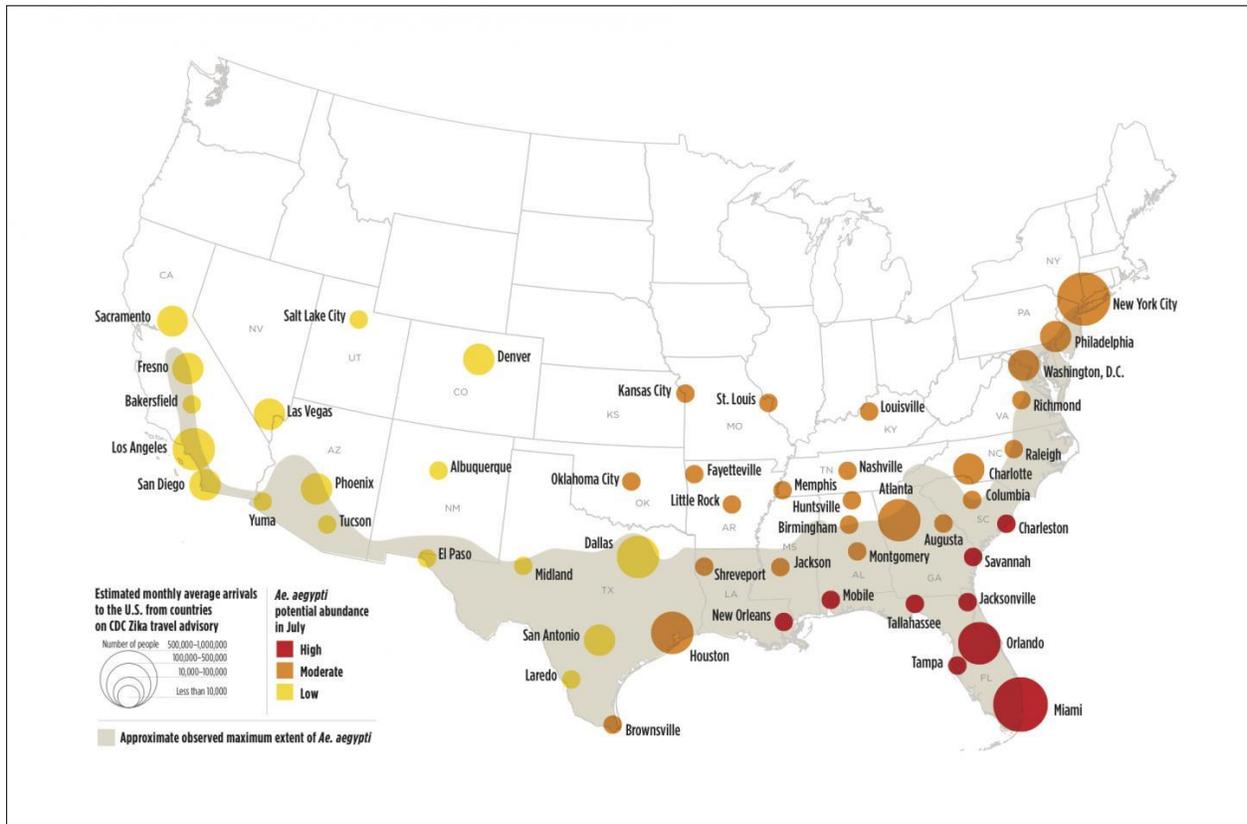


Figure 3. Map of Potential Zika Virus Risk.

Source: National Center for Atmospheric Research (http://www.eurekalert.org/pub_releases/2016-03/ncfa-pzv031516.php)

In Virginia, the places where the Zika virus (ZIKV) is likely to take hold and be spread by local mosquitoes among the human population are found in the most heavily populated jurisdictions. That is because the virus transmission cycle requires a concentrated mixture of people and mosquitoes to maintain a human-to-mosquito-to-human transmission cycle. Areas where human population density is high (house lot sizes may be small) and where homes may be in poor repair, may allow the virus to move more easily between people and mosquitoes.

Some geographic locations may be at higher risk for Zika transmission because of typical travel patterns (tourism, business, immigration, foreign visitors) of residents.

Fortunately, some of Virginia's most heavily populated jurisdictions have established mosquito surveillance and control programs and may be able to respond to a detected outbreak by concentrating prevention efforts in affected neighborhoods. However, there are many smaller jurisdictions in Virginia with no mosquito control capability that may have neighborhoods that have potential to become Zika transmission zones.

As with the dengue virus (DENV) and the chikungunya virus (CHIKV), the prevention or reduction of transmission of ZIKV is completely dependent on limiting person-mosquito contact and the control of mosquito vectors. Mosquito surveillance is a key component of any local integrated vector management program. The goal of mosquito-based surveillance is to quantify human risk by determining local vector presence and abundance.

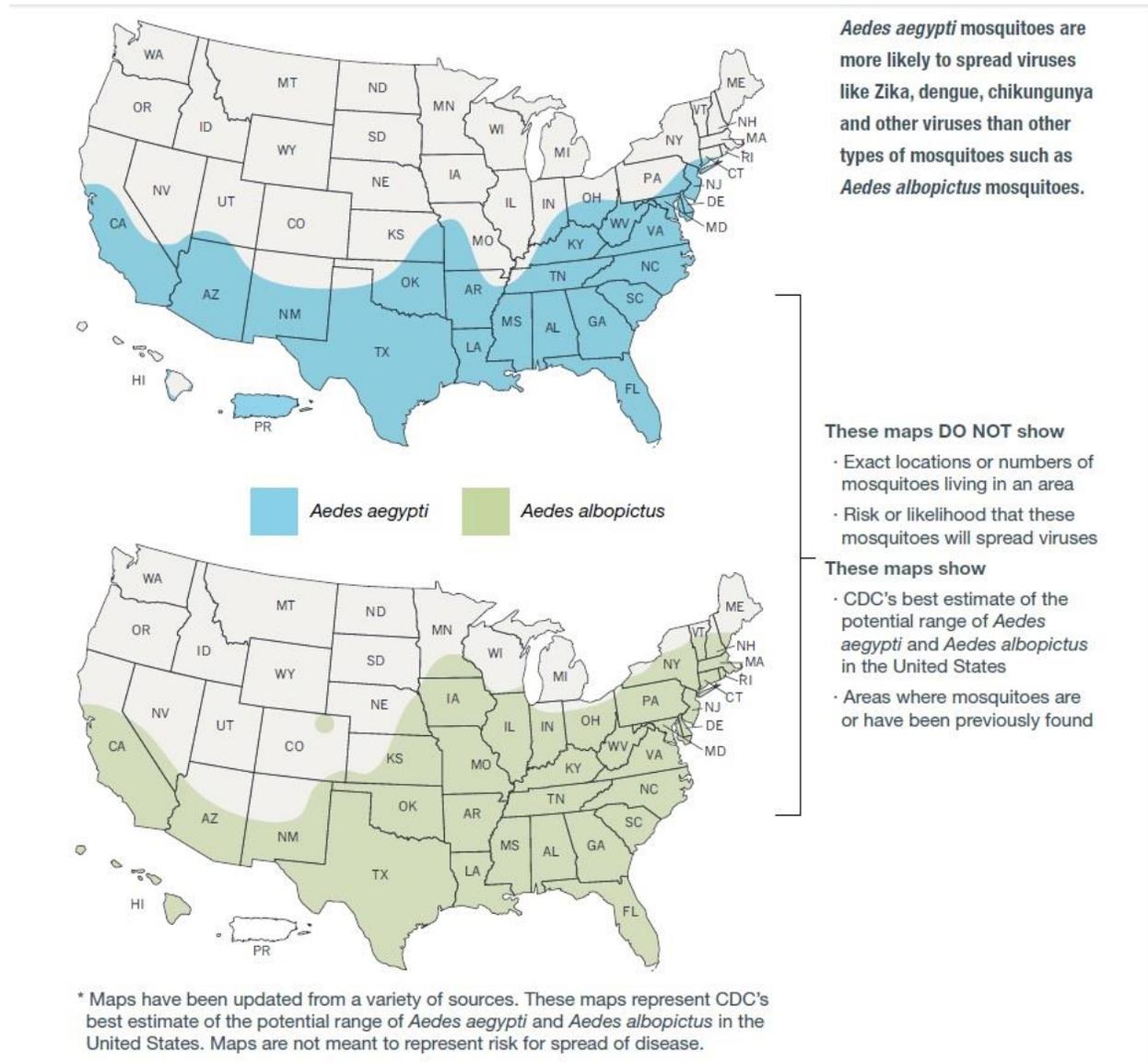


Figure 4. Estimated Range of *Aedes albopictus* and *Aedes aegypti* in the United States, 2016

Source: CDC <http://www.cdc.gov/zika/pdfs/zika-mosquito-maps.pdf>

I. The Vector Mosquitoes

The only known mosquito species in Virginia known to be capable of Zika transmission are the Asian tiger mosquito (*Aedes albopictus*) and the yellow fever mosquito (*Aedes aegypti*). These

mosquitoes both have the same flight and biting behavior and both rely almost exclusively on artificial containers of water as their egg laying habitats. *Aedes aegypti* mosquitoes tend to feed almost exclusively on people and this makes them very efficient at transmitting ZIKV, DENV and CHIKV from person to person. *Aedes albopictus* frequently bite people, but they also like to feed on animals such as dogs and cats, so although they are perfectly capable of becoming infected with and transmitting these viruses, they are less efficient at doing so because many of their blood meals come from animals that are not known to serve as reservoirs for the viruses.

Aedes albopictus are the most common nuisance mosquito in Virginia and are present and common in every jurisdiction in the state (see Figure 3 above). Although small, isolated populations of *Aedes aegypti* are occasionally discovered in Virginia, they are so uncommon as to be an insignificant risk factor as vectors. Therefore, most mosquito surveillance and control efforts will be targeted on *Aedes albopictus*, and if any *Aedes aegypti* happen to be present, they will be readily detected and controlled by this same effort.

II. Prevention and Control of Zika, Dengue and Chikungunya Virus Transmission

The principal functions of ZIKV mosquito-based surveillance programs are to:

- Determine which neighborhoods might be likely places for ZIKV transmission
- Monitor for the presence of *Aedes albopictus* in target neighborhoods and identify geographic areas of high mosquito abundance (high-risk) within the neighborhoods
- Identify which container habitats or properties are producing the most mosquitoes
- Identify and map larval sites that cannot be accessed or eliminated.
- Monitor mosquito populations to gauge the effectiveness of vector control efforts
- Test collected mosquitoes to monitor for ZIKV infection rates during outbreaks to:
 - identify primary/secondary mosquito vectors
 - establish thresholds at which humans get infected

The risk of arbovirus transmission varies regionally and local surveillance and control capabilities may vary considerably among jurisdictions (e.g., number of trained personnel and resources available, etc.). Furthermore, even the jurisdictions with the greatest mosquito surveillance and control capabilities in Virginia do not have the resources needed to perform mosquito control across the entire jurisdiction. Therefore, the most efficient use of mosquito surveillance and control resources should focus efforts on neighborhoods that are most likely to have imported human ZIKV infections, and/or on neighborhoods where persons with identified infections reside, who are more likely to be a source for local mosquito-borne transmission.

Whereas mosquito-based surveillance is the preferred method for monitoring or predicting West Nile virus outbreaks, it is not the preferred method for monitoring or predicting ZIKV, DENV and CHIKV outbreaks. For these arboviruses, it is more efficient to detect infections in people and focus surveillance and control efforts around the identified patients. In the United States, dengue, chikungunya, and Zika virus disease are nationally notifiable conditions and healthcare providers are required to report any confirmed or suspect cases to local and state health departments. In turn, health departments should immediately notify state and local mosquito control authorities about human cases that passed at least a portion of their viremic phase of

illness locally. Timely identification and response to mosquito-borne disease outbreaks of Zika, dengue, and chikungunya requires constant communication between healthcare providers, local and state public health departments, and mosquito control specialists.

Ideally, effective vector-based Zika prevention involves initiating control measures such as source reduction (container habitat elimination) and larvicide treatments before the beginning of the mosquito season, and measures to reduce the population of adult mosquitoes, such as adulticide treatments, following identification of potentially viremic patients in places where the mosquito populations are significant. However, in jurisdictions where locally-acquired outbreaks are detected, a more concerted combination of containment and large-scale vector control may be needed to minimize vector-human contact. In addition to routine educational campaigns focused on key prevention messages, source reduction and enhanced public education campaigns may be initiated in jurisdictions that do not have established or sufficient mosquito surveillance and control capabilities, when probable or confirmed when infections are detected.

III. Mosquito Surveillance and Control Response to Identified Zika Cases in Virginia

This section of the plan provides a tiered approach to public health mosquito surveillance and control activities with the goals of being responsive to the needs of the residents of Virginia, and preventing the spread of Zika virus infection by providing a reasonable, practical, justifiable, and consistent approach to mosquito surveillance/control activities across the Commonwealth.

The overarching principle of controlling Zika virus disease is for persons with Zika virus circulating in their blood (viremia) to avoid mosquito bites and those with Zika virus in their semen to avoid unprotected sex. Because persons can be unaware of the presence of the Zika virus in their body, wide dissemination of disease prevention messages is important during the mosquito season and throughout the outbreak of Zika virus disease in the Americas. Public education and personal responsibility for mosquito bite prevention and other personal protection measures are key to Zika control. VDH staff responsible for implementing these activities must mindfully adhere to applicable confidentiality laws and policies.

Planning Assumptions:

Travel-associated and sexually transmitted Zika virus infections will continue to occur. Local summer transmission may occur in limited areas of the continental United States (CONUS) and Hawaii where competent vectors exist.

- Because of the risk of transmission of Zika virus infection through blood transfusions, blood safety interventions are needed for both unaffected and affected areas. With the recent outbreaks in the Americas, the number of Zika virus infections among travelers visiting or returning to the US is likely to increase.
- Local transmission of Zika virus in US territories and affiliated Pacific Island countries is ongoing.
- Neither vaccines nor proven clinical treatments are expected to be available to treat or prevent Zika virus infections before local transmission begins within CONUS or Hawaii.

- The efficacy of vector control in reducing mosquito-borne infection risks may be limited, as has been the case with similar mosquito-borne viruses, such as dengue and chikungunya.

Definitions:

- **Targeted mosquito surveillance:** Mosquito surveillance activities at or as close as possible (within 150-200 meters of an applicable Zika patient’s home) as described below. Mosquito surveillance activities may include any or all of the following: property and neighborhood inspection for mosquito habitats; eliminating these habitats when possible (i.e., dumping containers); trapping mosquitoes for speciation and arboviral mosquito testing (when available); and dissemination of educational materials (as appropriate for the type of housing and areas where containers may be found).
- **Targeted mosquito control:** Mosquito control activities at or as close as possible (within 150-200 meters of an applicable Zika patient’s home) as described below. Control activities may include larval and/or adult mosquito control methods as needed and as available.
- **Routine mosquito surveillance/control:** Mosquito surveillance activities are already conducted in some jurisdictions in Virginia and these routine activities are not based on the presence of an identified human case of Zika virus disease.

A. DETERMINATION OF NEED FOR TARGETED MOSQUITO SURVEILLANCE AND CONTROL ACTIVITIES AROUND A PERSON’S HOME:

Criteria For Initiating Targeted Mosquito Surveillance and Control Activities:

Whether targeted mosquito surveillance and control is needed in response to an identified case of Zika virus infection will depend on a number of criteria; there will be different levels of urgency with respect to the case status of the patient. The following factors should be considered when determining whether mosquito surveillance and control activities are needed.

- a. Are Asian tiger mosquitoes (*Aedes albopictus*) currently active in Virginia (in unusually warm years the *Ae. albopictus* season may run from May 1st to October 30th)?
- b. Was the Zika patient potentially viremic while in Virginia during the mosquito season?
- c. Did the health department receive the report of the viremic or potentially viremic patient within 30 days of the patient’s estimated viremic period?
- d. Did the patient acquire the Zika infection elsewhere, or while in Virginia? (This will help prioritize activities if needed)

NOTE: Although the level of viremia in asymptomatic individuals is unclear, for purposes of implementing targeted mosquito control and surveillance activities, viremic patients in this plan are considered to be those individuals that present with clinically compatible symptoms of Zika virus disease and relevant lab results as described below.

These are the current guiding principles for determining whether targeted mosquito surveillance and control activities are needed, it is expected that there will be case-by-case exceptions to the rule. Local health districts are encouraged to contact the Office of Epidemiology to consult on

particular cases of interest. If local transmission is documented in Virginia, targeted activities may be initiated for a wider population than outlined below.

1. Targeted mosquito surveillance and/or control is recommended for:

- a. Viremic Patients: A person who presents with one or more of clinically compatible symptoms of Zika virus disease AND a PCR positive Zika lab result.
- b. Patients who are/were potentially viremic while in Virginia: A symptomatic person who is in Virginia anytime during their first seven days of illness who meets any of the following criteria:
 - Three or more symptoms in absence of an available lab result (e.g., lab results pending)
 - Three or more clinically compatible symptoms AND a presumptive Zika positive IgM result
 - A person with an infection that meets the probable or confirmed Zika virus disease case definition, with prioritization for locally-acquired infection.

Patients meeting these criteria should be considered as having the potential to infect local mosquitoes. **As resources permit, targeted mosquito surveillance activities are recommended around homes and other properties where individuals spent a considerable amount of time while viremic and had mosquito exposure.**

Targeted mosquito control activities may be conducted if necessary and resources permit. Control activities will be determined as “necessary” based on findings during mosquito surveillance as described later in this document.

2. Targeted mosquito surveillance and/or control may be considered for:

- a. Asymptomatic persons with positive lab results: Targeted mosquito surveillance may be considered on a case-by-case basis for asymptomatic persons with positive lab results. Based on information gathered through surveillance efforts, mosquito control measures may also be deemed necessary.

3. Targeted mosquito control is NOT routinely recommended for:

- a. Patients who were not viremic while in Virginia: Persons who have an onset of illness a week (seven days) or more prior to their return to Virginia should not be a significant threat for passing the virus on to local mosquitoes. No mosquito surveillance and control response is necessary around the homes of these patients. Local and state mosquito surveillance programs may find it useful, however, to map the location of such an imported case, in case of further events such as sexual transmission and to document whether travel related cases are concentrated in certain geographic areas.

B. IMPLEMENTATION OF TARGETED MOSQUITO SURVEILLANCE AND CONTROL ACTIVITIES:

If resources are limited, localities should prioritize targeted surveillance and control activities for those cases meeting criteria as described in Section III.A.1, and III.A.2, above and those cases that are highly suspected or confirmed to be *locally* acquired. As resources permit, localities should conduct larval and adult mosquito control activities around homes or other areas where individuals spend a considerable amount of time and have mosquito exposure of viremic or potentially viremic patients as recommended below.

NOTE: It is important to remember that targeted adult mosquito control efforts to knock down the adult mosquito population in the environment, will be short lived in the absence of consistent and regular elimination, dumping or treating of mosquito habitats within the treated environment

1. Guidance for Larval and Adult Mosquito Control Activities:

- a. **Available Resources:** In localities where there are no existing mosquito surveillance programs, Office of Epidemiology-Division of Environmental Epidemiology (DEE) Mosquito Surveillance personnel will be deployed to conduct targeted mosquito surveillance activities for applicable case patients, as resources and time permit. If surveillance activities at the patient’s home indicate that there are no significant mosquito populations, there will be no recommendation for any mosquito control action, but the patient should be advised to avoid mosquitoes in other locations. If surveillance shows that there is a significant mosquito population on the patient’s property (i.e., > 25 mosquitoes per BG Trap set for 24 hours, or five or more mosquitoes seen hovering around surveillance personnel during the site visit, there will be a recommendation that mosquito control is needed. In localities where there are no local mosquito control programs, localities should explore options for soliciting support from neighboring jurisdictions or through contractual services to conduct targeted mosquito control operations when necessary. While targeted control methods may not be available for every patient meeting criterion, localities should consider and plan accordingly if widespread local transmission were to take hold in their geographical area.
- b. **Size of Area to be Surveyed and/or Treated:** The recommended mosquito control response for ZIKV is to focus surveillance and control efforts in a 150 meter to 200 meter (approx. 500 to 650 foot) radius around the residence of a home in which an identified patient resides. However, in the case of a traveler with an onset of symptoms within the previous week, larval mosquito control can be limited to the patient’s property and if recommended, adult mosquito control in the form of a “barrier treatment” could also be limited to the patient’s property. Otherwise, if the patient had been bitten by mosquitoes and several weeks had elapsed between when the patient became viremic and when the surveillance revealed a need for mosquito control, it is recommended that the treatment area be expanded to the 150 or 200 meter radius. This would mean that surveillance or control personnel should request access to all properties within the proposed radius and where access was granted, the control actions would be to eliminate, dump or treat every accessible container habitat within that radius, followed by adult mosquito control within the same radius. Localities may consider widening this treatment range if the 150-200 meter area does not put a mosquito surveillance effort outside a range that would

reasonably protect the patient's anonymity. Judgment will need to be applied here and the Office of Epidemiology will be available to consult on these situations as needed.

- c. **Larval Mosquito Control:** Mosquito surveillance personnel should always conduct larval control while inspecting a property; surveillance personnel can dump containers of water found on the property around a home during the inspection/ surveillance effort. When possible, mosquito surveillance personnel should speak to the homeowner or other household members and point out any containers that should be discarded, stored in a dry place, dumped on a weekly basis, or regularly treated with larvicides. It is important to note that the application of larvicides on a homeowner's property can only be done by surveillance personnel who are trained and certified/licensed for mosquito control. The VDH-DEE personnel designated to do surveillance on patient properties will not be trained and certified pesticide applicators. However, as homeowners can legally treat habitats on their own property with over-the-counter larvicide products available to the public, VDH-DEE surveillance personnel will be carrying consumer packages of larvicides that they can give to the homeowner to use in treating their own property. For example, if the homeowner has an untreated swimming pool that is breeding mosquitoes, the homeowner would be given a six pack of larvicide dunks and told to treat the pool with one dunk for every 100 square feet of water surface, once every month.
- d. **Adult Mosquito Control:** Adult mosquito control is accomplished by the spraying of insecticide fogs (aerosols) that kill the mosquitoes that fly through it, or by spraying a residual layer of insecticide called a "barrier treatment" on the foliage of bushes, shrubs, and ivy that the mosquitoes rest on. Aerosol treatments do not leave any residual layer of insecticide in the treated area and only kill the mosquitoes that are flying in the area at the time of the treatment. Aerosol treatments can be made at close range with portable (backpack) aerosol generators/foggers, or from up to a hundred feet away by use of truck mounted foggers; close range treatments are always more effective. Barrier treatments are applied by the use of powered backpack sprayers that generate droplet sizes that are large enough to stick to surfaces, and will kill any mosquitoes or other insects (including beneficial insects and pollinators) that sit on that foliage for a period of up to three or four weeks after treatment, depending on rainfall; barrier treatments are very useful around places where container habitats cannot be eliminated.

2. Determining the Need for Adult Mosquito Control:

The need for adult mosquito control is determined by the size of the local Asian tiger mosquito population on the property. This can be estimated by several methods including:

- a. Surveillance personnel can look for mosquitoes flying around them while conducting a property inspection; although there is no set standard for what number of observed mosquitoes constitutes a large population, one method of estimation is that if five or more adult Asian tiger mosquitoes are observed flying around surveillance personnel during the inspection, adult mosquito control is warranted.
- b. If a BG Sentinel Trap baited with BG lure and CO₂ is set over a 24 hour trap period and collects more than 25 Asian tiger mosquitoes, adult mosquito control is warranted.

3. The Method of Adult Mosquito Control:

The adult mosquito control method is determined by whether or not one can easily eliminate the local larval mosquito habitats.

- a. If the larval habitats that supply most of the local adult mosquito population can be found and eliminated, it may only be necessary to control the adult mosquito population with an aerosol treatment.
- b. If the local adult mosquito population is large and originates primarily from larval habitats that cannot be accessed or eliminated by mosquito control personnel, barrier treatments can be used on the patient's property, or on other neighborhood properties adjoining or surrounding the untreatable larval habitat(s).

Other best practices include implementing targeted educational and surveillance activities across a large enough area so as to not inadvertently identify the address of a suspected/confirmed case-patient.

Control of adult Asian tiger mosquitoes by use of truck mounted foggers may provide a certain amount of anonymity to a patient because no specific property is targeted, however, adult mosquito control by truck mounted equipment is more difficult to achieve and requires different actions and insecticides than are used for other mosquito species.

Truck mounted treatment for Asian tiger mosquito control requires the following specific actions:

- a. Treatment should be done within the hour immediately following sundown, or at night;
- b. The aerosol generating nozzle should be aimed horizontally;
- c. All streets and alleyways in the neighborhood should be used to minimize the distance between the aerosol generator and the target properties and to maximize aerosol coverage;
- d. An insecticide with a flushing agent should be used to stimulate resting mosquitoes into flight (there is a water based aerosol insecticide called "Duet" that contains flushing agent [Prallethrin + Pyperonyl Butoxide] that has been used for Asian tiger mosquito control with varying degrees of success; and
- e. Several treatments spaced several nights apart may be needed to achieve a significant reduction of the mosquito population.

4. Recommendations for Sharing Information with Mosquito Surveillance and Control:

In many jurisdictions that have mosquito control programs, it is quite normal for mosquito control personnel to be invited to inspect private residential properties for mosquito populations or "mosquito breeding habitats" and for these personnel to dump or treat any aquatic breeding habitats they encounter. Therefore, mosquito surveillance and larval control may not arouse the suspicions of neighbors. Conversely, it is not common for public mosquito control personnel to conduct adult mosquito control activities on private property. Furthermore, adult mosquito control activities typically require the use of powered backpack, aerosol generating equipment

that could attract the attention of neighbors. Therefore, if inspection activities identify adult mosquito populations that are worthy of concern around a patient's home, adult mosquito control activities at that location could potentially lead to a patient's confidentiality being compromised.

- a. **Patient confidentiality issues that determine if mosquito surveillance and control can be conducted around a patient's home:** Due to the legal requirement to protect patient anonymity, any targeted mosquito surveillance and control activities being conducted on or around a suspected patient's home should be implemented in a fashion that preserves the anonymity of the patient.
- b. **Obtaining patient permission to share address information with mosquito surveillance and control:** Local health departments should obtain patient authorization prior to sharing address (or other identifying) information to any local mosquito control program. If a patient qualifies for targeted mosquito surveillance and control due to having a viremic period in Virginia, Local Health Department personnel should contact such a patient and advise the patient to avoid contact with mosquitoes (if still in their viremic period) and to take other personal protective measures. During this phone contact, the health department representative should also request permission to share the address of the patient and/or patient contact information with local mosquito surveillance/control personnel. In districts with a mosquito control program, if the patient does authorize disclosure of his/her address it should be shared directly with the mosquito control manager, not other employees. In districts without a mosquito control program, disclosure of his/her address should be shared directly with the local health department person designated to inspect/survey patient's properties for the presence of Asian tiger mosquitoes. Additionally, whether or not a local health department person has been designated for this purpose, the patient's address should be shared with Dr. David Gaines, and or with Jim Broyhill (both at VDH-DEE in Richmond) so that if needed, their roving mosquito surveillance team can visit and survey the property.

The patient's address or other identifying information **should not** be shared without patient permission. It is recommended that any release of address or other identifying information to mosquito control should include the condition that the patient's information will not be disclosed to the public.

If the patient does not authorize disclosure of his/her address, and targeted mosquito surveillance and control is deemed a necessary and priority action, these situations can be reviewed on a case-by-case basis with consultation with the Office of the Attorney General. Local health departments should contact the Office of Epidemiology-DEE for further guidance in such situations. Local health departments should be prepared to discuss neighborhood characteristics, particularly in regard to the number and density of houses in the neighborhood, and the level of urgency for mosquito surveillance and control activities, as this information is important to inform this consultation.

5. Conducting Adult Mosquito Control on Patient's Property

If permission for adult mosquito control on the patient’s property is granted, the following options may be taken depending on the origin and severity of the adult mosquito population:

1. If the mosquito population appears to have originated primarily from container habitats on the patient’s property, adult mosquito control could be accomplished either by an aerosol treatment, or a residual “barrier treatment” either of which can be applied with powered backpack applicators. The container habitats on the property should all be dumped, eliminated or treated too.
2. If the mosquito population also appears to originate from adjoining properties, a barrier treatment should be applied to foliage (e.g., ivy, shrubs, bushes or hedges) around the patient’s property and mosquito personnel should inspect other properties on the block for the breeding habitat of the mosquitoes and take action or give advice as necessary to eliminate breeding habitats.

IV. Mosquito Surveillance and Control Recommendations by Transmission Risk Category

STAGE	PHASE LEVEL	TRANSMISSION RISK CATEGORY
Pre-Incident	0	Preparedness – Vector present or possible in the state
	1	Mosquito Season – <i>Aedes</i> vector species mosquito biting activity. Introduced-travel-related or sexually transmitted cases
Suspected / Confirmed Incident	2	Limited Local Confirmed Transmission – Single locally acquired case, cases clustered in a single household or resulting from a common exposure.
Incident / Response	3	Widespread Local Transmission – Zika virus illnesses with onsets occurring ≥ 2 weeks apart within a defined area/community
	4	Widespread Multi-jurisdictional Transmission – Zika virus illnesses with onsets occurring ≥ 2 weeks apart in more than one jurisdiction.

PRE-INCIDENT | PHASE 0 - Preparedness:

The goal for this phase is to reduce the threat when mosquito season begins and to be ready to effectively and rapidly respond to each level of threat.

In preparation for possible local implementation of Zika mosquito control activities, health districts should engage with local governments and community organizations to establish communication networks, plan for public communication, and identify resources and expertise for vector inspection, surveillance, and control services. Public communication includes messages on personal protection, elimination of *Aedes* mosquito breeding sites, and campaigns to motivate residents to remove and dispose of water-holding containers.

It is recommended that each health district identify personnel or community partners who can be or are already trained and available to conduct on-site mosquito inspections, look for potential mosquito breeding grounds or the presence of daytime flying mosquitos and make recommendations, and establish a process for ensuring availability of these services. Resources for mosquito surveillance and control may be identified among health district personnel or local mosquito control organizations within a neighboring jurisdiction. Mosquito surveillance personnel can also be requested from the VDH Division of Environmental Epidemiology (DEE) in Richmond.

The following basic critical activities should be undertaken, ideally, before the seasonal appearance of vector mosquitoes to increase readiness to prevent or limit possible Zika virus transmission.

- Efforts to survey for and eliminate mosquito habitats before the mosquito season (beginning May 1) are always advisable, but may only be possible in jurisdictions that have ample mosquito surveillance and control resources. However, if local transmission has been detected in a neighborhood the previous season, it would be advisable if local resources and personnel can be made available to inspect the affected community and eliminate or minimize the presence of larval habitats before the mosquito season.
- Public health officials and vector control officials should develop a communications network to ensure timely exchange of information, and collaboratively share information to guide optimum vector control efforts.
- Develop and begin to conduct public mosquito education campaigns focusing on (1) personal protection measures; (2) how citizens can reduce or eliminate larval habitats for *Ae. albopictus*; and (3) motivating the community to cover, dump, remove, or treat any water-holding containers or to treat them with larvicides.
- Local and state responding officials should review existing staffing capacity, resource allocation, and technical expertise at the local level for vector control and consider use of intergovernmental agreements for vector control to help adjacent counties outside their jurisdiction, as well as pre-positioning contracts with vendors to supply additional capacity.
- Conduct surveys to determine abundance, distribution, and type of containers; large accumulations of containers (e.g. tire piles), or large containers (e.g., flooded boats, neglected swimming pools, etc.) that could result in locally high mosquito abundance. Determine if there are any local laws available that will allow the jurisdiction to remove or treat significant container habitats on private property.
- If resources exist, develop procedures for the systematic collection and analysis of vector distribution and insecticide sensitivity data.
- Initiate a community-wide source reduction campaign – the goal of the campaign is to motivate the community to remove and dispose of any water holding containers.

PRE-INCIDENT | PHASE 1 – Mosquito season: *Aedes aegypti* or *Aedes albopictus* mosquito biting activity. Introduced travel-related or sexually transmitted cases.

The goals for this phase include reducing the general risk of transmission in the most vulnerable areas by preemptively reducing vector populations and initiating precautionary vector control

measures within a minimum of 150 meters of introduced cases (i.e., residents with suspected or confirmed symptomatic Zika virus infection acquired through travel or sexual contact). **NOTE:** Areas with only *Ae. albopictus* populations at very low density may elect not to conduct vector control around introduced cases, due to lower likelihood of transmission.

SUSPECTED/CONFIRMED INCIDENT | PHASE 2 – Limited, Local Confirmed Transmission:

Single locally acquired case, cases clustered in a single household, or cases resulting from a common exposure source.

Once non-travel or non-sexually transmitted cases are identified, local transmission is presumed, and the purpose of vector control is to prevent transmission from expanding to unaffected areas and to break transmission where it exists. The basic elements of response for Phases 2 are the same as for Phase 1 for travel cases, but as the extent of transmission increases, the intensity of intervention and scale of resources committed should increase. Further, cases suspected to be locally acquired during Phase 2 should be prioritized.

The actions recommended below are to be implemented during both Phase 1 and Phase 2, for those patients who meet the definition of viremic/potentially viremic patient, and for whom other factors have been considered (e.g., exposure to mosquitoes). Please see page X for definitions.

- **Provide 1:1 education:**
 - At the time a physician requests Zika virus testing, public health should ask the clinician to relay the prevention messages to the patient. The majority of patients tested will not have the disease, but the opportunity to make the most difference in terms of disease prevention for symptomatic and/or viremic patients is at the time of testing. Ensure that health care providers have access to appropriate educational materials and messages to give to persons with suspected/confirmed Zika virus disease.
 - Education should also be provided when a patient tests positive. The health department can call the physician to determine which party will contact the patient to relay the prevention messages over the phone.
 - The focus of the education to the case-patient is on personal protection to avoid mosquitoes and strategies to eliminate mosquito habitats around the household or other area where he or she spends time outside and could be bitten by mosquitoes.
 - Prevention messages include: the need to avoid mosquito bites; recommendations for personal protection (e.g., insect repellent, proper clothing, window and door screens to prevent mosquitoes from entering the home, or use of air conditioning and staying indoors); and recommendations to eliminate mosquito habitats where a person lives.
- **Actively Engage Community through Public Education Campaigns:**
 - Continue public education campaigns focusing on avoiding mosquito bites and reducing or eliminating larval habitats for *Ae. albopictus*
 - Include public service announcements and partnerships with local governments, non-profit organizations and schools.

- **Conduct targeted mosquito surveillance to assess vector status in vicinity of the case. This includes:**
 - **With patient authorization, conduct home visit to provide 1:1 education and to inspect the property** for the presence of daytime-flying mosquitoes and potential mosquito habitats.

Home visits may be conducted by a local environmental health representative, MRC volunteer, or another person who is able to differentiate mosquitoes from other types of flying insects and what container habitats to look for. Trained mosquito surveillance personnel from a jurisdiction with a mosquito control program or VDH mosquito surveillance personnel may also conduct home visits. It might be effective for public health staff representing environmental health plus one representing nursing or epidemiology to go on-site to conduct the environmental assessment and reiterate the personal protection advice, respectively.

- **Conduct mosquito surveillance activities (adult sampling). Please contact either local mosquito surveillance and control program or the OEpi-Division of Environmental Epidemiology to request assistance. Sharing information with mosquito surveillance personnel requires authorization of the patient as described elsewhere in this document. The purpose of these activities is to:**
 - Estimate, identify or confirm areas of high adult mosquito abundance
 - Determine distribution of vector mosquitoes and insecticide sensitivity to the extent possible
 - Evaluate the efficacy of source reduction and larvicide treatments
 - Also consider performing systematic searches for immature mosquito or larval stages.

Mosquito surveillance includes trapping and mosquito identification (and arboviral testing, if available) on property and surrounding area as resources permit. If there does not appear to be many* Asian tiger mosquitoes in the area around the patient’s home, there is no need to expand out to a 150-meter radius. Conversely, if there are mosquitoes around the patient’s home, it is recommended to work outwards toward that 150-meter radius to find and try to eliminate all the sources of the mosquitoes.

- Surveillance personnel should identify potential mosquito habitats around the home or other locations of known common exposure (e.g., friend’s home or other site where patient was bitten)
- Targeted surveillance and control activities involving home visits should be closely coordinated with concurrent educational efforts and messaging.
- *There is no set standard for what number of observed mosquitoes constitutes a “large” population; one method of estimation is whether five or more adult Asian tiger mosquitoes are observed flying around mosquito surveillance personnel during the inspection or whether 25 or more tiger mosquitoes were collected in a BG trap baited with BG lure and CO2 that was set for 24 hours.

- **If resources allow and the situation supports it, consider mosquito control:** If on inspection adult Asian tiger mosquito populations are present around the patient’s home, an effort should be made to identify and eliminate any container breeding habitats on the property. If the patient has been bitten by mosquitoes around the home (or other property) while symptomatic, it is recommended that adult mosquito control be considered at that location as well as an effort made to eliminate container habitats. In addition, staff may:
 - Continue/maintain community source reduction efforts.
 - Initiate preventive adult mosquito control measures to reduce adult populations targeting areas of high mosquito abundance
 - Concentrate control efforts around places with high mosquito density
 - Use larvicide in containers/bodies of water that cannot be dumped
 - During Phase 2, particularly for locally acquired cases, if there are mosquitoes around the patient’s property and the patient may have contracted the virus from these mosquitoes, or was subsequently exposed to these mosquitoes while viremic, adult mosquito control should be strongly considered around the patient’s home. If mosquito surveillance findings indicate that Asian tiger mosquitoes are present in a wider area than the patient’s property, an extension of adult mosquito control out to the 150-meter radius may also be considered if resources permit.

INCIDENT/RESPONSE | PHASE 3/4: Widespread Local and/or Multi-jurisdiction

Transmission:

Two or more cases are reported within a definable area/community OR in different jurisdictions with onsets occurring ≥ 2 weeks apart. Affected individuals did not travel, did not have a sexual partner who traveled, and are not known to have attended a common event.

Many elements of response for Phases 3 and 4 are the same as for Phase 2, but as the extent of transmission increases, the intensity of intervention and scale of resources committed should increase. At wider transmission, some methods not practicable for small foci might be incorporated.

All of the above activities are recommended as previously described, plus:

- **Virginia’s Unified Command Structure would be engaged** to provide coordination of statewide response efforts and the identification of supplementary resources for jurisdictions as needed.
- **Vector control efforts should align with state and local government decisions** regarding boundaries for declaring an area as a site of “active Zika transmission”. (This may model county/city lines, be a zip code designation, or smaller area such as a neighborhood.)
 - As resources allow, local and state officials should plan to consider intensifying and expanding vector control efforts within the areas of active transmission.

- **When recommended and feasible,**
 - Divide the outbreak area into operational management areas where control measures can be effectively applied to all private properties within a few days; repeat as needed to reduce mosquito density
 - Conduct door-to-door [property to property] inspections and mosquito control in an area-wide fashion (reach >90% coverage of the control area within a week).

- **Provide education:**
 - In addition to 1:1 education of case patients, targeted community-level educational campaigns should be considered to ensure awareness of the importance of mosquito bite prevention and source reduction.
 - Mosquito control personnel and/or local health department teams should distribute educational literature at the homes and neighborhoods they visit, as appropriate for the type of housing and potential for the presence of containers that may serve as mosquito habitats.

- **Conduct home visits**
 - Inspect the properties for potential mosquito habitats and the presence of flying mosquitoes.
 - Perform systematic searches for immature mosquito or larval stages.

- **Conduct mosquito surveillance:**
 - Conduct trapping and mosquito identification and arboviral testing if available on property and surrounding area to a 150-meter radius around each home or other relevant sites of exposures (if possible) of cases as resources permit.
 - Initiate/maintain sampling by trapping with BG traps to estimate adult mosquito abundance and evaluate effectiveness of insecticide treatments by comparison of trap counts from pre and post-treatment trapping.

- **Conduct mosquito control:**
 - If mosquito populations are present around the patients' homes, use backpack aerosol generators to apply spatial and/or residual adulticide (adult mosquito control) treatments to reduce vector abundance in shrubs, ivy, and hedgerows within 150–200 meters around the home of any persons with suspect or confirmed infections to the extent that such resources can be made available.
 - Expansion of mosquito surveillance and control to the surrounding neighborhood area may be warranted in this situation, and consideration of this step and definition of the target area will be on a case by case basis (may depend on the layout of the neighborhood). Water-holding containers that cannot be dumped, covered, discarded or otherwise modified should be treated with long-lasting larvicide dunks or briquets.
 - The duration of control activities should be no less than 45 days after the date of onset of the last known case (the time it is possible for an Aedes feeding on that person to continue to transmit Zika virus). As a precaution, the affected jurisdiction might choose to continue moderate surveillance and control efforts where indicated, beyond the 45-day buffer or until the end of mosquito season.

- **Continue community outreach**
 - Organize area/community clean-up campaigns targeting disposable containers (source reduction), including large junk objects that accumulate water (junk cars or boats, broken washing machines, refrigerators, toilets) in buildings, public areas, etc.
 - If funding allows, host a community volunteer / waste disposal program to help facilitate removal of larval habitats.

V. Trapping and Surveillance Methods for *Aedes aegypti* and *Aedes albopictus*

Ovitrap

Ovitrap are small metal, glass or plastic containers, usually dark in color, containing water and a substrate (wood, seed germination paper, cloth, plant gel) where female mosquitoes lay their eggs. Ovitrap can be used to detect the presence of gravid *Ae. aegypti*, *Ae. albopictus* and a wide variety of other gravid females of container-breeding *Aedes* mosquito species (Fay and Eliason 1966, Mackay et al. 2013, Reiter et al., 1991). Ovitrap take advantage of the fact that gravid *Ae. aegypti* and *Ae. albopictus* females lay their eggs in artificial containers. Adequate sampling requires regular (weekly) trapping at fixed sites, representative of the habitat types, present in the community. Ovitrap should not be deployed in the field for more than a week at a time because they could become larval sites and may begin producing adult mosquitoes; however, some ovttrap are specifically designed not to produce mosquitoes (Chan et al. 1977; Barrera et al. 2013).

Ovitrap have several advantages, including being inexpensive, easily deployed, and not invasive (they can be placed outside of houses, not requiring entry into homes). A small number of ovttrap is usually enough to determine vector presence; less than 100 ovttrap can reliably estimate abundance in a large urban neighborhood (Mogi et al., 1990). Typically, one ovttrap is placed per city block. Lastly, ovttrap data is easy to analyze; it is usually expressed as the percentage of positive ovttrap (ovttrap with eggs). The mean number of eggs per ovttrap can be used to estimate adult mosquito abundance.

Interpreting ovttrap data may require caution, because ovttrap compete with naturally occurring larval habitats and the estimates from oviposition surveys may not accurately reflect the abundance of gravid females under some conditions. For example, oviposition indices may be skewed after source reduction campaigns when gravid females find fewer suitable habitats and lay larger proportions of eggs in the ovttrap confounding the evaluation of control efforts (Focks 2003). Some degree of training in microscopy may be needed for accurate egg counting especially when there is debris on the oviposition surfaces. Lastly, the collected eggs need to be hatched and reared out in the laboratory and the larvae or adults identified to species, which requires trained personnel.

Immature stage (larvae and pupae) surveys

Because of a wide variety in type, size and shapes of water-holding containers, there is no standard equipment for sampling the immature stages of container breeding mosquitoes. If the container is large enough, such as a 55 gallon barrel, a dipper or net may be used. However, the common containers are small cans, tires etc., and usually the entire contents are emptied onto a tray or a pan and the immature stages picked out using a dropper. The immature stages are usually reared out in the lab and identified to species.

Adult mosquito trapping

Ae. aegypti and *Ae. albopictus* are not efficiently captured by the most commonly used mosquito traps, such as the CDC miniature light trap, or CDC gravid trap. Currently the most commonly used adult traps for *Ae. aegypti* and *Ae. albopictus* are BG Sentinel Traps, and a variety of gravid traps such as the CDC-Autocidal Gravid Ovitrap (CDC-AGO) (Mackay et al. 2013, Barrera et al. 2014a, b).

The BG Sentinel Trap: The BG Sentinel Traps use a combination of attractive visual and olfactory cues. They have the advantage of being collapsible and light. BG-Sentinel traps are more effective in capturing *Ae. aegypti* than CDC backpack aspirators, and also collect adult females in all physiological states (Maciel-de-Freitas et al. 2006, Williams et al. 2006, Ball and Ritchie 2010). These traps are also effective for collecting *Ae. albopictus* (Meeraus et al. 2008, Bhalala and Arias 2009, Farajollahi et al. 2009, Obenauer et al. 2010). The efficiency of BG traps can be increased by baiting them with lures (e.g., CO₂, BG-Lure®).

Gravid female traps: There are a number of recently developed traps that use similar principles of attraction as the ovitraps; that is, to attract and capture gravid females. These traps either use funnels (Gomes et al. 2007, Eiras et al. 2014) or sticky boards (Mackay et al. 2013, Chadee et al. 2010, Barrera et al. 2013) to prevent captured mosquitoes from escaping. The advantage of gravid traps is that they are considerably cheaper and easier to operate compared to BG traps.

Landing –biting counts: This is one of the oldest and most effective, but labor-intensive techniques used to detect, capture, and quantify host-seeking daytime biting mosquito vectors such as *Ae. aegypti* and *Ae. albopictus*. However, due to potential health risks to field staff, especially in areas with ongoing arbovirus transmission, CDC does not recommend this technique. Another limitation of this collection method is the inherent variation among collectors both in attracting and collecting specimens. A tent trap has been recently developed, which can provide protection to collectors from mosquito bites (Casas-Martinez et al., 2013).

VI. Mosquito-Based Surveillance Indicators

Data derived from mosquito surveillance primarily estimates mosquito abundance; estimates are used to indicate levels of risk. The indices derived from those data vary in information content, ability to be compared over time and space, and association with arbovirus transmission levels and levels of human risk. The indicators that are commonly used can be broadly divided into 1)

immature stage (larvae and pupae) survey indices, 2) eggs per ovitrap per week, 3) female mosquitoes per trap period/week, and 4) adult infection rates (IR).

Immature stage survey indices

Larval surveys (*Stegomyia* indices): Larval surveys usually involve identifying all or most of the immature mosquitoes found in every container (or a representative sample of containers) in the target area, home(s) community, neighborhood etc. Every water-holding container is inspected and categorized as positive (contains larvae/pupae) or negative otherwise (no larvae/pupae). The second and less used method is single-larva surveys where only a single larva is identified from each container (Sheppard 1969). The container indices below are computed from survey data.

- House Index (HI; percentage of houses with at least one positive container)
- Container Index (CI; percentage of all containers with water that are larva/pupa positive), and
- Breteau Index (BI; number of positive containers per 100 houses (Connor et al. 1923, WHO 2009)).

Mosquito thresholds for DENV, CHIKV, ZIKV and YFV transmission using larval indices should be determined by each local vector control program for each location; state or national wide thresholds should be used with caution. It was proposed that a House Index of 5% (Soper, 1967), a Container Index of 10% (Connor et al., 1923), or a Breteau Index of 5 (Brown, 1977) prevented YFV transmission, and that HI of 1% suppressed DENV transmission (Pontes et al., 2000). Such thresholds may not apply to all locations and to all arboviruses. A recent study in Taiwan reported the following container *Aedes* threshold values for DENV transmission: BI= 1.2, CI= 1.8%, and HI= 1% (Chang et al. 2015).

Pupal surveys: Pupal surveys (pupae per house, per person, per hectare) are based on the assumption that pupal productivity is a better estimate of the adult population than the traditional indices (HI, CI, and BI) or larval counts (Focks 2003). Pupal surveys can also identify the types of containers that produce the majority of adult mosquitoes; these data can help vector control programs identify target containers for enhanced surveillance and control (Focks and Chadee 1997, Nathan and Focks 2006). Pupal surveys usually involve sampling large numbers of houses and containers to obtain reliable estimates (Reuben et al. 1978, Barrera et al. 2006a, b). However, several methods have been developed to guide sample size requirements for pupal surveys (Alexander et al. 2006, Barrera et al. 2006a, b, Barrera 2009).

As with larval surveys, pupal surveys to determine DENV, CHIKV, ZIKV and YFV transmission thresholds (pupal abundance indices) should be determined by each local vector control program for each location. Currently there is no information on pupal indices on CHIKV and ZIKV transmission, however some models show that it takes between 0.5 and 1.5 *Ae. aegypti* pupae per person to sustain DENV transmission at 28°C in a human population with 0 – 67% immunity (Focks et al. 2000).

Eggs per ovitrap per week. Although no specific threshold values have been established for each arbovirus, absence of dengue hemorrhagic fever cases in Thailand was noted when the densities of *Ae. aegypti* eggs per ovitrap per week was less than two (Mogi et al. 1990). Also, although using a different ovitrap, DENV transmission occurred in Taiwan when the density of eggs per house (2 ovitrap/house) was around two (Wu et al. 2013).

Adult infection rates

In the past, *Ae. aegypti* and *Ae. albopictus* surveillance has relied heavily on immature indices because until recently it has been difficult to monitor adult mosquito abundance. However, the BG Sentinel Trap and a variety of gravid traps make it possible to accurately estimate adult mosquito abundance and to track infected mosquitoes. Tracking adult infected mosquitoes may help establish entomological infection rate thresholds for human disease risk for DENV, CHIKV, ZIKV and YFV transmission similar to work performed for West Nile, St. Louis, and Eastern equine encephalitis viruses (CDC 2013). The infection indices used are the same as those used for other arboviruses: Minimum Infection Rate (MIR), Maximum Likelihood Estimates of the Infection Rate (MLE), and Vector Index (VI) (CDC 2013). However, adult mosquito infection rates cannot be used to predict outbreaks in DENV, CHIKV, ZIKV and YFV surveillance programs because of the very limited data on infection rates and prevalence of human infections. Data obtained in DENV surveillance programs show that, in some cases, an elevation in mosquito infection rates precede outbreaks or increased transmission (Chow et al. 1998, Mendez et al 2006) but not in others (Chen et al., 2010). These mixed results make it difficult to establish threshold mosquito infection rates for human infections and outbreaks for DENV. However, these studies used different mosquito collection methods and there is a chance data obtained from BG Sentinel traps and gravid traps may improve abundance and infection rate estimates, and provide timely risk assessment.

VII. Handling of field-collected adult mosquitoes

Because virologic surveillance relies on identifying DENV, CHIKV, ZIKV, and YFV in the collected mosquitoes through detection of viral proteins, viral RNA, or live virus, efforts should be made to handle and process the specimens in a way that minimizes exposure to conditions (e.g., heat, successive freeze-thaw cycles) that would degrade the virus. It has been shown that DENV and CHIKV RNA could be detected by RT-PCR in dead mosquitoes exposed in sticky cards or dried at ambient temperature for several weeks (Bangs et al. 2001; Mavale et al. 2012).

- Optimally, a cold chain should be maintained from the time mosquitoes are removed from the traps to the time they are delivered to the processing laboratory, and through any short-term storage and processing.
- Transport mosquitoes from the field in a cooler either with cold packs or on dry ice. Sort and identify the mosquitoes to species on a chill-table or tray of ice if available.

- If arbovirus screening is not done immediately after mosquito identification and pooling, the pooled samples should be stored frozen, optimally at -70°C, but temperatures below freezing may suffice for short-term storage.

Mosquitoes are generally tested in pools no greater than 50 and only female mosquitoes are tested in routine arbovirus surveillance programs. Arboviruses can be detected in mosquito pools by using RT-PCR assays (Lanciotti et al. 1992, Lanciotti et al. 2007, Lanciotti et al. 2008, Laurent et al. 2007, Ummul Haninah et al. 2010, Santiago et al. 2013 Savage et al. 2015, Chow VTK et al. 1998, Shu et al. 2003, Chien et al. 2006, Santos et al. 2008, Chen et al. 2010, Balm et al. 2012, Faye et al. 2013, Dash et al. 2012).

VIII. Limitations to mosquito-based surveillance

- Currently available information on adult infection rates and larval/pupal indices may not predict risk for human infection.
- Larval/pupal surveys may miss cryptic, often overlooked habitats (e.g. gutters, broken septic tanks, sprinkler heads/assemblies, storm drains, etc.) and fail to provide accurate data on the relative abundance of the vector species.
- Larval/pupal indices may not correlate with adult mosquito abundance.
- Developing useful thresholds requires consistent effort to assure the surveillance indices and their association to human risk is comparable over time. Mosquito surveillance and human disease incidence data collected over several transmission seasons is required to produce useful predictive indicators. However, this is challenging to obtain with only sporadic arboviral outbreaks.

General guidelines for the diagnosis, treatment, prevention, and control of DENV and CHIKV have been published (PAHO 2011; WHO 2009).

Control of immature stages

An important step in *Ae. aegypti* and *Ae. albopictus* control operations is identifying the types and abundance of containers producing mosquitoes and their productivity. Different containers require specific control measures that depend on the nature of the container and how it is used. There are five general types of containers producing *Ae. aegypti* and *Ae. albopictus*:

- Phytotelmata (tree holes, leaf axils, etc.)
- Non-essential or disposable containers (food and drink containers, tires, broken appliances)
- Useful containers (water-storage vessels, potted plants and trivets, animal drinking pans, paint trays, toys, pails, septic tanks)
- Cavities in structures (fence poles, bricks, uneven floors and roofs, roof gutters, air-conditioner trays)
- Outdoor underground structures (storm drains, water meters, public wells, septic tanks)

Commonly used larvae/immature control methods

Environmental sanitation: This is the permanent elimination of containers producing *Ae. aegypti* and *Ae. albopictus* such as establishing municipal refuse recycling programs (glass, metal, and plastic), used-tire recycling operations, etc.

Larvicides: This is the use of chemicals or biological agents to kill or prevent development of mosquito immature stages. There are a number of agents that can be used to control mosquito production in containers:

- Chemical larvicides (temephos)
- Biological larvicides: These include products containing *Bacillus thuringiensis* var. *israelensis* (B.t.i.), spinosad, and Insect Growth Regulators (IGRs) such as juvenile hormone analogs (methoprene, pyriproxyfen) and chitin synthesis inhibitors (Diflubenzuron, Novaluron). Biological larvicides have little or no impact on non-target organisms and do not accumulate in the environment.
- Monomolecular films and oils. These products spread on the water surface forming a thin film that causes suffocation of immature mosquitoes by preventing gas exchange.

Evaluation of the effectiveness of pre-adult mosquito control may be accomplished by comparing the presence/absence and abundance of immature stages in treated containers before and after treatment or by comparing treated and untreated areas (Chadee 2009).

Biological control: A variety of aquatic predators may be used especially in large containers. These include carnivorous copepods and larvivorous fish (*Gambusia affinis*). However, biological control may not be practical especially since *Ae. aegypti* and *Ae. albopictus* often develop in small containers.

Control of adult mosquitoes

Chemical control:

- Chemical control of adult mosquitoes includes space spraying, residual spraying, barrier spraying, and using attractive toxic baits.
- Barrier spraying of residual insecticides on external walls of houses and vegetation has been effectively used to reduce exposure to exophilic mosquito species (Anderson et al. 1991, Perich et al. 1993, Cilek 2008), including *Ae. albopictus* (Trout et al., 2007).
- Residual insecticides are used on surfaces that adult mosquitoes frequently visit and land on, such as walls and ceilings, discarded containers, vegetation, curtains, covers for water-storage vessels, lethal ovitrap oviposition strips, etc. There is evidence that indoor residual spraying (IRS) is particularly effective for controlling *Ae. aegypti* (Chadee 1990) primarily due to its indoor resting behavior. However, there are concerns about continuous insecticide exposure for the residents and currently, no residual insecticides are registered in the US for widespread spraying of indoor areas to control of adult mosquitoes.
- Space spraying of insecticides is carried out by backpack, truck- or air-craft mounted equipment.

Attractive toxic sugar baits have been shown to reduce adult populations of *Ae. albopictus* in Florida (Naranjo et al. 2013, Revay et al. 2014). Eugenol (a component of clove oil) and boric acid have been tested as toxicants in these studies. It is not clear whether these baits would work against *Ae. aegypti* in tropical urban areas because it has been reported that females of this species do not commonly consume sugars (Costero et al. 1998).

Using insecticide to control adult mosquitoes should always include insecticide resistance monitoring and management. Insecticide resistance has been demonstrated in almost every class of insecticide, including microbial pesticides and IGRs (Brogdon and McAllister 1998a). Insecticide resistance, which is an inheritable trait, usually leads to significant reduction in the susceptibility of insect populations which renders insecticide treatments ineffective. Insecticide resistance may be monitored using bioassays in larvae and adult mosquitoes (WHO 2009, Brogdon and McAllister 1998b[PDF - 28 pages]).

Physical control (non-insecticidal mosquito traps):

Gravid female mosquitoes can be lured to traps baited with an oviposition medium and captured using sticky glue while attempting to lay eggs (CDC Autocidal Gravid Ovitrap, AGO trap; Barrera et al. 2014a, b; Mackay et al. 2013). The use of three AGO traps per home in more than 85% of houses in neighborhoods in southern Puerto Rico has shown sustained and effective reductions of *Ae. aegypti* populations (80%).

Personal Protection/Repellents:

CDC recommends the use of products containing active ingredients which have been registered by the U.S. Environmental Protection Agency (EPA) for use as repellents applied to skin and clothing. EPA registration of repellent active ingredients indicates the materials have been reviewed and approved for efficacy and human safety when applied according to the instructions on the label. For more details, visit <http://www.cdc.gov/westnile/faq/repellent.html>.

Appendix D – Zika Communications Plan

1. Goals and Objectives:

- The primary communication goal of VDH for the response to ZIKA is to ensure timely, accurate, honest and consistent messages and flow of information.
- Be first. Be right. Be credible.
- VDH will provide information on ZIKA to the general public and to a variety of targeted audiences (See section 6).

2. Primary Messages to Communicate about ZIKA:

- **Prevention:** The best way to prevent ZIKA is to prevent mosquito bites. There is no vaccine.
- **Explain who's most at risk:** pregnant women; women of child-bearing age; travelers; and general public
- **Explain response:** Provide details on what is being done to respond to situation. (Mosquito control, surveillance, backyards)
- VDH will do everything possible to prevent, control and decrease the spread of ZIKA. (Working with jurisdictional partners, ZIKA Task Force, etc.)

3. Protocols for Information Dissemination:

- VDH recognizes that ZIKA virus disease will generate ongoing media attention.
- The Office of Epidemiology (OEpi) will create approved messages immediately and update them weekly. Under the direction of the State Epidemiologist, the OEpi Division of Environmental Epidemiology (DEE) will lead the development and review of ZIKA-related materials and information for targeted audiences.
- Once material is approved by the State Epidemiologist and Chief Deputy for Public Health & Preparedness, the Risk Communication Manager will lead the release of ZIKA-related materials and information statewide with the assistance as needed by the Regional Public Information Officers (PIO) in coordination with District Health Directors and District-Designated PIOs.
- Health Districts may create their own ZIKA materials using the [VDH branding guidance](#), talking points and materials from the VDH website ([Zika Virus webpages](#) and [EPI Disease Control Manual](#)) and [CDC Zika website](#). If districts want to create materials using other resources, they must be reviewed and approved by OEpi and ORCE (coordinate through Regional PIOs). Turnaround time for approval would be within 3 days.

- County/city communication materials (with the jurisdiction's name and contact information, not the local health district's), even if the local health district provided input, DO NOT need to be reviewed/approved by OEpi and ORCE.
- ORCE's Risk Communication Manager will oversee all statewide media relations activities.
- The State Epidemiologist will lead efforts to ensure communication between all health care providers is handled appropriately.
- In the event of a state of emergency declaration by the Governor, the Virginia Department of Emergency Management's Office of Public Affairs becomes the lead state agency for the organization and management of the dissemination of information. VDH functions (as described within this plan) would be coordinated through the VDEM Joint Information Center (JIC). VDH representatives serve on the JIC.

4. Spokespersons:

- VDH State Health Commissioner, Chief Deputy Commissioner for Public Health and Preparedness, State Epidemiologist (or her designee), and State Entomologist will serve as the principle spokespersons on the state level in regards to ZIKA. The Director of the Office of Emergency Preparedness will serve as spokesperson for state ZIKA action plan (ZAP) and Governor's ZIKA Task Force.
- On the local level, the Local Health Directors (or their designees) will serve as the spokespersons. The District-Designated PIOs and Regional PIOs will provide information to media outlets but will arrange interviews with the noted medical spokespersons in most cases to provide expert and credible quotes and sound bites.

5. Methods:

- VDH will disseminate information to external audiences through a variety of methods (See Section 6).
- VDH will disseminate information specific to VDH staff through the internal website, e-mail, conference calls, and video conference meetings.
- VDH Risk Communication will coordinate/share information with the Governor's and Secretary's offices. A news release from the Governor will be going out ahead of the May 1 start of mosquito season.
- For non-English speaking populations, VDH will use translated ZIKA materials provided by the CDC, or for customized information the agency will utilize two existing statewide translation services contracts for any VDH-specific material not created by CDC. Both of these contracts expire April 30 of this year. Contract renewal negotiations are underway. Through April 30, the

contracts are with Language Services (Contract#1200019-501AA) and Proprio (Contract#1200020-501AA).

- VDH will use 2-1-1 for calls from the general public seeking general information about ZIKA, if evolving situation requires.
- If local health districts choose to establish local call centers, they should utilize the VDH FAQs as well as any district-specific details. If districts want to create additional FAQs, they must be reviewed and approved by EPI and Risk Communication (Coordinate through Regional PIOs). Turnaround time within 3 days.
- The ZIKA case count on the VDH external website will be updated weekly, each Thursday by 9 a.m.

6. Targeted Audiences and Materials:

Targeted Audiences	Purpose	Materials	Purpose/Distribution	Timeline	Budget
Pregnant Women	Prevention	VDH Zika and Pregnancy Flier	<ul style="list-style-type: none"> • VDH Clinics • VDH website, VDH FB and LinkedIn Clinicians pages 	completed	
		<ul style="list-style-type: none"> • CDC Printed materials • CDC Social media 	<ul style="list-style-type: none"> • District staff and others disseminate materials to local OB/GYNs and FM (safety net and private providers) to provide to their patients • VDH website & social media accounts 	Available	
		Animated videos and PSA with Dr. Levine (4 total)	<ul style="list-style-type: none"> • VDH website • PSA on targeted TV and radio • VDH YouTube • Movie screens 	May 21 Movie ads to run beginning May 25	\$45K \$30K
		Paid advertising	<ul style="list-style-type: none"> • Social media sites • Targeted TV and radio 	Campaign to begin May 9	
		Text 4 Baby messages	Text-4-baby app	In progress	
	Guidance (Pregnant Women Exposed to Zika virus)	Clinician Letters , VDH Zika website,	Provide information through clinicians <ul style="list-style-type: none"> • VDH Clinician specific social media accounts (Facebook for Clinicians & LinkedIn for 	In development	

Targeted Audiences	Purpose	Materials	Purpose/Distribution	Timeline	Budget
			Clinicians) and VDH website <ul style="list-style-type: none"> • District staff and MRCs disseminate materials to OB/GYNs and family medicine (safety net and private providers) • Clinician’s letter with links to materials 		
Couples Seeking Pregnancy	Prevention	Social media	VDH social media sites Online paid ads/campaign	May 8- through mosquito season	
Sexually active persons	Prevention	Social media	VDH social media sites Online paid ads/campaign		
Travelers	Prevention	Social media campaign	VDH social sites	May 8 – through mosquito season	
		Ads	Travel websites		
		Video message from Dr. Levine	Airport television monitors	Underway/outreach to airports	
		Signage	Airports (Dulles, Regan National – coordinate with BWI)		
General Public	Awareness and Prevention	Press releases at each stage (mosquito season begins, first local transmission, widespread transmission)	Statewide media – State is lead until further notice. Governor press release ahead of Mosquito season	April 25 release	
		Animated video	<ul style="list-style-type: none"> • VDH website • VDH social media 	Timeline as above – info ongoing since Feb. --once videos created utilize May 8 and on through season	
		Zika weather related messages	<ul style="list-style-type: none"> • TV and radio news meteorologists 	In progress/ reach out meteorologists contacted	
		Door hangers (now 4 options)	<ul style="list-style-type: none"> • District staff and others disseminate materials • Local government 	All four completed and up for review April 25 (RAP approved,	Approx. \$5K per 50,000 hangers

Targeted Audiences	Purpose	Materials	Purpose/Distribution	Timeline	Budget
			mosquito control staff disseminate materials	printing quote received	
VA Clinicians	Prevention and Response	Clinical guidance	<ul style="list-style-type: none"> • Work with VACOG and VAFM to identify how to get CDC materials to clinicians who provide prenatal care • Clinician Letters • District Clinician Updates • VDH website • District staff present at hospital grand rounds, medical society meetings, etc. 	Underway/ASAP	
Government Officials	Awareness , response and vector control	Multi-scenario Messaging Developed and reviewed by Gov. Zika Task Force	<ul style="list-style-type: none"> • State level briefings by SHC and Central Office staff to Governor, Secretary, VDEM • Local government briefings by District Health Directors • District staff coordinate with local mosquito control staff 	Developed April 1, 2016	
VDH Employees	Public Health Messaging and Ambassadors	Main Messages	<ul style="list-style-type: none"> • VDH intranet • Madison Building TV monitors 		

7. Monitoring Emerging Communication Issues:

- VDH Risk Communication Team will monitor media reports on ZIKA through its daily traditional media monitoring and add social media monitoring once mosquito season begins, with updated as other milestones are reached (locally acquired transmission and widespread) to gauge reaction to the situation and to look for instances of misinformation to be corrected.
- VDH also has existing relationships and open lines of communication with state agency and jurisdictional PIOs, and stakeholders on the state and local level in order to receive requests for information or questions concerning particular aspects of the ZIKA virus response. The

ZIKA Task Force will continue to meet and share issues, questions, and topics needing clarification.

- VDH will immediately respond to misinformation or questions regarding particular issues through social media, “posting correct” information on VDH accounts, phone calls or e-mails directly to reporters or the organization requesting clarification.

8. Evaluation:

- Wherever possible, analytics will be used to measure and reassess materials throughout the campaign. Videos, social media banners, paid search ads and door hangers will include Zika Virginia specific domain names as a way to capture metrics. Will also perform a mid-response analytic review to see if a mid-course correction needs to be made or a shift in ad placements.
- When it comes to Twitter/tweets, VDH main account will be primary mode, with other VDH and districts retweeting. We ask this so we can capture the metrics. If a local health district wants to put a district-specific tweet, please share with ORCE for awareness, and where appropriate, VDH main account will retweet.

9. Other Issues for Consideration:

- VDH will limit any potentially identifying information released about individuals under investigation as locally acquired cases.

Appendix E – Zika Mosquito Messages

Zika mosquito messages have been developed for each phase of operations described in the body of this Annex (*Preparedness, Mosquito Season, Limited Local Confirmed Transmission, and Widespread Local Transmission*). Messages for each phase are organized below by the following categories:

- Prevention Messages:
 - Personal Protection from Mosquitoes
 - Actions to Take Around the Home
 - Proper Pesticide Use for Mosquitos that Carry Zika (Information from VDACS)
- Mosquitoes and Zika infection in Virginia (general info on transmission)
- Mosquito control in Virginia (breeding and control)

Messaging at each phase will include all the messages outlined in the tables below as well as the messages that apply to all or multiple phases. Much basic information stays the same through each phase, but some changes slightly, and new information is included in each phase. Information that changes or is added between the phases is bolded for easy reference.

When in doubt, refer to CDC guidance/messaging at <http://www.cdc.gov/zika/pdfs/zika-key-messages.pdf>.

Messages through all Phases (*Preparedness, Mosquito Season, Limited Local Confirmed Transmission, and Widespread Local Transmission*)

Prevention Messages

Personal Protection from Mosquitoes (From VDH and CDC websites: www.vdh.virginia.gov and <http://www.cdc.gov/zika/prevention/index.html>)

All Phases (<i>Preparedness, Mosquito Season, Limited Local Confirmed Transmission, and Widespread Local Transmission</i>)	
PHASE	MESSAGES
0,1,2,3,4	<p>Personal Protection from Mosquitoes (From VDH and CDC websites: www.vdh.virginia.gov and http://www.cdc.gov/zika/prevention/index.html)</p> <p>Currently, there is no vaccine to prevent Zika infection, so preventing being bitten is very important.</p> <ul style="list-style-type: none"> • Wear long-sleeved shirts and long pants. • Stay in places with air-conditioning or that use window and door screens to keep mosquitoes outside. • Sleep under a mosquito bed net if you are overseas or outside and not able to protect yourself from mosquito bites. • Use <u>Environmental Protection Agency (EPA)-registered</u> insect repellents. When

	<p>used as directed, EPA-registered insect repellents are proven safe and effective, even for pregnant and breast-feeding women.</p> <ul style="list-style-type: none"> ○ Always follow the product label instructions. ○ Reapply insect repellent as directed. ○ Do not spray repellent on the skin under clothing. ○ If you are also using sunscreen, apply sunscreen before applying insect repellent. <ul style="list-style-type: none"> ● If you have a baby or child: <ul style="list-style-type: none"> ○ Do not use insect repellent on babies younger than 2 months of age. ○ Dress your child in clothing that covers arms and legs, or ○ Cover crib, stroller, and baby carrier with mosquito netting. ○ Do not apply insect repellent onto a child’s hands, eyes, mouth, and cut or irritated skin. ○ Adults: Spray insect repellent onto your hands and then apply to a child’s face. ● Treat clothing and gear with permethrin or purchase permethrin-treated items. <ul style="list-style-type: none"> ○ Treated clothing remains protective after multiple washings. See product information to learn how long the protection will last. ○ If treating items yourself, follow the product instructions carefully. ○ Do NOT use permethrin products directly on skin. They are intended to treat clothing.
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Actions to Take around the Home (“Drain and Cover” Campaign)

All Phases (<i>Preparedness, Mosquito Season, Limited Local Confirmed Transmission, and Widespread Local Transmission</i>)	
0,1,2,3,4 “Drain and Cover” Campaign	<p><u>Actions to Take Around the Home</u></p> <p>Stop mosquitoes from living and multiplying around your home or business. Everyone can take several simple actions around their home and neighborhood to reduce the population of mosquitoes that can carry Zika Virus.</p> <ul style="list-style-type: none"> ● Drain standing water: Drain water from garbage cans, house gutters, pool covers, coolers, toys, flower pots or any other containers where sprinkler or rain water has collected. ● Discard old tires, drums, bottles, cans, pots and pans, broken appliances and other items that aren’t being used. ● Protect boats and vehicles from rain with tarps that don’t accumulate water. ● Maintain the water balance (pool chemistry) of swimming pools. Empty plastic swimming pools when not in use.

Proper Pesticide Use for Mosquitoes that Carry Zika (Information from Virginia Department of Agriculture & Consumer Services)

All Phases (<i>Preparedness, Mosquito Season, Limited Local Confirmed Transmission, and Widespread Local Transmission</i>)	
0,1,2,3,4 (VDACS)	<ul style="list-style-type: none"> • Read and Follow the label directions of any pesticide to protect yourself, others and the environment. • The label directions will describe the pesticide, tell you how to properly apply it, list protections for the user and the environment, and provide appropriate first-aid actions to take. • Pesticides labeled for outdoor areas only should not be used indoors. • Only use a pesticide labeled for the type of pest it is intended to control. • To be legal for use in Virginia, a pesticide must be registered with the Department of Agriculture and Consumer Services' (VDACS) Office of Pesticide Services (OPS). You can check to see if a specific pesticide is registered by visiting http://www.vdacs.virginia.gov/pesticide-product-registration.shtml. • If you decide to hire a commercial pest control company, check that it is licensed and that its applicators are certified. • Licensed pesticide businesses are listed at http://www.vdacs.virginia.gov/pesticide-business-license.shtml. • All certified commercial applicators available at http://www.vdacs.virginia.gov/pesticide-applicator-certification.shtml. • For more information related to pesticides and their proper use, please visit www.vapesticidesafety.com.

Phase 0 (*Preparedness*) and Phase 1 (*Mosquito Season*)

Mosquitos and Zika infection in Virginia

Phase 0 (<i>Preparedness</i>) and Phase 1 (<i>Mosquito Season</i>)	
PHASE	MESSAGES
0,1	<p><u>Mosquitoes and Zika infection in Virginia:</u></p> <ul style="list-style-type: none"> • People in Virginia can acquire Zika through the bite of an infected mosquito, during travel to an area where the virus is circulating among mosquitoes.
0,1	<ul style="list-style-type: none"> • The infection is transmitted primarily by mosquitoes. It is most commonly transmitted by the yellow fever mosquito (<i>Aedes aegypti</i>), but the Asian tiger mosquito (<i>Aedes albopictus</i>) can also transmit it.
0,1	<ul style="list-style-type: none"> • Both of these mosquito species circulate in Virginia, with Asian tiger mosquitoes being the most common nuisance mosquito here. Therefore, there is a risk of Zika virus being imported into Virginia and being transmitted by local mosquitoes during mosquito season. If that happens, infection by mosquito bite may be possible.

Mosquito Control in Virginia

Phase 0 (<i>Preparedness</i>) and Phase 1 (<i>Mosquito Season</i>)	
PHASE	MESSAGES
0,1	<p><u>Mosquito control in Virginia:</u></p> <ul style="list-style-type: none"> • Mosquito season has begun, so there is potential for our local yellow fever mosquitoes and Asian tiger mosquitoes to become infected with the Zika virus by biting infected persons who have returned from areas of Zika activity.
0,1	<ul style="list-style-type: none"> • These two mosquito species are different from most other mosquito species in Virginia because they fly and bite during daylight hours and will enter homes through any open door or window and bite indoors. These two species are also different from other species because they lay their eggs exclusively in containers of water (i.e. containers made of plastic, ceramic, glass, metal, concrete, wood or stone) and they do not lay their eggs in “ground” bodies of water such as puddles, flooded ditches, ponds or streams.
0,1	<ul style="list-style-type: none"> • Some localities may have mosquito surveillance, prevention and control programs. Those programs, if any, can vary widely from locality to locality. For information on whether your city or county has a program, please contact your local government’s administrative office.
0,1	<ul style="list-style-type: none"> • Control and prevention for these two mosquito species requires tactics that are different than what is normally used for other mosquito species. For example, treating neighborhoods with truck-mounted foggers and larviciding puddles and stagnant water in ditches, swamps, or streams will not control either of these two mosquito species. Mosquito control and prevention requires: <ul style="list-style-type: none"> ○ Thorough inspection of residential and commercial properties to find and eliminate, dump, or treat the containers of water that these mosquito species lay their eggs in. Effective treatment of a neighborhood often requires a property to property effort. ○ Spraying aerosol fogs into the foliage of shrubs, hedges, ivy and other vegetation or structures where these mosquitoes sit. ○ Spraying residual insecticide barriers on the foliage of shrubs, hedges, ivy, other low vegetation or walls on properties where these mosquitoes are abundant. “Residual” means that the insecticide stays effective for a longer period of time. ○ Maintaining screens on all home/building windows and doors to prevent the entry of these mosquitoes into the home.

Phase 2 (*Limited Local Confirmed Transmission*)

Personal Protection from Mosquitos

Phase 2 (<i>Limited Local Confirmed Transmission</i>)	
PHASE	MESSAGES
2	<p><u>Personal Protection from Mosquitos</u> (FROM VDH and CDC WEBSITES: http://www.cdc.gov/zika/prevention/index.html)</p> <p>Add/emphasize in Phases 3 & 4 (widespread Zika virus): If you have Zika, protect others from getting sick During the first week of infection, Zika virus can be found in the blood and passed from an infected person to another mosquito through mosquito bites. An infected mosquito can then spread the virus to other people. To help prevent others from getting sick, avoid mosquito bites during the first week of illness.</p>

Mosquitos and Zika infection in Virginia

Phase 2 (<i>Limited Local Confirmed Transmission</i>)	
PHASE	MESSAGES
2	<p><u>Mosquitos and Zika infection in Virginia:</u></p> <ul style="list-style-type: none"> • People in Virginia can acquire Zika through the bite of an infected mosquito, either during travel to an area where the virus is circulating among mosquitoes or, less likely, from the bite of an infected mosquito in Virginia.
2	<ul style="list-style-type: none"> • The infection is transmitted primarily by mosquitoes. It is most commonly transmitted by the yellow fever mosquito (<i>Aedes aegypti</i>), but the Asian tiger mosquito (<i>Aedes albopictus</i>) can also transmit it. • Both of these mosquito species circulate in Virginia, with Asian tiger mosquitoes being the most common nuisance mosquito here.
2	<ul style="list-style-type: none"> • Zika virus infection is confirmed and the epidemiologic investigation finds that the person's most likely source of infection was through the bite of a mosquito bite in Virginia. This is called local transmission.

Mosquito Control in Virginia

Phase 2 (<i>Limited Local Confirmed Transmission</i>)	
PHASE	MESSAGES
2	<p><u>Mosquito control in Virginia:</u></p> <ul style="list-style-type: none"> • Since a non-travel related case(s) of Zika virus disease has been confirmed in Virginia, mosquito experts have determined that our local yellow fever mosquitoes and Asian tiger mosquitoes have become infected with the Zika virus and are able to transmit it locally. Therefore, it is important to be aware of these mosquitoes' habits

	to prevent being bitten and to find and eliminate their breeding sites.
2	<ul style="list-style-type: none"> • These two mosquito species are different from most other mosquito species in Virginia because they fly and bite during daylight hours and will enter homes through any open door or window and bite indoors. These two species are also different from other species because they lay their eggs exclusively in containers of water (i.e. containers made of plastic, ceramic, glass, metal, concrete, wood or stone) and they do not lay their eggs in “ground” bodies of water such as puddles, flooded ditches, ponds or streams.
2	<ul style="list-style-type: none"> • Some localities may have mosquito surveillance, prevention and control programs. Those programs, if any, can vary widely from locality to locality. For information on whether your city or county has a program, please contact your local government’s administrative office.
2	<ul style="list-style-type: none"> • Control and prevention for these two mosquito species requires tactics that are different than what is normally used for other mosquito species. For example, the treating of neighborhoods with truck-mounted foggers and larviciding puddles and stagnant water in ditches, swamps or streams will not control either of these two mosquito species. Mosquito control and prevention requires: <ul style="list-style-type: none"> ○ Inspecting residential and commercial properties thoroughly to find and eliminate, dump, or treat the containers of water that these mosquito species lay their eggs in. Effective treatment of a neighborhood often requires a property to property effort. ○ Spraying aerosol fogs into the foliage of shrubs, hedges, ivy and other vegetation or structures where these mosquitoes sit. ○ Spraying residual insecticide barriers on the foliage of shrubs, hedges, ivy, other low vegetation or walls on properties where these mosquitoes are abundant. “Residual” means that the insecticide stays effective for a longer period of time. ○ Maintaining screens on all home/building windows and doors to prevent the entry of these mosquitoes into the home.

Phase 3 (*Widespread Local Transmission*)

Personal Protection from Mosquitos

Phase 3 (<i>Widespread Local Transmission</i>)	
PHASE	MESSAGES
3	<p><u>Personal Protection from Mosquitos</u> (From VDH and CDC websites: http://www.cdc.gov/zika/prevention/index.html)</p> <p>Add/emphasize in Phases 3 & 4 (widespread Zika virus): If you have Zika, protect others from getting sick</p> <ul style="list-style-type: none"> • During the first week of infection, Zika virus can be found in the blood and passed from an infected person to another mosquito through mosquito bites. An infected mosquito can then spread the virus to other people. <p>To help prevent others from getting sick, avoid mosquito bites during the first week of illness.</p>

Mosquitos and Zika infection in Virginia

Phase 3 (<i>Widespread Local Transmission</i>)	
PHASE	MESSAGES
3	<p><u>Mosquitoes and Zika infection in Virginia:</u></p> <ul style="list-style-type: none"> • People in Virginia can acquire Zika through the bite of an infected mosquito in Virginia, or during travel to additional areas where the virus is circulating among mosquitoes.
3	<ul style="list-style-type: none"> • The infection is transmitted primarily by mosquitoes. It is most commonly transmitted by the yellow fever mosquito (<i>Aedes aegypti</i>), but the Asian tiger mosquito (<i>Aedes albopictus</i>) can also transmit it. • Both of these mosquito species circulate in Virginia, with Asian tiger mosquitoes being the most common nuisance mosquito here.
3	<ul style="list-style-type: none"> • Zika virus has been confirmed in multiple people who have not traveled to areas where the virus is circulating among mosquitoes. That means that mosquitoes in Virginia are infected with the Zika virus, and are transmitting it through their bite to Virginians.

Mosquito Control in Virginia

Phase 4 (<i>Widespread Local Transmission</i>)	
PHASE	MESSAGES
3	<p><u>Mosquito control in Virginia:</u></p> <ul style="list-style-type: none"> • Zika virus disease has become widespread in Virginia, with our local yellow fever mosquitoes and Asian tiger mosquitoes infected with the Zika virus and transmitting it locally. It is vital to be aware of these mosquitoes' habits to prevent being bitten and to find and eliminate their breeding sites.

3	<ul style="list-style-type: none"> • These two mosquito species are different from most other mosquito species in Virginia because they fly and bite during daylight hours and will enter homes through any open door or window and bite indoors. These two species are also different from other species because they lay their eggs exclusively in containers of water (i.e. containers made of plastic, ceramic, glass, metal, concrete, wood or stone) and they do not lay their eggs in “ground” bodies of water such as puddles, flooded ditches, ponds or streams.
3	<ul style="list-style-type: none"> • Some localities may have mosquito surveillance, prevention and control programs. Those programs, if any, can vary widely from locality to locality. For information on whether your city or county has a program, please contact your local government’s administrative office.
3	<ul style="list-style-type: none"> • Control and prevention for these two mosquito species requires tactics that are different than what is normally used for other mosquito species. For example, the treating neighborhoods with truck-mounted foggers and larviciding puddles and stagnant water in ditches, swamps, or streams will not control either of these two mosquito species. Mosquito control and prevention requires: <ul style="list-style-type: none"> ○ Thorough inspection of residential and commercial properties to find and eliminate, dump, or treat the containers of water that these mosquito species lay their eggs in. Effective treatment of a neighborhood often requires a property to property effort. ○ Spraying aerosol fogs into the foliage of shrubs, hedges, ivy and other vegetation or structures where these mosquitoes sit. ○ Spraying residual insecticide barriers on the foliage of shrubs, hedges, ivy, other low vegetation or walls on properties where these mosquitoes are abundant. “Residual” means that the insecticide stays effective for a longer period of time. ○ Maintaining screens on all home/building windows and doors to prevent the entry of these mosquitoes into the home.

Appendix F – Resources and References for Zika Public Education and Outreach

VDH External Website

- Weekly cases number and region breakdown
- Office of Epidemiology:
- [Zika Fact Sheet](#) (English & Spanish)
- [Areas with Zika](#)
- [Zika Virus and Pregnancy](#) (which includes a printable flier about Zika and Pregnancy, in English and Spanish)
- [Information for Clinicians](#)
- [Information for Colleges & Universities](#)
- [Zika Prevention](#)
- [Zika Testing](#)
- [Information on Mosquitoes](#)

[Commissioner's Briefing for the General Assembly \(Power Point\)](#)

VDH Internal Website

- ORCE pages – Drain & Cover printable brochure (English only at the moment), can be printed in house on card stock/two to a page. VDH logo is to one side (left), allowing for inclusion of district/department info on right.
- OEpi Disease Control Manual contains:
 - [Zika Guidelines](#) (rev. 3/23/2016)
 - [VDH Fact Sheet on Zika virus infection](#) (rev. 3/2/16)
 - [CDC Zika Web Page](#)
 - [CDC Q and A's for Obstetrical Healthcare Providers: Pregnant Women and Zika virus infection](#)
 - [VDH FAQs about Mosquitoes](#)
 - [VDH Zika Virus Testing Approval Form \(if testing is approved\)](#) (3/3/16)
 - VDH Zika Virus Disease Case Report Form (for probable or confirmed cases) (pending)
 - [CSTE Interim Case Definitions: Zika Virus Disease and Zika Virus Congenital Infection](#)
 - [VDH Zika Virus Disease Case Definition Algorithm](#) (3/2/16)
 - [VDH Testing Algorithm](#) (rev. 3/22/16)
 - [DCLS Instructions for Lab Testing](#)
 - [CDC Additional Information on Laboratory Testing for Zika, Chikungunya and Dengue viruses](#)
 - [VDH Chikungunya/Dengue/Zika Cheat Sheet](#) (rev. 2/8/16)
 - Instructions for VEDSS Data Entry: Zika virus disease (pending)
 - [Talking Points and Slides](#)
 - [CDC Key Messages](#) (3/16/16)

- [VDH Talking Points](#) (rev. 3/23/16)
- [VDH Zika Slides](#) (rev. 3/23/16)

[VDH Zika Literature Review](#) (rev. 3/15/16)

Additional Information

- Chesapeake Mosquito Control Commission training video
<https://www.youtube.com/watch?v=7jTiGCPOklo&feature=youtu.be>
- Fleming-Dutra KE, Nelson JM, Fischer M, et al. [Update: Interim Guidelines for Health Care Providers Caring for Infants and Children with Possible Zika Virus Infection — United States, February 2016](#). MMWR Morb Mortal Wkly Rep 2016;65(Early Release):1–6.
- [Interim CDC Recommendations for Zika Vector Control in the Continental United States](#) (posted March 18, 2016)
- Oduyebo T, Petersen EE, Rasmussen SA, et al. [Update: Interim Guidelines for Health Care Providers Caring for Pregnant Women and Women of Reproductive Age with Possible Zika Virus Exposure — United States, 2016](#). MMWR Morb Mortal Wkly Rep 2016;65(Early Release):1–6.
- Oster AM, Brooks JT, Stryker JE, et al. [Interim Guidelines for Prevention of Sexual Transmission of Zika Virus — United States, 2016](#). MMWR Morb Mortal Wkly Rep 2016;65(Early Release):1–2.
- Pan American Health Organization (PAHO): [Zika virus infection](#)
- Petersen EE, Staples JE, Meaney-Delman, D, et al. [Interim Guidelines for Pregnant Women During a Zika Virus Outbreak – United States, 2016](#). MMWR Morb Mortal Wkly Rep 2016;65place_Holder_For_Early_Release:30–33.
- Staples JE, Dziuban EJ, Fischer M, et al. [Interim Guidelines for the Evaluation and Testing of Infants with Possible Congenital Zika Virus Infection — United States, 2016](#). MMWR Morb Mortal Wkly Rep 2016;65place_Holder_For_Early_Release:63–67.
- Virginia Mosquito Control Association <http://mosquito-va.org/> World Health Organization (WHO): [Zika virus](#)

Appendix G – CDC US Pregnancy Registry and VDH Procedures

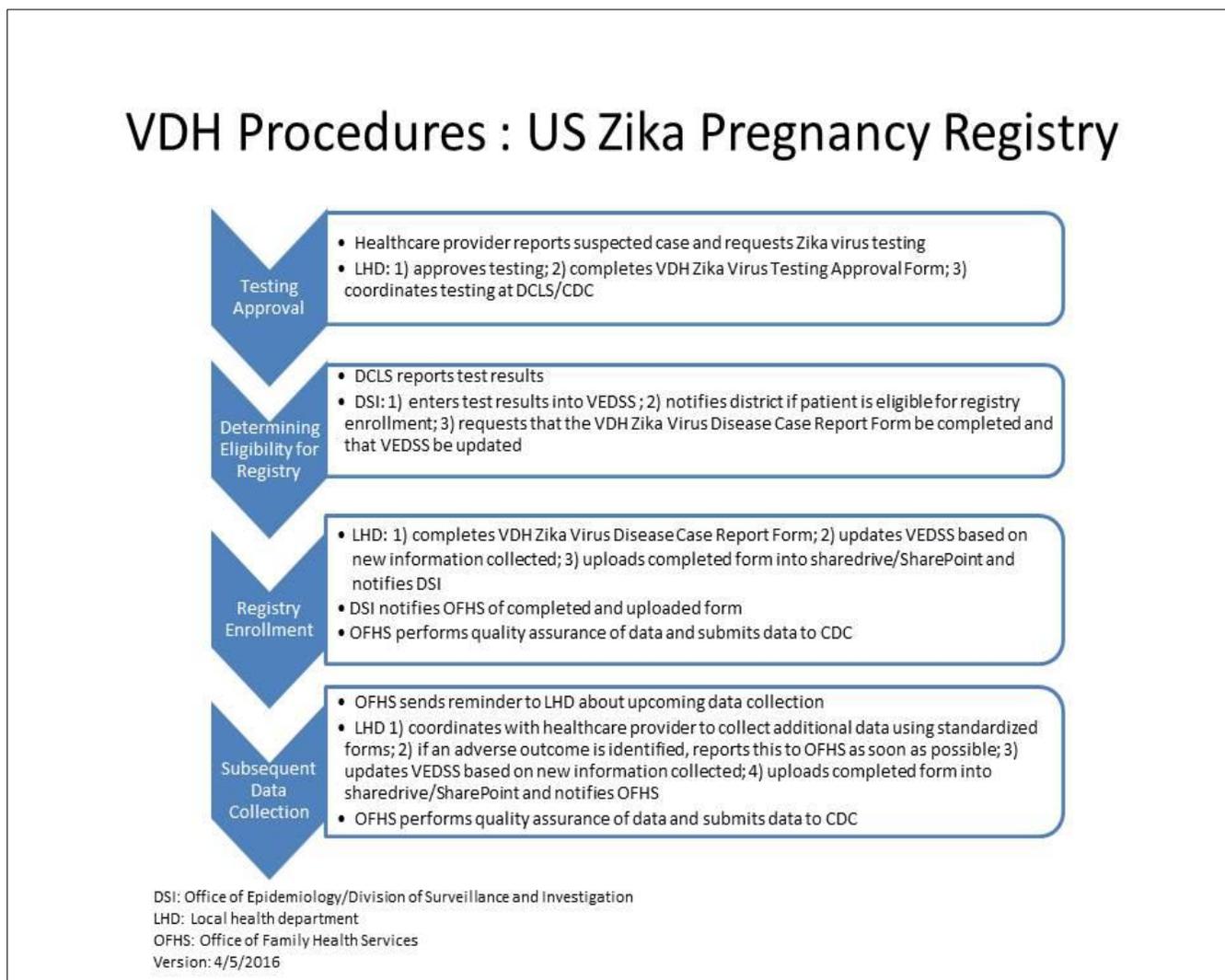


Figure 5. VDH Procedures for CDC US Pregnancy Registry.

Description of the US Zika Pregnancy Registry

Purpose:

- To understand more about Zika virus infection during pregnancy and congenital Zika virus infections, CDC has established the US Zika Pregnancy Registry.
- The data collected will be used to update guide recommendations for clinical care and testing, to plan for services for pregnant women and families affected by Zika virus, and to improve prevention of Zika virus infection during pregnancy.
- For more information, refer to CDC’s US Zika Pregnancy Registry website located at <http://www.cdc.gov/zika/hc-providers/registry.html>

Data collection:

- For Virginia residents enrolled in the registry, information will be collected by the local health department where the person resides from the healthcare provider.
 - If the healthcare provider is located in another health district, then the health department staff should let the other district know that follow-up is being done with one of their providers. For providers located in another state, the LHD should notify VDH Central Office before contacting the provider; VDH Central Office will notify the other state health department as a courtesy.
- Health department staff will collect information using standardized forms.
 - Upon identification of a person eligible for enrollment, the VDH Zika Case Report Form will be used for initial data collection. Subsequent data collection will be done using either a VDH or CDC form. Standardized forms will include clinical information, testing during pregnancy, results from evaluation and testing conducted at birth, and clinical/developmental information from the infant through the first year of life.
- Health department staff will collect information directly from the healthcare provider caring for the enrolled pregnant woman or infant.
- Data collection will occur at the following points (as applicable)
 - Upon initial identification
 - Once during the second and third trimesters of pregnancy
 - At the time of delivery
 - For the infant: at 2, 6, 12 months of age

*Inclusion Criteria**

All women living in the US (except Puerto Rico) who have been infected with Zika virus during their pregnancy and their infants are eligible for enrollment. Specifically, eligible persons for enrollment include the following:

- Pregnant women who meet the confirmed or probable CSTE interim case definition for Zika virus disease
- Pregnant women who have laboratory evidence of Zika infection (regardless of symptoms), but who do not meet the CSTE case definition
 - Laboratory evidence includes those that have positive or inconclusive Zika virus test results.
- Infants born to pregnant women who meet the above criteria

*The CSTE interim case definitions are available at

https://www.cste2.org/docs/Zika_Virus_Disease_and_Congenital_Zika_Virus_Infection_Interim.pdf.

Roles and Responsibilities related to the US Zika Pregnancy Registry

Healthcare Provider:

- Report any suspected or confirmed cases of Zika virus disease to the LHD
- Coordinate with LHD staff to test persons approved for testing
- Coordinate with LHD staff collecting information about persons enrolled in the registry
- Notify LHD staff if the person enrolled in the registry moves or changes healthcare provider

LHD/Health districts:

- Approve persons for testing
- Notify healthcare provider of results (if needed)
- Upon identification, collect information from clinician/patient using the VDH Zika Case Report Form
- Coordinate with the healthcare provider to enroll the person into the registry
- Complete data collection forms
- If an adverse outcome is identified, notify Office of Family Health Services
- Update VEDSS record based on collected data
- Upload completed forms to share drive/SharePoint and notify VDH Central Office

VDH Central Office:

- Division of Environmental Epidemiology (DEE)
 - Report cases to CDC that meet case definition via ArboNet
- Division of Surveillance and Investigation (DSI)
 - Track persons approved for testing and test results
 - Notify districts of test results and whether person is eligible for enrollment into the registry
 - Notify OFHS when person eligible for enrollment has been identified
 - Notify other state health departments if providers in their jurisdiction who care for Virginia residents will be contacted by LHD
- Office of Family Health Services (OFHS)
 - Consult with VDH's Institutional Review Board
 - Oversee Virginia residents enrolled in the registry
 - Remind LHD staff about upcoming data collection points
 - Submit collected information to CDC and coordinate with CDC as needed

Division of Consolidated Laboratory Services (DCLS):

- Conduct or facilitate Zika testing for those approved for testing and provide DCLS/CDC test results. (Refer to Figure above).

Talking Points

- Very little is known about the risks of Zika virus infection during pregnancy.

- Information about the timing, absolute risk, and spectrum of outcomes associated with Zika virus infection during pregnancy is needed to direct public health action related to Zika virus and guide testing, evaluation, and management.
- Eligible persons will be enrolled in the registry as part of public health surveillance.
 - In Virginia, Zika virus disease is a reportable condition in Virginia (under Arboviral infection). Physicians practicing in Virginia who suspect or confirm Zika virus disease should report this condition to the LHD (§ 32.1-36). Physicians may voluntarily report additional information at the request of VDH for special surveillance or other epidemiological studies (§ 32.1-36).
 - The Commissioner or his designee may examine medical records upon the request of the Commissioner or his designee during the course of investigation, research or studies of diseases or deaths of public health importance (§ 32.1-40). The Commissioner may share the identity of patients and practitioners with CDC if pertinent to an investigation, research or study; any person to whom such identifies are divulged shall preserve their anonymity (§ 32.1-41).
 - Zika virus disease is a nationally notifiable condition which means that VDH reports cases to CDC. According to CDC, the US pregnancy registry, which is designed to monitor the frequency of occurrence of adverse birth outcomes in the context of a public health emergency, does not meet the definition of research under 45 CFR 46.102(d). CDC is applying for an Assurance of Confidentiality (<http://www.cdc.gov/od/science/integrity/confidentiality/>) to assure individuals and institutions that those conducting the project will protect the confidentiality of the data collected.
- Persons who are enrolled should be informed about the registry. However, the person's consent is not required for data collection because information will be collected directly from the healthcare provider by the LHD staff for public health surveillance.
- Information is being collected by district staff from clinicians caring for the pregnant women or infants. Information is not being collected directly from the person enrolled in the registry.
- VDH wants to limit the potentially identifiable information that will be shared with CDC to protect the person's identity; VDH anticipates providing the person's age and county of residence, but will not provide the person's name, date of birth, healthcare provider name, facility or contact information.
- For persons enrolled,
 - Being in the registry will not cost any money.
 - The person does not need to do any extra paperwork, go to any extra appointments, or have any extra tests that would not be routinely recommended according to CDC's guidelines for women infected with Zika virus during pregnancy.
- CDC Fact sheets for healthcare providers and patients are available at <http://www.cdc.gov/zika/hc-providers/registry.html>.