2018 Zika Virus Preparedness Resources Toolkit

Vector Control

Epidemiology

Prevention

Laboratory

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Purpose/Goal: The threat of Zika virus disease—and consequent need for preparedness—has become a top national public health priority. Population movement, climate change, expanding vector ranges, and viral movement across borders and hemispheres have all abetted the virus’s emergence. To further the response to this new threat in the United States, CSTE has compiled a reference document to help epidemiologists, laboratorians, entomologists, mosquito control officials, clinicians, and other public health professionals better understand the nature of the challenge and to boost their capacity to develop and implement evidence-based prevention and control strategies.

This Zika Virus Preparedness Resources Toolkit covers a broad range of relevant topics:
- General background information and tools
- Epidemiology
- Data management
- Laboratory guidance
- Maternal and Child Health guidance
- Vector research and management
- Policy statements
- An Appendix explaining acronyms and abbreviations

Target Audience: State, territorial, local and tribal epidemiologists; state and private laboratory directors; clinicians; mosquito control officials; public health educators and media directors; public health administrators; and other public health professionals.
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The most comprehensive and technical document addressing Zika virus in the United States is the Centers for Disease Control and Prevention (CDC) Zika Interim Response Plan, released in May 2017. In addition, there are numerous, less technical sources of information:
- Overviews created by various governmental and non-governmental organizations
- Media interviews with different experts and media articles incorporating prevention and control advice
- Journal articles discussing possible social and economic implications of Zika virus disease spread in the United States.

Technical Guidance and Information

Technical guidance for preventing and controlling Zika virus infections is of immense importance for public health practitioners, clinicians and the public. Together, the CDC’s Zika Response Plan and the World Health Organization’s (WHO’s) response plan show the commonalities between national and international responses. Similar information is available from elsewhere at the CDC and from other sources. Importantly, our understanding of what can be done is enhanced by understanding what we do not know, as reflected in discussions of research priorities and in the Lancet update article.

An Update on Zika Infection.
www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)31450-2.pdf This comprehensive review covers the history of Zika virus emergence; pathophysiology of infection; Zika virus transmission, diagnosis and possible complications; and knowledge gaps as of early 2017.

California Zika Response Activities and Resources, May 2016.
https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CAZikaResponseActivitiesResources.pdf. This is California’s overview of the state health agency’s Zika virus surveillance, communication, response and control activities and resources.

CDC. Guidance for areas with local transmission of Zika virus in Hawaii and the continental US
https://www.cdc.gov/zika/geo/domestic-guidance.html. This webpage outlines CDC recommendations for areas with active and possible Zika transmission.

CDC. Top 10 Zika Response Planning Tips: Brief Information for State, Tribal, Local, and Territorial Health Officials
https://www.cdc.gov/zika/public-health-partners/tips.html. This webpage lists general tips and resources for state, local and territorial health officials responsible for preparing for and responding to Zika virus expansion into their jurisdictions.

CDC. Zika Interim Response Plan, May 2017
https://www.cdc.gov/zika/pdfs/zika-draft-interim-conus-plan.pdf. This early plan presents CDC guidance and resources for responding to cases of Zika virus infection in the continental United States. It is intended for state, local and tribal jurisdictions, but can be used elsewhere as applicable. (It may be superseded by later plans.)

Center for Infectious Disease Research and Policy (Dec. 5, 2017). Phase 1 trials promising for 2 Zika vaccines, including shelved one
http://www.cidrap.umn.edu/news-perspective/2017/12/phase-1-trials-promising-2-zika-vaccines-including-shelved-one. This newsletter article describes efforts to create a killed viral vaccine against Zika, and the importance of that goal. It provides links to related articles.

Community Preventive Services Task Force Recommendation for Text Messaging Interventions to Improve Medication Adherence for Chronic Disease Management. MMWR, 2017;66(47):1309. http://dx.doi.org/10.15585/mmwr.mm6647a6 or https://www.thecommunityguide.org/findings/health-information-technology-text-messaging-medication-adherence-chronic-disease. While this article is not specific to Zika virus, it discusses the robust body of literature regarding the use of text messaging to achieve positive maternal and child health outcomes. Similar text messaging interventions could be used to transmit mosquito control and pregnancy protection advice during times of possible Zika transmission.
David Heymann discusses Zika and new CCDM chapter on the virus

https://www.nap.edu/catalog/23404/potential-research-priorities-to-inform-public-health-and-medical-practice-for-domestic-zika-virus This National Academies of Science workshop was organized to develop Zika virus research priorities. The workshop addresses (1) key factors to reduce the likelihood of local Zika virus transmission in the United States; (2) areas of insufficient knowledge related to the prevention strategies; (3) potential research priorities of specific concern (e.g., establishing causality or the absence of causality between Zika virus and microcephaly); and (4) critical communication needs regarding the level of risk and associated risk factors; viral transmissibility; associated health consequences; and the measures and strategies that should be taken to minimize Zika virus infections and prevent Zika virus spread in the United States.

Occupational Safety and Health Administration and National Institute for Occupational Safety and Health. Interim Guidance for Protecting Workers from Occupational Exposure to Zika Virus. Fact Sheet April 2016
https://www.cdc.gov/niosh/topics/outdoor/mosquito-borne/pdfs/osha-niosh_fs-3855_zika_virus_04-2016.pdf. This discusses protective measures for people who work outdoors, healthcare and laboratory workers, agricultural workers, and mosquito control workers. It also offers general guidance for employers of people suspected or confirmed of being infected with Zika virus.

New Jersey Department of Health (NJDOH). Emerging Infections Educational Kit: Spot Symptoms, Stop the Spread, and Save Lives. To download: 1) On your device, launch your mobile browser (Safari, Chrome, or other) and enter “bar:qsp.mobi/tv28sh3a” into your address; 2) Select “Install” and wait until your download ends; 3a) (for Androids) Relaunch your browser, select the “refresh” button; 3b) (for Apple) Relaunch your browser, select the “refresh” button. This eGuide provides basic epidemiological information about 12 EIDs, including Zika virus; disease outbreak preparedness information; and, online resources from CDC, NJDOH, WHO and others. You can use this guide to develop infectious disease training; to serve as a teaching aid for interactive workshops; and to access EID information from NJDOH’s Communicable Disease Service.

Pennsylvania Department of Health, Department of Environmental Protection, and Other Stakeholders. Pennsylvania Zika Virus Response Plan (Revised May 2016).
http://www.health.pa.gov/my%20health/diseases%20and%20conditions/u-z/zikavirus/documents/pennsylvania%20zika%20virus%20response%20plan.pdf. This is Pennsylvania’s overview of the elements of Zika virus surveillance, communication, response and control.

http://www.ct.gov/dph/lib/dph/publications/Zika_plan.pdf. This provides a comprehensive overview of the elements of Zika virus surveillance, communication, response and control. It is based on the Connecticut’s West Nile Virus response plan.

WHO. Zika Strategic Response Plan
http://apps.who.int/iris/bitstream/10665/246091/1/WHO-ZIKV-SRF-16.3-eng.pdf?ua=1&ua=1&ua=1&ua=1. This plan is for July 2016-December 2017.

WHO (2016). WHO’s response to Zika virus and its associated complications.

IFRC, PAHO, WHO, UNICEF. Risk Communication and Community Engagement for Zika Virus Prevention and Control
General Overviews

The following resources are aimed at a variety of audiences: health professionals, the public, the military, childcare workers, emergency response professionals, and non-native English speakers. All are in the public domain, so images and text can be used to create your own material, with source attribution.

APHC. Zika Virus Fact Sheet 18-085-0216  

ASPR-TRACIE. Zika: Resources at your fingertips  
https://asprtracie.s3.amazonaws.com/documents/aspr-tracie-zika-virus-disease-resources-at-your-fingertips.pdf. Compiled by the US Department of Health and Human Services Office of the Assistant Secretary for Preparedness and Response, this document provides Zika virus resources (mostly federal) and an overview of public health and healthcare system Zika virus considerations and implications relevant to healthcare workers, emergency management stakeholders and other audiences.

California Department of Public Health. Zika Outreach and Education Materials.  
https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/ZikaOutreachandEducationMaterials.aspx. This website contains posters, talking points, graphics and sample tweets relating to Zika virus and pregnancy, sex, travel, and family planning. It also provides links to additional resources that can be used to educate the public about Zika virus.

California Department of Public Health (CDPH). Zika: What Californians Need to Know  
https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Zika.aspx. This is the CDPH Zika website, containing information for travelers, health professionals, laboratories, blood centers and others. It also offers monthly updates on California Zika cases, a list of countries and territories with active Zika virus transmission, and a map and city list of Aedes mosquitoes in California.

CDC. Overview. 
https://www.cdc.gov/zika/about/overview.html. The CDC Zika virus homepage provides basic information on the virus (modes of transmission, risk factors, symptoms, prevention strategies, etc.) for a general audience.

CDC. Questions about Zika  

CDC. The basics of the virus and how to protect against it  

CDC. Top 5 things everyone needs to know about Zika  

CDC. What we know and what we don’t know (about Zika)  

CDC. Zika 101.  

CDC. Zika: The basics of the virus and how to protect against it  

CDC. How Zika spreads.  

CDC. Is it flu or is it Zika?  

CDC. What can be done?  
CDC. What you need to know about Zika
This provides simple language about five basic things people need to know about Zika virus. A Spanish version is available from
https://espanol.cdc.gov/enes/zika/about/needtoknow.html. A low-literacy fact sheet version is also available in English from the CDC.

CDC. Sick with chikungunya, dengue or Zika?

CDC. Zika Action Day Event Toolkit – Event Guidance

CDC. Zika Basics Flipbook for Community Health Workers

CDC Zika Homepage
http://www.cdc.gov/zika/index.html. This is a gateway to additional information relating to Mosquito Control, Prevention and Transmission, and Symptoms, Testing and Treatment

ChildCare Aware of America. Children and Zika: What child care providers need to know
https://www.youtube.com/watch?v=k6mFuVOrw_q. This one-hour video discusses Zika virus prevention and awareness for childcare workers.

Chicago Department of Public Health Stop Zika website
https://www.stopzikachicago.org/. This website contains general information—available in English or Spanish—for travelers, pregnant women and healthcare providers.

Maine Zika Fact Sheet (2017-08-29)

Zika Virus. A Toolkit for Healthcare providers in Maine
https://cdn.ymaws.com/www.cste.org/resource/resmgr/Zika/Zika_Toolkit_082017_1.pdf. This provides an overview of information about Zika virus, and guidance for case investigation and follow-up, screening and testing, patient counseling and specimen submission. It also includes patient handouts.

NJ Department of Health. Zika Basics Slide Show
https://www.youtube.com/watch?v=kQApHb8akkA. A YouTube overview of Zika virus basics.

NJ Department of Health. Zika virus brochure for the public (English)

Ottawa County, Michigan Health Department. Zika Information.
https://www.miottawa.org/Health/OCHD/zika.htm. This is Ottawa County’s adaptation of general information from the CDC.

Vectorbase. A list of public health resources from the NIH.


History of Zika Virus in the United States.
Together, the following articles provide a history of Zika virus in the United States.


Local Mosquito-Borne Transmission of Zika Virus — Miami-Dade and Broward Counties, Florida, June–August 2016. MMWR, 2016;65(38):1032-1038. [https://www.cdc.gov/mmwr/volumes/65/wr/mm6538e1.htm](https://www.cdc.gov/mmwr/volumes/65/wr/mm6538e1.htm). As of July 22, 2016, the Florida Department of Health had identified 321 Zika virus disease cases in the state, most (but not all) occurring in travelers from areas with active Zika virus transmission or sexual contacts of recent travelers.

Travel-Associated Zika Virus Disease Cases Among U.S. Residents — United States, January 2015–February 2016. MMWR, 2016;65(11):286-289. [https://www.cdc.gov/mmwr/volumes/65/wr/mm6511e1.htm](https://www.cdc.gov/mmwr/volumes/65/wr/mm6511e1.htm). During January 1, 2015–February 26, 2016, a total of 116 residents of 33 US states and the District of Columbia had laboratory evidence of recent Zika virus infection, based on testing performed at CDC.

Update: Ongoing Zika Virus Transmission – Puerto Rico, November 1, 2015–April 15, 2016. MMWR, 2016;65(17):451-455. [https://www.cdc.gov/mmwr/volumes/65/wr/mm6517e2.htm](https://www.cdc.gov/mmwr/volumes/65/wr/mm6517e2.htm). In December 2015, Puerto Rico became the first US jurisdiction to report local Zika virus transmission. This article discusses the island’s Zika virus surveillance and public health response through April 15, 2016.

Update: Non-congenital Zika Virus Disease Cases — 50 U.S. States and the District of Columbia, 2016. MMWR, 2016;67(9):265-269. [https://www.cdc.gov/mmwr/volumes/67/wr/mm6709a1.htm?__cid=mm6709a1_w](https://www.cdc.gov/mmwr/volumes/67/wr/mm6709a1.htm?_cid=mm6709a1_w). A total of 5,168 non-congenital Zika virus disease cases with symptom onset during January 1 – December 31, 2016, were reported to ArboNET. This article provides a high-level description of those cases.

Social and Economic Implications of Zika

One of the extraordinary aspects of Zika is that it is a mosquito-borne virus that can subsequently be transmitted sexually and vertically, from mother to fetus. The virus’s versatility holds possible implications for reducing the stigma of sexually transmitted infections, for mosquito control in the United States, and for maternal and child health. It also raises concerns about the virus’s possible economic impacts in the US.

Can Zika Account for the Missing Babies? Frontiers in Public Health, 29 November 2017. [https://doi.org/10.3389/fpubh.2017.00317](https://doi.org/10.3389/fpubh.2017.00317). Brazil experienced a 15% drop in live births between September and December 2016, compared with the previous year, and this sharp drop is strongly correlated with the number of recorded Zika virus cases about 40 weeks earlier.

The Potential Economic Burden Of Zika In the Continental United States. PLOS Neglected Tropical Diseases, 2017;11(4):e0005531. [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5407573/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5407573/). According this study, a Zika attack rate of 0.3% across the six states at greatest risk of Zika emergence (AL, FL, GA, LA, MS, TX) would result in costs exceeding $0.5 billion. An attack rate of 1% would exceed $1 billion, and an attack rate of 2% would exceed $2 billion.


Media Coverage and Information

Print, broadcast and social media can all be used to convey information about Zika virus. The challenge for public health professionals is to get information out first and be the most authoritative voice. In addition, public health professionals may tap key partners to deliver their messages to specific audiences.

Zika virus: Public Health on High Alert as Mosquito Season Looms: Preparations Ramping up in States. APHA, The Nation's Health. https://www.apha.org/topics-and-issues/communicable-disease/zika This newsletter article describes efforts to prepare for the 2017 Zika season in the US.

CDC’s Beard: How We Can Protect Ourselves, and Each Other, From Zika. APHA, Public Health Newswire, 19 August 2016. www.publichealthnewswire.org/?p=15853 Ben Beard, chief of CDC’s Bacterial Diseases Branch, advises people to control mosquitos around the home, use protection when engaging in sex, and travel safely.

MedicineNet. Zika Vaccine Works in Early Human Trial. October 5, 2017. https://www.medicinenet.com/script/main/art.asp?articlekey=207414 The important take-away from this article is that Zika virus vaccines are under development.

National Public Health Information Coalition (NPHIC). Zika Virus https://www.nphic.org/cdc-zikasite This site provides links to information for the public (including pregnant women and other high-risk groups), healthcare providers, and other specific groups.

NJ Department of Health. Telemundo interview with Dr. Arturo Brito, Deputy Commissioner of Health (Spanish) http://www.nj.gov/health/er/njphtv.shtml Dr. Brito discusses the Zika virus.


NJ Department of Health. Zika Virus Public Service Announcement (English, Spanish) https://www.youtube.com/watch?v=HSr4CeL3QUs Commissioner of Health Cathleen Bennett delivers a public service announcement regarding Zika virus. The Spanish version is available at: https://www.youtube.com/watch?v=Q_HrCbjc5xA.
The epidemiology of Zika virus is evolving along with the virus itself. The following resources and tools deal primarily with human surveillance. See the “Vector Research/Management” section for information about mosquito surveillance.

**Surveillance and Surveillance Strategies**

These resources include some of the premier databases available to track and analyze Zika virus outbreak data. There are also articles that could provide suggestions for instituting surveillance in new enzootic and endemic areas, and two describing the benefits of collaboration with local military institutions.


**ArboNET: National surveillance system for arboviral diseases in the United States** [http://www.nationalacademies.org/hmd/~~/media/Files/Activity%20Files/Global/ZoonoticDisease/Presentation4Fischer.pdf](http://www.nationalacademies.org/hmd/~~/media/Files/Activity%20Files/Global/ZoonoticDisease/Presentation4Fischer.pdf) This 2008 power point presentation announces the creation of the ArboNET system. It predates the expansion of Zika virus into the United States but describes ArboNET data sources and the strengths and weaknesses of this surveillance system. Not all jurisdictions have access rights to the system.

**Assessing real-time Zika risk in the United States** [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5415743/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5415743/) Given Zika’s low incidence in the US and the geographic variability in suitable vector conditions, a cluster of reported cases may reflect diverse scenarios, ranging from independent introductions to a self-sustaining local epidemic. This paper presents a quantitative framework for real-time Zika virus risk assessment that captures uncertainty in case reporting, importations, and vector-human transmission dynamics.


**CDC and the Instituto Nacional de Salud of Colombia Collaborate to Understand Long-Term Effects of Zika Virus Infection During Pregnancy** [https://www.cdc.gov/media/releases/2016/p0902-cdc-colombia-collaboration.html](https://www.cdc.gov/media/releases/2016/p0902-cdc-colombia-collaboration.html) Since February 2016, CDC and the Instituto Nacional de Salud (INS) have collaborated on Proyecto VEZ (Vigilancia de Embarazadas con Zika) to implement enhanced surveillance of women infected with Zika during pregnancy in three sites across Colombia. CDC and INS hope to better understand the full range of potential health problems after Zika virus infection in pregnancy.

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CDC. Real-time Evolution of Zika Virus Disease Outbreak, Roatan, Honduras
https://wwwnc.cdc.gov/eid/article/23/8/pdfs/16-1944.pdf A description of the surveillance methods that identified an outbreak of Zika virus infection in the Honduras, in an area where chikungunya virus and dengue virus were also present.

CDC. West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control
https://www.cdc.gov/westnile/resources/pdfs/wnvGuidelines.pdf Although this is a guide for West Nile Virus, it provides a description of ArboNET, the national arboviral surveillance system managed by CDC and state health departments.

CDC. World Map of Areas with Risk of Zika

CDC. Zika IMS Jurisdiction and Partner Sustainment Strategy, March 23, 2017

Chicago Tribune. ‘Herd Immunity’ May Be Curbing US Zika Numbers

Expected Duration of Adverse Pregnancy Outcomes after Zika Epidemic. Emerging Infectious Diseases, 2018;24(1):127-130.
https://wwwnc.cdc.gov/eid/article/24/1/17-0482_article Mathematical modeling analysis using reported outcome data suggests that surveillance for adverse pregnancy outcomes should begin as soon as a Zika virus outbreak is detected and should continue for 40 weeks after the outbreak ends.

FDA. Prevention of Blood-Transfusion Transmission of Zika virus

http://www.cs.amedd.army.mil/FileDownloadpublic.aspx?docid=93b3cfcad-57c7-476c-8b37-c81b1fa190db Describes a collaboration between the Georgia health agency and military facilities within the state to expand the surveillance capacities of both.

History, Epidemiology, and Clinical Manifestations of Zika: A Systematic Review.

https://www.ice.gov/sites/default/files/documents/Report/2016/ACFRC-sc-16093.pdf On Page 117, ICE states its policy to screen detainees in the family residential centers for Zika virus. People found to be infected are to be provided counseling and medical care.

http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)31368-5.pdf Zika outbreaks in different locations and populations have revealed wide variance in the incidence of microcephaly. More data are needed on the characteristics of different infected populations and how these might affect such incidence. See also the associated editorial Risk of Zika-related Microcephaly: Stable or Variable? http://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(17)31478-2.pdf

https://www.cdc.gov/mmwr/volumes/67/wr/mm6709a1.htm?s_cid=mm6709a1_e In 2016, 5,168 non-congenital Zika virus disease cases were reported by US states and the District of Columbia. Most cases (4,897, 95%) were in travelers returning from Zika virus-affected areas. A total of 224 cases (4%) were acquired through presumed local mosquito-borne transmission, and 47 (1%) were acquired by other routes.

Zika Virus Preparedness Resources Toolkit


Zika Virus Case Definition

Case definitions provide standardization among jurisdictions to facilitate data analysis. Below are the approved definitions for a Zika virus case in the United States.


CSTE. Zika Virus Disease and Congenital Zika Virus Infection Interim Case Definition and Addition to the Nationally Notifiable Diseases List. 26 February 2016 https://www.cste2.org/docs/Zika_Virus_Disease_and_Congenital_Zika_Virus_Infection_Interim.pdf

Case Investigation

Resources in this section define “imported case” and “local transmission.” There are also links to information to help differentiate Zika from other mosquito-borne viruses like dengue and chikungunya. Perhaps the most important resource in this section is CDC’s toolkit for investigating possible mosquito-borne transmission of Zika virus.

CDC. Toolkit for Investigating Possible Local Mosquito-Borne Transmission of Zika Virus https://www.cdc.gov/zika/public-health-partners/epidemiologic-investigation-toolkit.html This is the web page for CDC’s epidemiologic tool kit. The toolkit itself is posted at https://www.cdc.gov/zika/pdfs/toolkit-user-guide.pdf It contains tools useful for investigations and a Zika case investigation algorithm. The homepage can lead you to forms to help case investigations, creating case line-lists, investigate possible transmission via blood transfusion, collect exposure information, create community surveys, and household and workplace survey and visit logs.


Chikungunya in North-eastern Italy: A Summing Up of the Outbreak. Euro-surveillance, 2007;12(47): pii=3313. https://www.eurosurveillance.org/content/10.2807/esw.12.47.03313-en Although not focused on Zika, this article describes an outbreak in northern Italian towns with a recently established population of Aedes albopictus mosquitoes and a population of immigrants and refugees with chikungunya virus. Insufficient vector control contributed to the outbreak.


Contact Tracing

Contact tracing (now also referred to as partner notification or partner services) was first employed to control the spread of sexually transmitted infections (STIs), but is also relevant to prevent sexually transmitted cases of Zika virus. CDC toolkits contain resources for documenting visits to homes, workplaces and other sites where health officials are looking for primary and secondary cases. The Science Translational Medicine article describes a novel disease prevention practice that combines contact tracing with targeted insecticide spraying.
CDC. Toolkit for Investigating Possible Local Mosquito-Borne Transmission of Zika Virus: Household Survey Form
https://www.cdc.gov/zika/public-health-partners/household-survey-form.docx  Household member survey forms for tracking visits of index case household and neighboring households targeted for the community survey. The tool can be used to collect household member interview and specimen collection information.

CDC. Toolkit for Investigating Possible Local Mosquito-Borne Transmission of Zika Virus: Household/Workplace Visit Log
https://www.cdc.gov/zika/public-health-partners/visit-log.pdf  Can be used for tracking investigative visits to households and workplaces and other locations, where one would look for primary and secondary cases within such settings.

Combining contact tracing with targeted indoor residual spraying significantly reduces dengue transmission. Science Translational Medicine, 2017;3(2):e1602024. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5315446/  The authors investigated the epidemiological value of location-based contact tracing (identifying potential out-of-home exposure locations by phone interviews) to determine where to target insecticide spraying.

**Recent Travel**

While investigating possible risks and cases of Zika virus exposure, public health officials and clinicians will need to ask people about travel to areas with active Zika transmission.

CDC. Guidance for Areas of Local Zika Transmission in the Continental United States and Hawaii

CDC. Zika travel information

NJ Department of Health. Track When You’re Back Video
https://www.youtube.com/watch?v=0TOVYOabIV4 &feature=youtu.be  New Jersey State Epidemiologist Tina Tan shares “Track when you’re back” campaign messages.

**High Risk Populations**

*e.g. pregnant women*

Some groups face higher risks for subsequent disease transmission or for adverse health outcomes following Zika virus exposure. This sections details advice for these special populations. [Many of the CDC fact sheets are available in multiple languages at: https://www.cdc.gov/pregnancy/zika/protect-yourself.html.]

CDC. Doctor’s Visit Checklist

CDC. US Zika Pregnancy Registry. What Pregnant Women Need to Know

CDC. Men and Zika

CDC. Pregnant and Worried About Zika? Zika Prevention Kit for Pregnant Women

CDC. Pregnant and Living in an Area With Risk of Zika?

CDC. Pregnant and in an Area with Zika? Protect your pregnancy
CSTE Zika Virus Preparedness Resources Toolkit

**CDC. Pregnant? Read this before you travel**

**CDC. Thinking about having a baby? Plan your pregnancy**

**CDC. What to Know if Your Baby Was Born with Congenital Zika Syndrome**

**CDC. What to know if your doctor suspects microcephaly during pregnancy**

**CDC. Zika Pregnancy Registry: What Parents Need to Know**

**Center for Infectious Disease Research and Policy. Brazilian Study Sheds New Light on Zika Neuro Complications In Adults**

**Measures Taken to Prevent Zika Virus Infection During Pregnancy – Puerto Rico, 2016. MMWR, 2017;66(22):574-578.**
https://www.cdc.gov/mmwr/volumes/66/wr/mm6622a2.htm?s_cid=mm6622a2_w

**WA Department of Health. Zika Screening Questions.**
http://www.cste.org/resource/resmgr/Zika/Zika_Screening_Questions_2di.pdf

**WA Department of Health. Zika Intake Form.**
http://www.cste.org/resource/resmgr/Zika/Zika_Intake_Form_2dii.pdf

**Sexual Transmission**

While investigating possible risks and cases of Zika virus exposure, public health officials and clinicians will need to ask potentially exposed individuals about their sexual contacts during the infectious stage and counsel them about risk-reducing strategies.

**CDC. Clinical Guidance for Healthcare Providers for Prevention of Sexual Transmission of Zika Virus**

**CDC. Condom Use Palm Card**

**CDC. Guidance for Areas of Local Zika Transmission in the Continental United States and Hawaii**

Outlines recommendations for travel, prevention, testing and preconception counseling for pregnant women and couples considering conception in areas of active Zika virus transmission.

**CDC. LGBT Community: How to Protect Yourselves from Zika**

**CDC. Zika and Sex: Information for Pregnant Women in Areas with Risk of Zika**

**CDC. How to Protect Yourself From Getting Zika From Sex. Information for People Whose Partner Traveled to an Area with Risk of Zika**

**CDC. How to Protect Yourself From Getting Zika From Sex. Information for People Living in Areas with Risk of Zika**
**Mosquito Avoidance**

**CDC. Prevent Mosquito Bites**

**How to Avoid Mosquito Bites**
https://www.wikihow.com/Avoid-Mosquito-Bites  This wikiHow webpage explains strategies to prevent mosquito bites, avoid mosquito habitats and eliminate individual mosquitoes. Intended for the general public.

**6 Ways To Stop Mosquito Bites—And 6 Common Tactics That Just Don't Work.** Prevention Magazine, August 2015.
https://www.prevention.com/health/stop-mosquito-bites

Some common sense, and some not so obvious ways, to make it difficult for a mosquito to bite you.

**Abstaining From Sexual Relations or Using Condoms Correctly**

**CDC. Pregnant and Worried About Zika?**
Zika Prevention Kit for Pregnant Women

**CDC. Condoms**

**CDC. Sexual Transmission and Prevention of Zika**

**CDC. Travelers Can Protect Themselves from Zika.**
Zika Prevention Kit for Travelers

**Virginia Department of Health. Sexual Transmission of Zika Virus**

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**CDC. Zika Can Pass Through Sex**

**Investigating the Sexual Transmission of Zika Virus.**
The Lancet, 2018;6:e24-e25.
http://www.thelancet.com/pdfs/journals/langlo/PIIS2214-109X(17)30419-9.pdf  This commentary summarizes a WHO Zika Sexual Transmission Research Group meeting held in March 2017. In the absence of methodologically rigorous population-based studies, the epidemiology of sexually transmitted Zika virus remains poorly understood. To help remedy this information gap, the Group developed a sexual transmission framework describing seven variables and their inter-relationships: incubation period, serial interval, duration of infectiousness, probability of transmission per sex act, reproductive number, transmission rate through sexual contact, and susceptibility to Zika virus infection through sexual contact.

https://www.cdc.gov/mmwr/volumes/65/wr/mm6539e1.htm

**Investigating a Suspect Locally-acquired Zika Case**

It is important that areas near Zika enzootic and endemic locations have a high index of suspicion that the virus has spread into their jurisdiction.

**Screening Criteria for Ophthalmic Manifestations of Congenital Zika Virus Infection**
https://jamanetwork.com/journals/jamapediatrics/fullarticle/2636587  All infants with prenatal Zika exposure need an eye exam.

**NJ Department of Health. Zika Testing Criteria**

**Prevention Measures for Recent Case**

There are two major strategies for preventing transmission from a recently-occurring Zika case: avoiding mosquitoes and engaging in safe sexual practices.
Forms

Each public health jurisdiction has its own surveillance data forms. Many are suggested by the federal government to assure standardization of data reported by jurisdictions to the federal government.

Armed Forces Pest Management Board
http://www.acq.osd.mil/eie/afpmb/. Look under “Zika Virus Preparation” and click on “Vector Surveillance Log” to see a sample vector surveillance data collection form.

Educational Materials

These two resources describe Zika virus surveillance efforts and the rationale behind them.

CDC. (Zika Virus) Reporting and Surveillance. https://www.cdc.gov/zika/reporting/index.html This webpage describes the sources and uses of Zika virus surveillance data.

Zika Virus Surveillance and Preparedness – New York City, 2015-2016, MMWR, 2016;65(24). https://www.cdc.gov/mmwr/volumes/65/wr/mm6524e3.htm This article describes the surveillance and public education efforts of the New York City Department of Health and Mental Hygiene.
There are many data management systems in place in public health departments and public health laboratories. Some were created in-house, using public domain or other software, while others are proprietary creations of private consulting firms. CDC’s ArboNET is the nation’s comprehensive, public health surveillance data management system for Zika and other arthropod-borne viruses.

CDC. ArboNET Login Information. https://wwwn.cdc.gov/arbonet/ All health departments that report arthropod-borne virus data directly to the CDC have access to this system. Others may request access here: https://wwwn.cdc.gov/arbonet/Register.aspx

CDC. West Nile Virus Surveillance Resources. https://www.cdc.gov/westnile/resourcepages/survresources.html This web page, created for West Nile virus, provides background on ArboNET, CDC’s national arboviral surveillance system. In addition to cases of human disease, ArboNET maintains data on arboviral infections among presumptive viremic blood donors, veterinary disease cases, mosquitoes, dead birds, and sentinel animals.

Laboratory confirmation of infection is a critical component of surveillance and especially important to distinguish among Zika, dengue and chikungunya infections. By July 2016, all state public health laboratories were able to test for the virus using IgM enzyme-linked immunosorbent assays (ELISA), real-time polymerase chain reaction tests (RT-PCR), and/or plaque-reduction neutralization test (PRNT) assays.

Testing Algorithms

The CDC provides public health laboratories with recommend testing guidelines. All Laboratory Response Network member laboratories follow these guidelines and use CDC’s standardized test reagents.

APHL Responds to Zika
https://www.aphl.org/programs/preparedness/Crisis-Management/Pages/Zika.aspx A compendium of laboratory guidance documents can be found at this site.

CDC. Guidance for US Laboratories Testing for Zika Virus Infection, July 24, 2017
https://www.cdc.gov/zika/laboratories/lab-guidance.html Provides an overview of Zika virus testing, overview of updates to testing guidance, and information about biosafety, and testing methods for various populations.

CDC. Collecting and Submitting Specimens at Time of Birth for Zika virus Testing

CDC. Interim Guidance for Zika Virus Testing of Placental, Fetal or Infant Autopsy Tissues

CDC. Interim Guidance. Evaluation and Testing for Infants with Possible Zika Infection

CDC. Blood and Tissue Safety

https://www.cdc.gov/mmwr/volumes/65/wr/mm6518e1.htm

https://www.cdc.gov/zika/pdfs/denvchikvzikv-testing-algorithm.pdf This memo from CDC’s Division of Vector-borne Diseases outlines Zika virus testing options, as of February 7, 2016.

CDC. Zika Virus Testing Guidance

CDC. Updated Interim Pregnancy Guidance: Asymptomatic Pregnant Women with Possible Zika Virus Exposure

CDC. Interpretation Table for Nucleic Acid and Antibody Tests for Zika Virus Infection

FDA. Zika Virus Emergency Use Authorization.
https://www.fda.gov/MedicalDevices/Safety/EmergencySituations/ucm161496.htm This webpage describes tests permitted for Zika virus detection under the US Food and Drug Administration’s February 26, 2016, emergency use authorization.
http://jcm.asm.org/content/56/1/e01115-17.long

Using plaque reduction neutralization tests, researchers found that positive IgM test results could not distinguish among infection with Zika virus, dengue virus or unspecified flaviviruses. A positive IgM result should be considered a presumptive positive and not evidence of a confirmed infection.

http://bit.ly/2knsYhf Registered users can access a discussion of laboratory testing algorithms. (Online registration is available.)

FDA Approves First Test for Screening Zika Virus in Blood Donations
https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm579313.htm
The U.S. Food and Drug Administration has approved the cobas Zika test to screen donated blood for the Zika virus.

WebMD. Rapid, Easy Zika Test Developed.
https://www.webmd.com/a-to-z-guides/news/20170927/rapid-easy-zika-test-developed
This article describes a "dipstick" test for Zika and dengue viruses.

Sample Testing Algorithms Used by States and Local Jurisdictions

Although CDC-funded jurisdictions adhere to CDC guidance, they may differ in their reporting requirements, data forms, and test submission protocols. Below are samples state testing algorithms and protocols..

Indiana State Department of Health. Scenario Review: Who Should Be Tested?
http://www.cste.org/resource/resmgr/Zika/Scenario_Review_Who_Should_B.pdf This brief power point presentation provides guidance on testing in different patient scenarios.

Indiana State Department of Health. ISDH Zika Virus Testing Authorization Form.
http://www.cste.org/resource/resmgr/Zika/Zika_Virus_Authorization_Fo.pdf

Clinical Decision Support for Public Health and Healthcare Providers

Although the preponderance of clinical decision guidance comes from the CDC, below are examples from some professional organizations and health departments. The advice will be generally consistent but may emphasize different professional foci or have other minor differences.

ACOG. Clinical Practice: Updated Practice Guidance on Zika: New Information Available
https://www.acog.org/About-ACOG/ACOG-Departments/ACOG-Rounds/March-2016/Zika-Virus
Find prevention, management and treatment advice for obstetricians and gynecologists.

http://bestpractice.bmj.com/topics/en-gb/1302 Find a comprehensive summary of clinical practice advice, based on materials published in the professional literature.
CSTE Zika Virus Preparedness Resources Toolkit

CDC. (Advice) For Healthcare Providers
This page provides links to clinical evaluation and testing protocols for evidence of Zika virus infections.

CDC. Assessment of Infant Hearing for Infants Testing Positive for Zika Virus Infection
https://www.cdc.gov/mmwr/volumes/66/wr/mm6641a1.htm?s_cid=mm6641a1_w
Recommendations for testing children suspected of being infected with Zika virus.

CDC. Blood and Tissue Safety: Geographic Areas With Zika Virus Transmission Risk

Zika Virus Disease: A CDC Update for Pediatric Health Care Providers Update: Interim Guidance for the Diagnosis, Evaluation, and Management of Infants with Possible Congenital Zika Virus Infection — United States, October 2017
https://www.cdc.gov/mmwr/volumes/66/wr/mm6641a1.htm?s_cid=mm6641a1_w  Clinical guidance for pediatricians  http://pediatrics.aappublications.org/content/early/2016/03/22/peds.2016-0621

American College of Obstetricians and Gynecologists. Practice Advisory Interim Guidance for Care of Obstetric Patients During a Zika Virus Outbreak
https://www.acog.org/Clinical-Guidance-and-Publications/Practice-Advisories/Practice-Advisory-Interim-Guidance-for-Care-of-Obstetric-Patients-During-a-Zika-Virus-Outbreak

CDC. When to Test for Zika Virus

CDC. Guidance for Follow-up Care for Infants Born to Women with Possible Zika Virus Exposure

CDC. Key Zika considerations for health care settings

CDC. Measuring Head Circumference

- English https://www.youtube.com/watch?v=HWV1JdAhsSo
- Spanish https://www.youtube.com/watch?v=tPBxKLIj0
- Italian https://www.youtube.com/watch?v=Doy1L-ZeMvs
- French https://www.youtube.com/watch?v=SxDbKa7KBlc
- Creole https://www.youtube.com/watch?v=eYbGYoJ9guo

CDC. Spotlight on California Birth Defects Monitoring Program
https://www.cdc.gov/about/24-7/cdcresponders-zika/California.html  Examines California’s use of its birth defects monitoring systems to identify congenital defects due to Zika virus.

CDC. Symptoms (of Zika virus)

CDC. Treatment for Zika
https://www.cdc.gov/zika/symptoms/treatment.html  Treat the symptoms; there are no medications for the virus.

CDC. What to Know if Your Baby May Have Been Affected by Zika But Has No Related Health Conditions at Birth

CDC. What to Know if Your Baby Was Born with Congenital Zika Syndrome

CDC. Zika Pregnancy Registry: How Health Departments Can Participate


Florida Department of Health. Zika Free Florida. https://zikafreefl.org/healthcare-providers/ This website contains assorted information for healthcare providers. Providers may opt to join Zika Care Connect (https://www.zikacareconnect.org/), which provides information about caring for patients affected by Zika.


MA Department of Public Health. Webinar on Zika practice and guidelines. Beyond microcephaly: Post-delivery follow-up for Zika-exposed infants. http://bit.ly/2zeZe7U Registered users can access a discussion of potential medical and social services for Zika-exposed infants. (Online registration is available.)


Update: Interim Guidance for Health Care Providers Caring for Pregnant Women with Possible Zika Virus Exposure — United States (Including U.S. Territories), July 2017. MMWR, 2017;66(29):781-793. https://www.cdc.gov/mmwr/volumes/66/wr/mm6629e1.htm?s_cid=mm6629e1_w CDC no longer recommends routine Zika virus testing for asymptomatic pregnant women without ongoing exposure to Zika virus. Because of this change, it is critical that pediatric healthcare providers ask about possible maternal and congenital Zika virus exposure for every newborn.


Washington State Department of Health. Provider Guidance: Infants with Anomalies Consistent with Congenital Zika Virus Syndrome Unsupported by Testing (2016-06-09). http://www.cste.org/resource/resmgr/Zika/Guidance_for_incomp_neg_test.pdf The purpose of this checklist is to provide LHJs with guidance on testing and follow-up for infants with anomalies consistent with congenital Zika syndrome when 1) mothers previously tested negative for Zika virus and all maternal exposure occurred completely within the testing window or 2) mothers have not completed the testing algorithm.

WHO (2016). Psychosocial Support for Pregnant Women and for Families with Microcephaly and Other Neurological Complications in the Context of Zika Virus. Interim Guidance for Health-care Providers. http://who.int/csr/resources/publications/zika/psychosocial-support/en/ Although focused on microcephaly, many of the described supports—accurate information, supportive communication, etc.—also apply to other neurological conditions that may be associated with Zika virus.


Forms
Sample health department forms for Zika virus surveillance and testing.


Educational Materials
These fact sheets and webpages reflects efforts to provide Zika virus test advice to the public.


CDC. Make Sure to Get Your Zika Test Results https://www.cdc.gov/zika/pdfs/TestResultsCard.pdf


Given Zika virus’s sexual transmissibility, birth control and sexual risk reduction are important elements of a prevention and control strategy. In addition, infants born to Zika-exposed women require special attention, involving multiple medical, laboratory, and social/family services, at birth and as an infected child grows.


California Department of Public Health. Zika Virus Exposure Patient Self-Assessment Form [https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ZikaVirusExposureSelfAssessmentForm.pdf](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/ZikaVirusExposureSelfAssessmentForm.pdf) A checklist for patients to identify Zika virus exposure risks, possible symptoms of Zika virus infection, and risk factors for Zika virus transmission.


MMWR. Update: Interim Guidance for Health Care Providers Caring for Pregnant Patients with Possible Zika Virus Exposure – United States (including US Territories), July 2017 [https://www.cdc.gov/mmwr/volumes/66/wr/mm6629e1.htm?s_cid=mm6629e1_e](https://www.cdc.gov/mmwr/volumes/66/wr/mm6629e1.htm?s_cid=mm6629e1_e)


California Department of Public Health. Updated Zika Guidance for Healthcare Providers Caring for Pregnant Women [https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/UpdatedZikaGuidanceforHCPsCaringforPregnantWomen.pdf](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/UpdatedZikaGuidanceforHCPsCaringforPregnantWomen.pdf) Released August 2, 2017. There are some differences between California’s guidance and CDC’s July 24, 2017, updated guidance. For example, CDPH has decided to maintain the previous recommendations to test all asymptomatic pregnant women with possible, recent Zika virus exposure, regardless of whether the exposure is ongoing.
March of Dimes. Zika Care Connect
https://www.zikacareconnect.org/ Zika Care Connect (ZCC) provides healthcare professionals with a searchable network and the latest medical information from CDC about caring for patients affected by Zika. The ZCC website allows anyone to search for medical specialists in their local area.

HealthDay. Zika Hijacks Pregnant Woman’s Immune System

Awareness, Beliefs, and Actions Concerning Zika Virus Among Pregnant Women and Community Members — U.S. Virgin Islands, November–December 2016. MMWR, 2017;66(34):909-913. https://www.cdc.gov/mmwr/volumes/66/wr/mm6634a4.htm?s_cid=mm6634a4_e This article details results from a late 2016 survey of US Virgin Islands residents. Respondents were generally aware of the dangers of Zika virus but did not often take steps to prevent exposure. They did, however, support pesticide spraying.

Pregnancy Outcomes After Maternal Zika Virus Infection During Pregnancy — U.S. Territories, January 1, 2016–April 25, 2017. MMWR, 2017;66(23):615-621. https://www.cdc.gov/mmwr/volumes/66/wr/mm6623e1.htm In US territories, 5 percent of women with confirmed Zika virus infection during pregnancy had a fetus or baby with Zika virus-associated birth defects. Among the women with confirmed Zika infection during the first trimester, 8 percent, or nearly 1 in 12, had a fetus or baby with Zika virus-associated birth defects. This report, the first from the US territories, represents the largest number of completed pregnancies with laboratory confirmation of Zika virus infection to date.


Update: Interim Guidance for the Diagnosis, Evaluation, and Management of Infants with Possible Congenital Zika Virus Infection — United States, October 2017. MMWR, 2017;66(41):1089-1099. https://www.cdc.gov/mmwr/volumes/66/wr/mm6641a1.htm?s_cid=mm6641a1_e This updated guidance addresses concerns about the unknown sensitivity and specificity of currently available diagnostic tests for congenital Zika virus infection and recognizes additional clinical findings associated with congenital Zika virus infection.

Population-Based Surveillance of Birth Defects Potentially Related to Zika Virus Infection — 15 States and U.S. Territories, 2016. MMWR, 2018;67(3):91-96. https://www.cdc.gov/mmwr/volumes/67/wr/mm6703a2.htm?s_cid=mm6703a2_w In 15 US jurisdictions, researchers found 2,962 infants and fetuses that met the case definition. Prevalence of birth defects strongly linked to Zika virus infection increased significantly in areas with local Zika virus transmission.


Zika Virus-Associated Neonatal Birth Defects Surveillance — Texas, January 2016–July 2017. MMWR, 2017;66(31):835-836. https://www.cdc.gov/mmwr/volumes/66/wr/mm6631a5.htm?s_cid=mm6631a5_w Texas authorities enhanced surveillance for Zika infections among pregnant women following reports of local transmission in November 2016. Yet, Zika testing was not performed in 57% of the women giving birth during this study period.

NJ Department of Health. Maternal Child Health Provider Resource List http://www.nj.gov/health/cd/documents/Provider%20Resource%20Table%2007.25.16.pdf This is a list of resources and contact information for pregnant women and infants affected by Zika.

Investigating Cases of Congenital Zika Virus

Zika virus testing following a stillbirth or newborn death is extremely important. The immediate postpartum period is a sensitive time for the family, and follow-up can be challenging in a hospital with pathologists unused to this testing need. Communication with CDC’s Infectious Disease Pathology Branch is advisable. Reach them at pathology@cdc.gov or 404-639-3043.

Zika Testing After a Stillbirth or Newborn Death

Obtaining test specimens after a stillbirth or newborn death can be challenging, and communication with the CDC Infectious Disease Pathology Branch may be necessary to determine the appropriate specimen matrix and test assay. The branch can be contacted at pathology@cdc.gov or 404-639-3043. (If using e-mail, include brief clinical information and relevant digital images, if available.)

CDC. Collecting & Submitting Specimens at Time of Birth for Zika Virus Testing

https://www.cdc.gov/zika/hc-providers/test-specimens-at-time-of-birth.html Laboratory testing for congenital Zika virus infection is recommended for infants born to mothers with laboratory evidence of Zika virus infection during pregnancy and infants with clinical findings suggestive of congenital Zika virus syndrome and a maternal epidemiologic link suggesting possible transmission, regardless of maternal Zika virus test results.

Longitudinal Birth Defects Case Follow-up

The national Pregnancy Risk Assessment Monitoring System now tracks outcomes associated with neonatal Zika infections. CDC also supports state and local surveillance systems that focus on Zika-related impacts.


Health and Development at Age 19–24 Months of 19 Children Who Were Born with Microcephaly and Laboratory Evidence of Congenital Zika Virus Infection During the 2015 Zika Virus Outbreak — Brazil, 2017. MMWR, 2017; 66(49):1347-1351. https://www.cdc.gov/mmwr/volumes/66/wr/mm6649a2.htm?s_cid=mm6649a2_e By two years of age, children with Zika infections have severe health and developmental challenges, including seizures, an inability to sit independently, and problems sleeping, feeding, hearing and seeing.
Case Management and Linkage

Case management and long-term follow-up of Zika-infected infants requires collaboration and coordination among medical and social service professionals.

CDC. Additional Resources for Healthcare Providers
https://www.cdc.gov/pregnancy/zika/testing-follow-up/additional-resources.html This webpage describes Zika Care Connect, a set of resources for clinicians caring for patients affected by Zika virus.

CDC. 2017 Forum on Diagnosis, Evaluation and Management
https://www.cdc.gov/pregnancy/zika/testing-follow-up/webcast-clinichevalution.html Here you can access the July 2016 webcast, Clinical Evaluation & Management of Infants with Congenital Zika Infection, which includes three presentations:
Welcome: Clinical Evaluation and Management of Infants with Congenital Zika Infection
https://www.youtube.com/watch?v=6P6008JbfIE
Caring for Children with Complex Medical Needs
https://www.youtube.com/watch?v=R9rfmc4011o
Presentations of Group Discussions
https://www.youtube.com/watch?v=5qnTj5BRMtY

http://www.tandfonline.com/doi/full/10.3109/14767058.2016.1174210 Zika virus infection can have profound impacts on the fetus and newborn. Obstetric healthcare providers must keep abreast of evolving management and prevention practices.

https://www.cdc.gov/mmwr/volumes/66/wr/pdfs/mm6641.pdf See page 1094 and following for a discussion of case management and care linkages. A key point to note is that management and follow-up require oversight from a responsible primary care physician.

https://www.cdc.gov/mmwr/volumes/66/wr/mm6613e1.htm#contribAff This article describes recommendations for follow-up care for infants born to women with evidence of prenatal Zika virus infection.

Resources for Parents

Find information for parents about current recommendations for managing the health of (possibly) Zika-infected children, including recommended follow-up testing and clinical evaluations and possible social service needs.

CDC. Ideas for Talking to Your Children About Zika.

CDC. Zika Activity Book: Mosquito Bites are Bad! (For Children in Areas with Zika)

CDC. Zika Activity Book: Mosquito Bites are Bad! (For Children in the United States)

CDC. Zika Pregnancy Registry: What Parents Need to Know

CDC. The US Zika Pregnancy and Infant Registry.
https://www.cdc.gov/pregnancy/zika/research/registry.html This provides more information about the purposes and uses of the Zika Pregnancy registry.

Maine Center for Disease Control and Prevention. Zika Infographic for Pregnant Women.
http://www.cste.org/resource/resmgr/Zika/Zika_infographic_SE.pdf
Educational Materials

The following are educational materials for the public.

**Bedside. Birth Control Methods**
[https://www.bedsider.org/methods](https://www.bedsider.org/methods)  A review of birth control methods on a website recommended by the CDC.

**California Department of Public Health. Protect Yourself and Your Unborn Baby From Zika.**
(Ad Banner)

**CDC. Going to the American tropics?**

**CDC. Mosquito Bite Prevention for Travelers**

**CDC. Pregnant? Protect Yourself from Mosquito Bites**
[https://stacks.cdc.gov/view/cdc/37913](https://stacks.cdc.gov/view/cdc/37913)  A Zika prevention poster produced by the CDC.

**CDC. Protecting Camp Staff and Campers**

**CDC. Protecting Children in Areas with Zika.**

**CDC. Protecting Children in Puerto Rico from Zika**
[https://stacks.cdc.gov/view/cdc/40401](https://stacks.cdc.gov/view/cdc/40401)

**CDC. Recently in the American Tropics?**
[https://www.cdc.gov/chikungunya/pdfs/Arbovirus_inbound_11x14_508.pdf](https://www.cdc.gov/chikungunya/pdfs/Arbovirus_inbound_11x14_508.pdf)  A Zika prevention poster.

**CDC. Spring Break on Your Mind?**

**CDC. Travelers Can Protect Themselves from Zika**

**CDC. What We Know. And What We Don’t Know**

**NJ Department of Health. Zika Advisory**
The primary vector of Zika virus is the *Aedes aegypti* mosquito, which lays eggs in association with temporary pools of water. Both natural (e.g., tree holes) and human-made (e.g., plant pot saucers) containers can serve as mosquito breeding sites, potentially bringing mosquitoes closer to areas of human habitation. Mosquito prevention and control involves a careful mix of environmental spraying on the population level, use of mosquito repellents on the personal level, and alteration of human behavioral and environmental actions.

**Mosquito Trapping/Field Collection Methods**

Per CDC, adult mosquito monitoring is used to determine the abundance of adult vector mosquitoes and to identify areas where control measures are needed. It is also useful to assess the effectiveness of intervention methods. Currently, testing mosquitoes for Zika virus is not recommended, as this virus does not have a known animal reservoir outside of humans in the United States, and there is no expected advantage to be obtained over good human surveillance programs.


Local Mosquito-borne Transmission of Zika Virus: Miami-Dade and Broward Counties, June-August 2016. MMWR, 2016;65(38):1032-1038 [https://www.cdc.gov/mmwr/volumes/65/wr/mm6538e1.htm](https://www.cdc.gov/mmwr/volumes/65/wr/mm6538e1.htm) An account of the initial Florida case investigations.


Florida Medical Entomology Laboratory. Identification Guide to Common Mosquitoes of Florida. [http://fmel.ifas.ufl.edu/fmel---mosquito-key/](http://fmel.ifas.ufl.edu/fmel---mosquito-key/) This guide includes quick genera keys, species identification tables, and information on basic mosquito anatomy.

Georgia’s Collaborative Approach to Expanding Mosquito Surveillance in Response to Zika Virus: A Case Study [https://www.ncbi.nlm.nih.gov/pubmed/28511272](https://www.ncbi.nlm.nih.gov/pubmed/28511272) This case study describes and evaluates Georgia’s mosquito surveillance capacity before and after the declaration of Zika virus as a public health emergency. This brings you to the abstract of the journal article. You may need help from a hospital, medical/public health school, or health department librarian to obtain the complete article.


Environmental Control after Local Transmission

What steps should be taken when a human case of Zika virus infection is likely due to local transmission via mosquito bite? After getting a detailed local travel history, an examination of areas of likely exposure should reveal possible and actual mosquito breeding sites. Treatment and remediation procedures will then be necessary.


AFPMB. Department of Defense Guidance for the Surveillance, Control and Testing of Ae. aegypti, Ae. albopictus or Ae. polynesiensis for Zika Virus. http://www.acq.osd.mil/eie/afpmb/docs/zika/Strategy_Control_Zika_Virus.pdf This memorandum establishes a Department of Defense strategy for vector surveillance, testing, and control on military installations and housing areas where the named mosquitoes are present.


CSTE Zika Virus Preparedness Resources Toolkit

**Tip and Toss**

One of the leading strategies for reducing or eliminating container breeding mosquitoes is to “tip and toss” peri-domestic containers to drain small pools of water.

“Tip and Toss” – A Homeowner’s Guide to Preventing Mosquito-borne Disease
http://www.wcu.edu/WebFiles/PDFs/Mosquito_Tip_and_Toss.pdf  A fact sheet from Western Carolina University.

**Larviciding, Adulticiding**

Chemical pesticides can be used to reduce or eliminate larval and adult populations of vector mosquito species.

Biomedical Advanced Research and Development Authority. BARDA Backs Food-grade Compound As Repellent Against Zika-Carrying Mosquitoes

CDC. Information on Aerial Spraying.
Information about aerial spraying for mosquito control. Also available in Spanish at https://espanol.cdc.gov/enes/zika/vector/aerial-spraying.html
CDC. Did You Know: Important Information about Aerial Spraying for Mosquito Control

CDC. Get Rid of Mosquitoes at Home
https://stacks.cdc.gov/view/cdc/42594/Share Simple ideas for mosquito control around the home

CDC. Information on Aerial Spraying

CDC. Prevent Mosquito Bites

CDC. Larvicides Kill Young Mosquitoes
- Bengali https://stacks.cdc.gov/view/cdc/40649
- Chinese https://stacks.cdc.gov/view/cdc/40650
- Japanese https://stacks.cdc.gov/view/cdc/40651
- Korean https://stacks.cdc.gov/view/cdc/40652
- Marshallese https://stacks.cdc.gov/view/cdc/40653
- Russian https://stacks.cdc.gov/view/cdc/40654
- Samoan https://stacks.cdc.gov/view/cdc/40655
- Spanish https://stacks.cdc.gov/view/cdc/40656
- Tagalog https://stacks.cdc.gov/view/cdc/40657
- Tongan https://stacks.cdc.gov/view/cdc/40658
- Palauan https://stacks.cdc.gov/view/cdc/40659

CDC. Mosquito Control During an Outbreak.

CDC. Mosquito Control: Keep Mosquitoes Out of Your Septic Tank

CDC. Mosquito Control: Protect Your Family Outside Your Home
https://www.cdc.gov/zika/prevention/prevent-mosquito-bites.html This is a webpage with information on a variety of measures one can employ to protect against mosquito bites.

CDC. Mosquito Control: What State and Local Mosquito Control Programs Do

CDC. Mosquito Control: What You Need to Know about Filling Tree Holes

CDC. Mosquito Control: What You Need to Know about Indoor Spraying

CDC. Mosquito Control: What You Need to Know about Outdoor Spraying
CSTE Zika Virus Preparedness Resources Toolkit

EPA. Repellents: Protection Against Mosquitoes, Ticks and Other Arthropods
https://www.epa.gov/insect-repellents
This is the EPA’s homepage regarding insect repellents, with links to many related topics:
  Disease Risk from Mosquito and Tick bites: https://www.epa.gov/insect-repellents/risk-disease-mosquito-and-tick-bites
  What is an insect repellent? https://www.epa.gov/insect-repellents/what-insect-repellent
  Find the Repellent that is Right for You: https://www.epa.gov/insect-repellents/find-repellent-right-you
  Regulation of Skin-Applied Repellents: https://www.epa.gov/insect-repellents/regulation-skin-applied-repellents
  Repellency Awareness Graphic: https://www.epa.gov/insect-repellents/repellency-awareness-graphic
  Skin-Applied Repellent Ingredients: https://www.epa.gov/insect-repellents/skin-applied-repellent-ingredients

WHO. Mosquito control: Can It Stop Zika At Its Source?
http://www.who.int/emergencies/zika-virus/articles/mosquito-control/en/ Mosquito control is complex, costly, and blunted by the spread of insecticide resistance. Moreover, some control measures are not readily accepted by the public. Integrated approaches that tackle all mosquito life stages and fully engage professional partners and the public are key to success.

Environmental Health Professionals Conduct Mosquito Surveillance

The following articles describe environmental health professionals’ mosquito surveillance activities.

Reported Distribution of Aedes (Stegomyia) aegypti and Aedes (Stegomyia) albopictus in the United States, 1995-2016 (Diptera: Culicidae). Journal of Medical Entomology, 2016;53(5):1169-1175. https://academic.oup.com/jme/article/53/5/1169/1751696 Based on mosquito trapping records, this article asserts that finding Aedes aegypti and/or Aedes albopictus species in a location once does not mean it is an established species. A mosquito species is more likely to be established if it is found multiple times in multiple successive years.

NPR. Here’s Really Where Zika Mosquitoes are Likely in the US. http://www.npr.org/sections/health-shots/2016/06/13/481606093/heres-really-where-zika-mosquitoes-are-likely-in-the-u-s This is a newscast text based on the Journal of Medical Entomology article cited above.

USDA Wants Citizen Scientists to Help Fight Zika http://www.denverpost.com/2016/05/16/usda-wants-citizen-scientists-to-help-fight-zika/ A Denver Post article describing how the USDA is exploring the use of crowdsourcing as a budget-conscious way of mapping US mosquito populations.

Zika Virus Replication in the Mosquito Culex quinquefasciatus in Brazil. Emerging Microbes & Infections, 2017;6:e69. https://www.nature.com/emi/journal/v6/n8/pdf/emi201759a.pdf This article describes laboratory and field evidence that Culex quinquefasciatus mosquitoes can carry and possibly transmit the Zika virus.

Citizen Science. Resources for Training http://www.citizenscience.us/imp/resources.php This provides additional information about the use of “citizen scientists” to extend mosquito surveillance capacity. Included are a PowerPoint presentation, tests and other materials to educate students about mosquito-borne diseases and to train them to collect and identify mosquitoes.

Forms

The following form can be adapted for use in local mosquito surveys.

Citizen Science, Invasive Mosquito Project Data Collection Form http://www.citizenscience.us/imp/collectionform.php The form used by students conducting mosquito surveys in their communities.
Educational Materials

Professional organizations have developed different forms of educational materials relating to mosquito prevention and control for the public and for professionals.


Alabama Department of Public Health. Avoid the Bite: Reducing Mosquito Exposure
http://www.alabamapublichealth.gov/mosquito/avoid-the-bite.html This webpage provides information about reducing the risks of mosquito bites.

Alabama Department of Public Health. Mosquito-borne Diseases
http://www.alabamapublichealth.gov/mosquito/ A website with information about mosquito-borne diseases, mosquito trapping, and case counts of mosquito-borne diseases among Alabama residents.

Alabama Department of Public Health. Skeeter Beaters Coloring Book (for Elementary School Students)

Alabama Department of Public Health and Alabama Environmental Health Association Zika Virus Video Contest for Alabama Teens.

Alabama Department of Public Health. Zika Virus
http://www.alabamapublichealth.gov/mosquito/zika.html A webpage with a broad range of Zika-related information, including surveillance data, public education materials and more.

American Mosquito Control Association. Surveillance and Control Program Awarded by the CDC
http://www.mosquito.org/page/training Announcement of AMCA funding from CDC to create training and certificate programs for mosquito surveillance and control. Several training modules are available via this webpage.

APHA. Protect Yourself from Mosquito-borne Diseases
http://getreadyforflu.org/mosquitoes.htm

APHA. Zika Virus: How to Keep Your Family Safe.
http://getreadyforflu.org/zikafacttext.htm

Association of Public Health Laboratories. APHL Responds to Zika
https://www.aphl.org/programs/preparedness/Crisis-Management/Pages/Zika.aspx An overview of APHL activities to support Zika response.

ASTHO. Zika virus: Information for States and Territories
http://www.astho.org/Zika/

CDC. Mosquitoes and Hurricanes

CDC. Bed Net Use Wallet Card
https://www.cdc.gov/zika/pdfs/BedNetUseWalletCards-English.pdf Available in multiple languages. Use the same link but instead of typing “English” you can use Bengali, Chinese, Japanese, Marshallese, Russian, Samoan, Spanish, Tagalog, or Tongan. Alternatively, you can use https://stacks.cdc.gov/view/cdc/40645 (English). To see other languages, insert these numbers into the url: 40635 (Bengali), 40636 (Chinese), 40637 (Japanese), 40638 (Marshallese), 40639 (Russian), 40640 (Samoan), 40641 (Spanish), 40642 (Tagalog), 40643 (Tongan), or 40644 (Portuguese). Advice for professionals and the general public on everything from preventing mosquito bites to insecticide resistance.

CDC. How to Protect Against Mosquito Bites

CDC. Insect Repellent Wallet Card, Look for One of These Active Ingredients

CDC. Mosquito Bite Prevention (United States)

CDC. Mosquito Prevention Door Hanger
CSTE Zika Virus Preparedness Resources Toolkit

- Russian [https://stacks.cdc.gov/view/cdc/41797]
- Samoan [https://stacks.cdc.gov/view/cdc/41795]
- Spanish [https://stacks.cdc.gov/view/cdc/41804]
- Tagalog [https://stacks.cdc.gov/view/cdc/41799]
- Tongan [https://stacks.cdc.gov/view/cdc/41800]


- Bengali [https://stacks.cdc.gov/view/cdc/41798]
- Chinese [https://stacks.cdc.gov/view/cdc/41796]
- Japanese [https://stacks.cdc.gov/view/cdc/41793]
- Korean [https://stacks.cdc.gov/view/cdc/41802]
- Marshallese [https://stacks.cdc.gov/view/cdc/41794]
- Palauan [https://stacks.cdc.gov/view/cdc/41801]
- Portuguese [https://stacks.cdc.gov/view/cdc/41803]

CDC. Vector Control For Environmental Health Professionals (VCEPH) [https://www.cdc.gov/nceh/ehs/elearn/vcehp.html] Find information about CDC’s free VCEHP training courses, which qualify for continuing education units from the National Environmental Health Association. The Journal of Environmental Health article, “Innovative Vector and Pest E-Learning for Environmental Health Professionals [2016;79(5):30-32], provides background information about the courses: [https://www.cdc.gov/nceh/ehs/docs/jeh/2016/dec-vcehp-training.pdf]. And a two-page fact sheet about the program can be found at: [https://www.cdc.gov/nceh/ehs/docs/factsheets/vcehp-factsheet.pdf].

NEHA. Vector Control Tools and Resources for Environmental Health Professionals. Journal of Environmental Health, 2016;78(10):44-46. [https://www.cdc.gov/nceh/ehs/docs/jeh/2016/june-vcehp.pdf] This journal column, written by a fellow in CDC’s Environmental Health Services Branch, highlights a set of online vector control courses and other resources: Vector Control for Environmental Health Professionals; Vector Control Program Performance Assessment and Improvement Reports; Vector Control Population Health Driver Diagram; and Enhancing Environmental Health Knowledge: Vectors and Public Health Pests. Connect to the resources at: [www.cdc.gov/nceh/ehs/topics/vectorcontrol.htm].

ESA. Fact Sheet on Zika and the Aedes aegypti Mosquito [www.entsoc.org/press-releases/fact-sheet-zika-and-aedes-aegypti-mosquito] This fact sheet notes that there is no evidence that genetically-modified mosquitoes in Brazil (released to stop the spread of dengue) had a role in facilitating Brazil’s Zika virus outbreak. It also discusses the safety of the larvicide, pyriproxyfen.

Indiana State Department of Health. Fight the Bite [http://www.cste.org/resource/resmgr/Zika/Zika_Brochure_Fight_the_Bite.pdf] This brochure provides general information about reducing the risk of mosquito bites at home and while traveling, and about Zika and pregnancy.
NACCHO. Mosquito Surveillance and Control Assessment in Zika Virus Priority Jurisdictions
www.naccho.org/uploads/downloadable-resources/VectorAssessment2016NACCHO.pdf This slide deck presents the results of a 2016 NACCHO/CDC survey of surveillance and control competencies of ten jurisdictions at high risk of Zika virus transmission.

NACCHO. Zika in the United States

NJ Department of Health. #ZapZika Poster

NJ Department of Health. ZapZika: Safeguarding Campers from Mosquitoes Webinar

ESA. Predicting Shifts in the Range of Invasive Insect Species in the Face of Climate Change.


NACCHO. Summer Is Here and So Are the Mosquitoes: Why Local Vector Control Is Key to Combating Zika
http://nacchopreparedness.org/summer-is-here-and-so-are-the-mosquitoes-why-local-vector-control-is-key-to-combating-zika/ This article stresses the need for core vector control competencies at the local level.

ESA. What Can an Entomologist Do for You?

ESA. What is Gene Drive?
www.entsoc.org/sites/default/files/files/Science-Policy/ESA-FactSheet-Gene-Drive.pdf This infographic explains a method to enhance the inheritance of a preferred trait (e.g., reduced ability to carry a pathogen) in a specific species (e.g., Aedes aegypti mosquitoes).
Health jurisdictions can use these policy statements to support efforts to develop or explain their own policy initiatives.

**American Mosquito Control Association (AMCA). Build Comprehensive Vector Programs**

**AMCA. Federal Funding for Mosquito Control: Advance Innovation and Discovery**

**AMCA. New Homeland Security Threat: Defending the United States from Mosquito-transmitted Diseases**

**APHA. Addressing the Urgent Threat of Global Climate Change to Public Health and the Environment. Policy Number 20078, November 6, 2007.**

**APHA. Discarded Tires as Sources of Arbovirus Vectors. Policy Number 9416, January 1, 1994.**

**APHA. Maximizing Public Health Protection with Integrated Vector Control. Policy Number 200013, January 1, 2000.**

**APHA. Prevent, Response, and Training for Emerging and Re-emerging Infectious Diseases, Including Bioterrorism. Policy Number 200016, January 1, 2000.**

**CSTE. Zika Virus Disease and Congenital Zika Virus Infection Interim Case Definition and Addition to the Nationally Notifiable Diseases.**
https://www.cste2.org/docs/Zika_Virus_Disease_and_Congenital_Zika_Virus_Infection_Interim.pdf

**CSTE. Zika Virus Disease and Zika Virus Infection Without Disease, Including Congenital Infections Case Definitions and Addition to the Nationally Notifiable Diseases List**

**NACCHO. Arbovirus Surveillance, Prevention, and Control. Policy 14-07.**

**NACCHO. Collaboration in Infectious Disease Prevention and Control. Policy 07-01.**

**NACCHO. Local Epidemiology and Surveillance. Policy 04-11.**

**NACCHO. Mosquito Control. Policy 07-10.**

**NACCHO. Vector-borne Disease. Policy 14-05**
PAHO. PAHO Statement on Zika Virus Transmission and Prevention (February 2, 2016)

ESA. Position Statement on Insecticide Resistance Management (Approved June 29, 2016)

ESA. Effective Mosquito Management with an IPM Approach (September 6, 2016)
Appendix: Acronyms

ACOG: American College of Obstetrics and Gynecology
AFPMB: Armed Forces Pest Management Board
AMCA: American Mosquito Control Association
APHA: American Public Health Association
APHC: Army Public Health Center
APHL: Association of Public Health Laboratories
APWA: American Public Works Association
ASPR-TRACIE: Assistant Secretary for Preparedness and Response – Technical Resources, Assistance Center, and Information Exchange
ASTHO: Association of State and Territorial Health Officials
BTI: Bacillus thuringiensis pesticide
CIDRAP: Center for Infectious Disease Research and Policy
CSTE: Council of State and Territorial Epidemiologists
CONUS: Continental United States
EID: Emerging infectious disease
EPA: Environmental Protection Agency
ESA: Entomological Society of America
FAQs: Frequently asked questions
FDA: US Food and Drug Administration
ICE: Immigration and Customs Enforcement
IFRC: International Federation of Red Cross and Red Crescent Societies
ISUOG: International Society of Ultrasound in Obstetrics and Gynecology
MMWR: Morbidity and Mortality Weekly Report
NACCHO: National Association of County and City Health Officials
NAS: National Academies of Science
NEHA: National Environmental Health Association
NIH: National Institutes of Health
NIOSH: National Institute of Occupational Safety and Health
NPHIC: National Public Health Information Coalition
NPR: National Public Radio
PAHO: Pan American Health Organization
UNICEF: United Nation’s International Children’s Fund
USDA: United States Department of Agriculture
WHO: World Health Organization