

Zika:

Resources at Your Fingertips

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Current as of October 7, 2016

This document provides Zika virus disease resources and an overview of public health and healthcare system considerations and implications that are applicable to professionals in those systems, emergency management stakeholders, and other audiences. **Appendix A** contains resources from the U.S. Department of Health and Human Services (HHS) Office of the Assistant Secretary for Preparedness and Response (ASPR) and relevant contact links. **Appendix B** includes citations with annotations for additional relevant resources and Zika Guidance. Finally, individuals can review ASPR TRACIE (Technical Resources, Assistance Center, and Information Exchange) [Topic Collections](#), which provide a wide array of materials and resources for further research.

This document and its hyperlinks/guidance references are current as of **October 7, 2016**. Changes since the last update are indicated in **RED FONT** and all changes or additions since the original publication include the date of inclusion or update. Information on Zika is constantly evolving, therefore if you are a clinician treating a patient, please check the Centers for Disease Control and Prevention (CDC) [Zika site](#) for the most current information and clinical guidance.

What is Zika Virus?

Zika virus is transmitted through the bite of an infected *Aedes* species mosquito. It is a single-stranded RNA virus of the genus Flavivirus (the same family as dengue). Illness is usually mild – current data show that most people infected will not become symptomatic. Symptoms (fever, rash, joint pain and conjunctivitis) typically resolve in a few days to a week without any medical intervention. The illness is rarely severe though Zika illness has been linked to rare cases of Guillain-Barré syndrome (ascending paralysis).

More concerning is the confirmed linkage between [Zika virus infection in pregnant women and microcephaly and other severe fetal brain defects](#). (Updated May 9, 2016) This linkage and the spectrum of potential Zika-mediated neurologic syndromes is being actively investigated. Women who contract Zika virus during pregnancy are at risk, though the timing and magnitude of the risk are not well defined. [Microcephaly](#) is a birth defect where a baby's head is smaller than expected when compared to babies of the same sex and age. Babies with microcephaly typically have smaller brains that might not have developed properly. Zika virus' effects on

neurological function may result in a spectrum of neurological disorders, not simply causing brain damage leading to microcephaly in utero or Guillain-Barre in pediatric and adult patients. Due to the clusters of microcephaly and other neurological syndromes potentially linked to the spread of Zika virus, the World Health Organization (WHO) declared the situation a [Public Health Emergency of International Concern](#) February 1, 2016. Zika virus is a [Nationally Notifiable Condition](#), so healthcare providers must notify their local/State health departments according to the laws or regulations for reportable diseases in their jurisdiction. (Updated May 9, 2016)

Access the [Patient Care](#) section of this document for information on Prevention, Transmission, Presentation, and Treatment.

Where is Zika Virus Found?

Zika virus was first discovered in the Zika forest in Uganda in 1947. Prior to 2015, Zika virus was found in Africa, Southeast Asia, and the Pacific Islands. The largest outbreak to date occurred in French Polynesia during 2013-2014. A recent retrospective analysis of this outbreak conducted by French Polynesian health authorities after cases of microcephaly were identified in Brazil, found increases of cases of microcephaly.

In May 2015, the Pan American Health Organization (PAHO) issued an alert for the first confirmed patient in Brazil. A significant increase in reported cases of microcephaly has occurred simultaneous to spread of the virus in Brazil. Many countries in Central and South America, the Caribbean, West Africa, Pacific Islands, and the United States report local transmission of the virus. (Updated August 5, 2016) [As of July 29, 2016, the CDC and the State of Florida have confirmed local Zika virus transmission by mosquitoes in the continental U.S.](#), in addition to the [cases reported in travelers \(updated October 7, 2016\)](#) who visited affected countries. There remains active transmission in American Samoa, Puerto Rico and the U.S. Virgin Islands (CDC, 2016). Though we cannot predict how widespread cases of Zika virus may be in the continental United States, recent chikungunya and dengue outbreaks indicate that we are not likely to experience the same type of rapid spread Zika virus infection currently occurring elsewhere. Local transmission of the virus is anticipated to be small and focal. The CDC is tracking domestic Zika cases and provides [current case counts and geographic spread of cases.](#) (Updated October 7, 2016)

The Florida Department of Health identified [areas of south Florida](#) where Zika has been spread by mosquitoes. (Updated October 7, 2016) [This updated guidance](#) is for people who live in or recently traveled to areas of South Florida. (Updated October 7, 2016)



Figure 1. *Zika virus spread worldwide and in the Americas.* Centers for Disease Control and Prevention, (Updated October 7, 2016).

Zika Virus Mosquito Vectors and Where They are Found

Figure 1 shows countries that have reported local transmission of Zika virus. Figure 2 shows locations within the continental U.S., where *Aedes aegypti* and *Ae. albopictus* mosquitoes, the primary vectors of Zika, dengue, and chikungunya viruses, are found. These *Aedes* mosquitoes have been found in 30 states and the District of Columbia, including the southeastern U.S., up the east coast to New York, and west to Indiana, Ohio, and Kentucky. These are areas at potential risk of local transmission of Zika virus (and also areas of potential transmission of dengue, chikungunya, and other diseases spread by *Aedes* mosquitoes). *Aedes* mosquitoes that spread Zika virus are aggressive daytime biters, but they can also bite at night. *Aedes* mosquitoes breed in small collections of water and seldom venture far from where they were born, making control particularly difficult. Outside of the continental U.S., *Aedes* mosquitoes have been found in the following states and territories: Hawaii, Puerto Rico, American Samoa, Guam, Northern Mariana Islands, and the U.S. Virgin Islands. Zika is spread from an infected mosquito-person-mosquito. The virus can spread to new areas where *Aedes* mosquitoes are known to exist when an infected, viremic traveler from an endemic area is bitten by a mosquito and that person transmits the virus to the mosquito, causing a new transmission chain to begin. Sustainment of that transmission depends on many variables, however, and does not assure that local transmission will continue. Once a mosquito is infected with Zika virus, it will remain infected for life. A mosquito lifespan is up to 30 days. (Updated May 9, 2016)

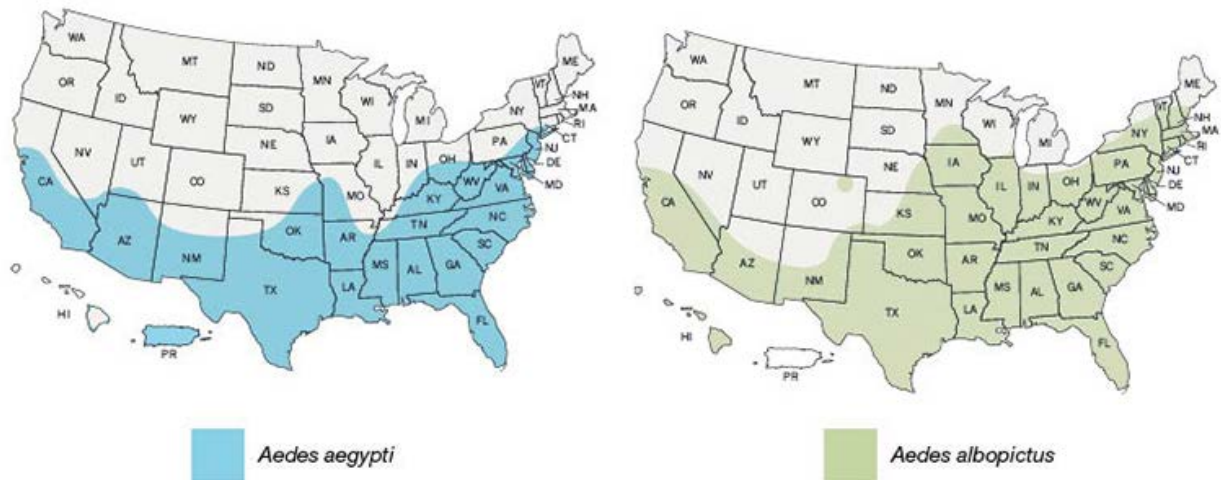


Figure 2. Estimated CONUS Aedes mosquito distribution. Graphic Courtesy of CDC. (Still current September 30, 2016)

Can Zika Virus be Transmitted Person to Person?

There is evidence that Zika virus can be [sexually transmitted \(male to female \[updated April 8, 2016\], male to male \[updated May 9, 2016\], and female to male \[updated September 2, 2016\]\)](#), and transmitted from a mother to her fetus during pregnancy. A recent case suggests possible [sexual transmission from an asymptomatic male to female](#). (Updated September 2, 2016) Although there is no evidence Zika virus can be transmitted through casual contact or through air, local healthcare providers and the CDC have completed a preliminary investigation of a possible case of non-sexual [person-to-person transmission in Utah](#). (Updated October 7, 2016). There are indications that it is possible to transmit Zika through a [blood transfusion \(updated October 7, 2016\)](#), so providers should, as always, use standard precautions for personal protection when dealing with blood and blood products.

[Current guidelines](#) for prevention of sexual transmission are as follows (updated October 7, 2016):

- Couples planning to conceive:
 - Men should wait at least 6 months after symptom onset or last possible Zika exposure to attempt to conceive.
 - Women should wait at least 8 weeks after symptom onset or last possible Zika exposure to attempt to conceive.
 - Couples undergoing fertility treatment with their own gametes and embryos should follow the same guidelines.
- Couples who are not pregnant or planning to become pregnant, but who want to maximally reduce their risk of sexual transmission:
 - Men should practice abstinence or use condoms consistently and correctly for at least 6 months after symptom onset or last possible Zika exposure.

- Women should abstain or use condoms consistently and correctly for at least 8 weeks after symptom onset or last possible Zika exposure.

Possible exposure is living in or traveling to a geographic area with active Zika transmission or sex without a condom with a partner who lives in or has traveled to such an area.

Earlier studies found that Zika virus has been [detected in semen](#) up to eight weeks after the onset of febrile illness and [very high concentrations of live virus have been detected in semen at 2 weeks](#). (Updated October 7, 2016) Additional studies are going, but current findings suggest that Zika virus [remains in semen longer](#) than other bodily fluids. (Updated October 7, 2016) Zika virus RNA has been found in semen as long as [188 days](#) after symptom onset, though it is not yet clear whether that presence means an individual can transmit the virus. (Updated October 7, 2016)

To avoid Zika transmission from a mother to her fetus, [pregnant women](#) should:

- Avoid travel to areas with active Zika transmission.
- Prevent mosquito bites if they must travel to or reside in areas with active Zika transmission.
- Abstain from sex or use a condom with a partner who has possible exposure to Zika.

How do Clinicians [Test for Zika Virus Disease?](#)

Molecular diagnosis, via polymerase chain reaction (PCR) testing, is available for Zika virus disease through CDC and select public health laboratories; however, the test is only positive during acute infection, approximately the first 7-14 days after onset of symptoms. Serologic diagnosis, through IgM testing, is often difficult to interpret in people who have been previously infected with another flavivirus (like dengue) due to antibody cross-reaction. In addition, because there is currently a limited number of laboratories capable of Zika testing, laboratory capacity cannot support widespread testing of the general population. Serologic testing for IgM antibodies should be offered to asymptomatic pregnant women who have traveled to locations with active Zika virus disease transmission within 2-12 weeks of return. Pregnant women with sexual partners who have traveled to areas with active Zika virus disease transmission should consult with their healthcare providers. A positive serologic test will require additional assays to determine the exact virus, but a negative test effectively rules out Zika virus exposure. Contact your local/state health department for local testing policies and procedures.

The [U.S. Food and Drug Administration](#) has issued ten Emergency Use Authorizations (EUAs) for commercially available testing and two for CDC-based testing.

Commercially-available test EUAs include: [\(updated October 7, 2016\)](#)

- [Focus Diagnostics, Inc.'s Zika Virus RNA Qualitative Real-Time RT-PCR test by qualified laboratories](#). This was the first commercially available test to be authorized for emergency use (updated May 9, 2016).
- [Altona Diagnostics RealStar® Zika Virus RT-PCR Kit U.S.](#) for the qualitative detection of RNA from Zika virus in serum or urine (collected alongside a patient-matched serum specimen) (updated June 6, 2016).
- [Hologic, Inc.'s Aptima Zika Virus assay](#), a test to help detect Zika virus infection in people who have symptoms of Zika virus infection, and live in or have traveled to an area with active Zika virus transmission.
- [Viracor-IBT Laboratories, Inc.'s \("Viracor-IBT"\) Zika Virus Real-time RT-PCR test](#) for the qualitative detection of RNA from Zika virus in human serum, plasma or urine (collected alongside a patient-matched serum or plasma specimen).
- [Siemens Healthcare Diagnostics Inc.'s VERSANT® Zika RNA 1.0 Assay \(kPCR\) Kit](#) for the qualitative detection of RNA from Zika virus in human serum, EDTA plasma, and urine (collected alongside a patient-matched serum or plasma specimen).
- [Luminex Corporation's xMAP® MultiFLEX™ Zika RNA Assay](#) for the qualitative detection of Zika virus RNA in human serum, plasma, and urine.
- [InBios International, Inc.'s ZIKV Detect™ IgM Capture ELISA](#) for the qualitative detection of human IgM antibodies to Zika virus.
- [Roche Molecular Systems, Inc.'s LightMix® Zika rRT-PCR Test](#) for the qualitative detection of RNA from Zika virus in human serum and EDTA plasma.
- [Vela Diagnostics USA, Inc.'s Sentosa® SA ZIKV RT-PCR Test](#) for the qualitative detection of RNA from Zika virus in human serum, EDTA plasma, and urine (collected alongside a patient-matched serum or plasma specimen).
- [ARUP Laboratories' Zika Virus Detection by RT-PCR Test](#) for the qualitative detection of RNA from Zika virus in human serum, EDTA plasma, and urine (collected alongside a patient-matched serum or EDTA plasma specimen).

In addition, the CDC is now recommending that the [CDC Trioplex real-time reverse transcription-polymerase chain reaction \(rRT-PCR\) test](#) should be performed on urine collected less than 14 days after onset of symptoms in patients with suspected Zika virus disease. Zika virus rRT-PCR testing of urine should be performed in conjunction with serum testing. A positive result in either specimen type provides evidence of Zika virus infection (updated May 9, 2016). CDC has also published [Interim Guidance for Interpretation of Zika Virus Antibody Test Results](#) and updated [Collection and Submission of Body Fluids for Zika Virus Testing](#) guidance (updated June 6, 2016). At CDC's request, FDA [amended](#) the EUA for the Trioplex rRT-PCR on September 21. **(Updated October 7, 2016)**

How is Zika Virus Disease Treated?

There is no specific treatment for Zika virus disease. Supportive care and symptom management are the best options. No vaccination currently exists. It is important to note that Zika virus disease is transmitted by the same mosquitoes that spread chikungunya and dengue viruses, therefore all three diseases should be considered in any patient with consistent signs and symptoms. The mainstay of disease management is prevention. Pregnant women should be referred to their provider for further evaluation and treatment.

For more information about Zika virus disease and the current outbreak, including guidance for clinicians, visit the [CDC Zika virus website](#).

Why is Zika Virus Disease a Public Health and Healthcare Systems Concern?

Zika virus is an emerging pathogen and our understanding of it is still evolving. The major reason that Zika virus disease is a public health concern is due to the implications for women in endemic areas or traveling to endemic areas who are pregnant or considering pregnancy and the potential neurological sequela that may present in some patients (updated May 9, 2016). Zika virus disease has been identified in [fetal and placental tissues](#) of fetuses with severe congenital abnormalities although little is known about the specific rates of transmission nor the risks and timing of [congenital malformations](#) (updated May 9, 2016). Though the brain damage and associated microcephaly have attracted the most attention, it is likely that Zika causes a broader spectrum of neurologic disease which is still being investigated. The WHO published a Bulletin titled [Defining the Syndrome Associated with Congenital Zika virus infection](#), which outlines the spectrum of abnormalities that may be associated with Zika virus infection. This spectrum includes microcephaly, craniofacial disproportion, spasticity, seizures, irritability and brainstem dysfunction including feeding difficulties, ocular abnormalities and findings on neuroimaging such as calcifications, cortical disorders and ventriculomegaly (Updated June 6, 2016). A [recent study](#) of infants with probable congenital Zika virus syndrome found that additional symptoms emerged with age and suggested that Zika-affected babies may continue to fall behind in development compared to those not affected. (Updated October 7, 2016) Early evidence does not suggest a greater health risk than the general population to [pediatric populations who acquire Zika virus disease postnatally](#); however, the study results emphasize the importance of counseling sexually active adolescents on Zika risks and prevention. (Updated October 7, 2016)

As there is no specific treatment or “cure” for Zika virus disease and symptoms of acute infection are usually mild and self-resolving, the most important steps for public health emergency managers relate to prevention, mitigation, and risk communication. Healthcare providers should familiarize themselves with the signs and symptoms of Zika virus, take travel histories of their patients and the sexual partners of pregnant women, and follow CDC guidance on diagnostic testing for Zika virus in pregnant women and monitoring of pregnant women with

evidence of Zika virus infection. Women in endemic areas face difficult choices about conceiving with no clear endpoint aside from vaccine availability or the end of the epidemic, and those who have visited or have a partner that have visited an endemic area may have to carefully consider their options, test, and take precautions for months afterwards.

Key Points for Consideration and Resources by Profession/Facility

Clinicians/Healthcare Providers

Preparedness

- Monitor outbreak information and changes or updates to [CDC medical management guidance](#) and from public health departments or healthcare coalitions.
- In the U.S., Zika testing is limited, although the CDC is working to expand capacity (updated May 9, 2016). Contact the state health department to facilitate testing. Ensure a plan is in place for transporting laboratory samples to designated labs for confirmatory testing.
- Familiarize yourself with [CDC testing criteria](#) (updated April 8, 2016) for Zika virus in pregnant women and children, patients with Guillain-Barré, and those with a history of travel to an area with local Zika virus transmission.
- Continue to collect travel histories during healthcare assessments for: (1) symptoms suggestive of mosquito-borne illness, and (2) all pregnant patients and their sexual partners. (Updated May 9, 2016)
- Review this [Zika Virus Planning Considerations for Healthcare Facilities and Coalitions](#) document to identify anticipated hospital and healthcare system planning issues. (Updated September 2, 2016)

Patient Care

- Prevention
 - There is currently no vaccine. Senior federal officials outlined [three potential strategies](#) for investigators to consider when conducting clinical trials on Zika vaccine candidates. (Updated October 7, 2016)
 - Healthcare providers should discuss Zika infection with [women of reproductive age](#), residing in or planning travel to areas with active Zika virus transmission. (Updated April 8, 2016) Currently, both ACOG and the Society for Maternal – Fetal Medicine recommend that asymptomatic women and men with possible exposure to Zika virus wait at least eight weeks after exposure before attempting pregnancy. Women of reproductive age who are diagnosed with Zika disease should also wait at least eight weeks, while viremic men should wait at least six

months after symptom onset to attempt pregnancy ([ACOG-SMFM Practice Advisory](#)). (Updated October 7, 2016)

- Access to barrier contraception should be assured for patients and partners at potential risk. (Updated May 9, 2016)
- This [Preconception Guide](#) can be used to frame the discussion. (Updated April 8, 2016)
- [Contraception to Prevent Unintended Pregnancy during the Zika Virus Outbreak](#). (Updated October 7, 2016)
- Because Zika infection is a cause of severe congenital disease, pregnant women (and those anticipating becoming pregnant in the next few months) who cannot avoid travel to endemic areas should strictly follow steps to [prevent mosquito bites](#) (updated May 9, 2016). Providers should counsel pregnant women in [mosquito avoidance](#).
- Serologic testing should be offered for *all* pregnant women regardless of symptoms who have traveled to areas with ongoing Zika virus transmission within 2-12 weeks of return from travel.
- If a pregnant woman has a male sex partner who lives in or has traveled to an area with Zika virus transmission, he or she should use a condom every time they have sexual intercourse or should not have sexual intercourse with that male partner during the pregnancy. (Updated May 9, 2016)
- Transmission
 - Primary mode of transmission of Zika virus is a bite from an infected mosquito.
 - Perinatal and sexual transmission, as well as transmission via blood transfusion have been reported.
 - Incubation period is 2-7 days, but other arboviral diseases, like dengue and chikungunya can take up to two weeks.
- Presentation
 - Most people infected with Zika virus will not become symptomatic (updated May 9, 2016).
 - Illness is usually mild, lasting several days to a week.
 - Acute onset of fever with maculopapular rash (flat, red area on skin covered by small bumps), arthralgia (joint pain), and/or conjunctivitis (inflammation of the inner surface of the eyelid and outermost layer of the eye) may occur.
 - Myalgia (muscle pain) and headache are also reported.
 - Hospitalization for acute Zika infection is uncommon. Deaths are rare.
 - A marked increase in the number of babies born with congenital neurologic damage has been reported in areas experiencing Zika virus disease outbreaks

and a causal link from Zika virus infection to neurological syndromes including microcephaly and [Guillain-Barré syndrome](#) has been confirmed (updated May 9, 2016). Pregnant women presenting with Zika virus disease symptoms should be evaluated according to the [Interim Guidelines for Health Care Providers Caring for Women of Reproductive Age with Possible Zika Virus Exposure— United States, July 2016. \(Updated October 7, 2016\)](#)

- The CDC Zika Pregnancy Hotline for Health Care Providers (770-488-7100) provides 24/7 consultative services for questions and concerns related to clinical management. (Updated May 9, 2016)
- Practitioners evaluating infants for congenital neurologic changes should use this [case definition. \(Updated October 7, 2016\)](#) Because it is difficult to predict at birth what problems babies will have, babies with specific findings or likely in utero exposure need close follow-up through regular check-ups with a doctor or other healthcare provider to track their growth and development. (Updated May 9, 2016)
- Cases of [Guillain-Barré](#) have been reported, which could result in the need for intensive care and mechanical ventilation – unlikely to reach levels of significant impact on the healthcare system, but localized surges requiring specialized care could be possible. In endemic areas, intensive care may not be available. (Updated May 9, 2016)
- Treatment
 - There is no “cure” or treatment specific to Zika virus disease.
 - Symptoms of acute Zika virus infection can be treated with supportive care.
 - Do **not** give NSAIDS—for example acetyl-salicylic acid (aspirin) and ibuprofen—until dengue infection can be ruled out. These drugs thin the blood and can increase the risk of bleeding. Fever and pain can be addressed with acetaminophen. (Updated May 9, 2016)
 - Be prepared for a possible increase in demand for specialized care for patients with Guillain-Barré syndrome— while unlikely to result in a surge in demand for critical care resources, the potential for Guillain-Barré syndrome and other neurologic sequelae should be prepared for in a diligent and determined manner. The potential for a cluster of cases certainly exists, while the availability of clinicians with expertise in the management of Guillain-Barré syndrome may be limited, especially in certain geographic locations. (Updated May 9, 2016)
 - Be prepared to strengthen antenatal care and ensure availability of fetal ultrasound capability as well as antenatal counseling and support.
 - Confirmatory [laboratory testing](#) is recommended for pregnant women with recent travel history to areas with local Zika virus transmission, [microcephalic](#)

(Updated October 7, 2016) infants born to mothers with relevant travel history and positive or inconclusive Zika virus diagnostic test results, and patients presenting with Guillain-Barré or other neurologic syndromes and a travel history to areas with ongoing transmission of Zika virus.

- Currently, Zika serologic tests are cross-reactive if the patient has been previously infected with other flaviviruses (e.g., yellow fever and dengue). In these cases, positive Zika IgM tests need further testing to attempt to rule out the possibility of a false positive.
- Little is known about Zika virus disease behavior in immunocompromised patients. We do not currently have data on risk factors for severe Zika virus disease. We do know that for West Nile virus, a related flavivirus, immunosuppression does appear to be a risk factor for more severe disease. Similarly, serious adverse events are more likely following administration of live yellow fever vaccine, which is also a related flavivirus. However, we do not know whether Zika virus would pose a similar risk in immunosuppressed patients. The CDC has provided additional information on [HIV infection and Zika virus](#). (Updated May 9, 2016)
- To help prevent others from getting sick from local mosquito transmission, patients should be advised to strictly [follow steps to prevent mosquito bites during the first week of illness](#). (Updated May 9, 2016)

Key Resources for Clinicians/Healthcare Providers

- Current Case Numbers
 - [Cases in the United States](#)
 - [Cases among Pregnant Women in the United States](#)
- General
 - [Zika Action Planning Follow-up Teleconferences](#). (Updated July 7, 2016)
 - [Zika Virus: Information for Clinicians](#). (Updated July 7, 2016)
 - [CDC Health Care Provider Guidance](#). (Updated July 7, 2016)
 - [CDC Symptoms, Diagnosis, & Treatment](#).
 - [Fact Sheets and Posters](#). (Updated October 7, 2016)
 - [Tools for Healthcare Providers](#).
 - [Training Resources for Health Professionals](#). (Updated June 6, 2016)
 - [Zika Virus Planning Resource Introduction](#). (Updated June 6, 2016)
 - [Providing Family Planning Care for Non-Pregnant Women and Men of Reproductive Age in the Context of Zika](#). (Updated October 7, 2016)
 - [Guillain-Barre Syndrome and Other Neurological Deficits Planning Resource](#). (Updated September 2, 2016)

- [Key Zika Considerations for Healthcare Settings](#). (Updated September 2, 2016)
- [Clinical Guidance for Healthcare Providers for Prevention of Sexual Transmission of Zika Virus](#). (Updated October 7, 2016)
- [Prevention of Sexual Transmission of Zika Virus](#). (Updated October 7, 2016)
- [Dispelling Rumours Around Zika and Complications](#). (Updated October 7, 2016)
- Pregnant Women and Women of Reproductive Age
 - [Update: Interim Guidance for Health Care Providers Caring for Pregnant Women with Possible Zika Virus Exposure](#). (Updated August 5, 2016)
 - [ACOG Practice Advisory](#). (Updated October 7, 2016)
 - [Estimating Contraceptive Needs and Increasing Access to Contraception in Response to the Zika Virus Disease Outbreak](#). (Updated April 8, 2016)
 - [US Zika Pregnancy Registry](#). (Updated April 8, 2016)
 - [Zika Active Pregnancy Surveillance System \(ZAPSS\)](#) (Updated June 6, 2016)
 - [Maternal-Fetal Health Planning Resource](#). (Updated August 5, 2016)
 - [Promoting Stress Management for Pregnant Women during the Zika Virus Disease Outbreak](#). (Updated June 6, 2016) [Spanish Version](#). (Updated July 7, 2016)
 - [Infographic: Zika Virus Testing for any Pregnant Woman Not Living in an Area with Zika](#). (Updated September, 2, 2016)
 - [Gaps in Contraception Access and Zika: Interactive Map](#). (Updated September 2, 2016)
 - [Make Sure to Get Your Zika Test Results](#). (Updated October 7, 2016)
- Infants
 - [Interim Guidelines for Health Care Providers Caring for Infants and Children with Possible Zika Virus Infection](#). (Updated September 2, 2016)
 - [Interim Guidance for the Evaluation and Management of Infants with Possible Congenital Zika Virus Infection](#). (Updated September 2, 2016)
 - [Webcast Recordings: Clinical Evaluation and Management of Infants with Congenital Zika Infection](#). (Updated September 2, 2016)
 - [Surveillance and Services for Babies Affected by Zika](#). (Updated April 8, 2016)
 - [ASPR Supporting Children with Special Health Care Needs Planning Resource](#). (Updated September 2, 2016)

- [Resources and Guidance for Healthcare Providers Caring for Infants Affected by Zika Virus.](#) (Updated September 2, 2016)
- [Screening, Assessment and Management of Neonates and Infants with Complications Associated with Zika Virus Exposure in Utero.](#) (Updated September 2, 2016)
- [Support for Families of Newborns Affected by Zika.](#) (Updated September 2, 2016)
- [Psychosocial Support for Pregnant Women and for Families with Microcephaly and other Neurological Complications in the context of Zika virus: Interim Guidance for Healthcare Providers.](#) (Updated September 2, 2016)
- Testing
 - [Diagnostic Testing.](#) (Updated September 2, 2016)
 - [Collection and Submission of Body Fluids for Zika Virus Testing.](#) (Updated June 6, 2016)
 - [Interim Guidance for Zika Virus Testing of Urine.](#) (Updated June 6, 2016)
 - [Zika Virus: Collection and Submission of Fetal Tissues for Zika Virus Testing.](#) (Updated September 2, 2016)
 - [When to Test for Zika Virus.](#) (Updated September 2, 2016)
 - [Health Alert Network: CDC Expands Guidance for Travel and Testing of Pregnant Women, Women of Reproductive Age, and Their Partners for Zika Virus Infection Related to Mosquito-borne Zika Virus Transmission in Miami-Dade, Florida.](#) (Updated September 2, 2016)
 - [Collection and Submission of Specimens for Zika Virus Testing at the Time of Birth.](#) (Updated September 2, 2016)
- [Guidance for Organ Donation and Transplantation Professionals Regarding the Zika Virus.](#) (Updated April 8, 2016)
- Worker Health and Safety Resources
 - [Preventing Transmission of Zika virus in Labor and Delivery Settings Through Implementation of Standard Precautions.](#) (Updated April 8, 2016)
 - [Biosafety Guidance for Transportation of Specimens and for Work with Zika Virus in the Laboratory.](#) (Updated April 8, 2016)
 - [Interim Guidance for Protecting Workers from Occupational Exposure to Zika Virus.](#) (Updated May 9, 2016)
 - [WHO: Protecting the Health and Safety of Workers in Emergency Vector Control of Aedes Mosquitoes.](#) (Updated May 9, 2016)

- [NIOSH: Mosquito-Borne Diseases](#). (Updated May 9, 2016)
- [Society for Human Resource Management: The Zika Virus: What Employers Should Not Do](#). (Updated May 9, 2016)
- [EHS Today: The Zika Virus: Answers to Employers' FAQs](#). (Updated May 9, 2016)
- [NIOSH Fact Sheet – Prevent Mosquito-borne Diseases: Cruise Line Employees](#). (Updated July 7, 2016)
- [Human Resources Flexibilities and Authorities for Federal Employees Affected by the Zika Virus](#). (Updated October 7, 2016)

Emergency Manager/ Public Health Preparedness/ Healthcare System Emergency Management Professionals

Prevention/Mitigation

- Community-based vector control/ bite prevention education in collaboration with environmental health entities
 - Community/Facility
 - Eliminate standing water and maintain brush.
 - Apply insecticide spray to outdoor areas as feasible.
 - Making netting and other prevention items available as appropriate.
 - [Individuals](#)
 - Use insect repellent (as appropriate) and advise to follow label instructions.
 - Place netting over sleeping areas (e.g., beds, cribs) when screens are not available.
 - Avoidance of exposure is best and pregnant women/those considering pregnancy should delay travel to endemic areas when possible.
 - Refer to CDC guidance on [Prevention](#) for more specific steps. (Updated April 8, 2016)
- On May 24, 2016, CDC issued a [Technical Statement on the Role of Disinsection in the Context of Zika Outbreaks](#) stating that CDC does not recommend disinsection inside commercial passenger aircraft to be an effective approach to control the movement of Zika virus over long distances, such as from one country to another. CDC recommends that other local public health interventions should be the primary focus to prevent local transmission of Zika virus. (Updated October 7, 2016)
- Risk communication
 - Provide clear instructions to the community about mosquito abatement and avoiding mosquitoes, particularly during biting hours.

- Refer to guidance on [controlling mosquitoes at home](#). (Updated October 7, 2016)
 - Use the [Mosquito Control and Bite Prevention Educational Flipbook](#) when presenting to audiences. (Updated October 7, 2016)
 - The community should be educated to purchase and properly use EPA-registered insect repellents containing one of the following active ingredients: DEET, picaridin, IR3535, oil of lemon eucalyptus, permethrin, or para-menthane-diol.
 - When used as directed, EPA-registered [insect repellents are proven safe and effective](#), even for [pregnant and breastfeeding women](#). Insect repellent [containing DEET should not be used on infants younger than 2 months of age and repellents containing oil of lemon eucalyptus should not be used on children under 3 years](#). (Updated September 2, 2016)
 - Follow instructions on [treating clothing with permethrin](#). (Updated October 7, 2016)
 - Share information with the community about signs and symptoms of Zika virus disease and when to seek medical evaluation or treatment.
 - [CDC Zika Fact Sheets and Posters](#). (Updated October 7, 2016)
 - [March of Dimes Zika Virus and Pregnancy Fact Sheet](#). (Updated October 7, 2016)
 - [Zika Action Guide: Health Ministers are a Community Resource](#). (Updated October 7, 2016)
 - [Zika Virus Disease and Your Eyes](#). (Updated October 7, 2016)
 - Publicize travel advisories, targeting travelers, especially women who are pregnant or considering pregnancy.
 - [Current CDC Travel Advisories](#). (Updated October 7, 2016)
 - [Travel guidance for Miami-Dade County Areas](#). (Updated September 2, 2016)
- Establish or enhance surveillance (in people and mosquitoes).
 - Conduct regular surveillance of and testing for mosquitoes. The use of GIS mapping of mosquito locations and abatement programs can show effectiveness and impact. (Updated May 9, 2016)
 - Screen patients for travel history to an area with ongoing Zika transmission.
 - Zika virus disease affected patients
 - Birth defect surveillance
 - Neurologic and autoimmune syndrome surveillance
 - Border screening is not an effective method of controlling vector-borne diseases and is not recommended for Zika management.
- Blood donation – click links for new national guidance that has been issued by the U.S. Food and Drug Administration.

- [Revised Recommendations for Reducing the Risk of Zika Virus Transmission by Blood and Blood Components.](#) (Updated September 2, 2016)
- [Recommendations for Donor Screening, Deferral, and Product Management to Reduce the Risk of Transfusion Transmission of Zika Virus.](#) (Updated April 8, 2016)
- [Donor Screening Recommendations to Reduce the Risk of Transmission of Zika Virus by Human Cells, Tissues, and Cellular and Tissue-Based Products.](#)
- [Investigational Test to Screen Blood Donations for Zika Virus.](#) (Updated April 8, 2016)
- [Review emergency authorities and statutes](#) for any relief necessary.
- Prepare for major national and international events in Zika-affected areas.

Preparedness/Response

- Monitor outbreak information and changes or updates to CDC medical management guidance.
 - Key roles of healthcare coalitions include:
 - Sharing guidance that comes out from federal, state, and local authorities, including updates.
 - Identifying local/regional experts (specifically, neurology, maternal fetal medicine, neonatology) who can interpret guidance and serve as regional discussant/subject matter experts.
 - Coordinating with public health departments on testing indications and process.
 - Coordinating public information about Zika virus disease.
- If local cases are detected in endemic areas (such as U.S. territories) with open-air homes /hospitals, consider bed netting, insect spray, or other mosquito prevention equipment for facilities and workers.
- Ensure a plan is in place for transporting laboratory samples to designated labs for testing. Ensure healthcare facilities have plans and policies in place that state under what situations testing is indicated. Wide-spread testing is NOT recommended and testing is often best carried out in the primary care or obstetric clinic setting since the results are not rapidly available.

Recovery

- Continue surveillance and mosquito abatement, as appropriate.
- Evaluate any long-term health impacts to the community.

Key Resources for Emergency Managers/ Public Health Professionals:

- [Surveillance and Control of *Aedes aegypti* and *Aedes albopictus* in the United States.](#) (Updated May 9, 2016)

- [Information on Aerial Spraying](#). (Updated October 7, 2016)
- [Aerial Spraying with Naled](#). (Updated October 7, 2016)
- [Country Classification Technical Guidance](#). (Updated August 5, 2016)
- [Interim CDC Recommendations for Zika Vector Control in the Continental United States](#). (Updated April 8, 2016)
- [CDC State Public Health Laboratory Diagnostic Testing Guidance](#). (Updated June 6, 2016)
- [3 Zika Tests Explained](#). (Updated October 7, 2016)
- Use the [HHS Response and Recovery Resources Compendium](#) to search the repository of HHS products, services, and capabilities available to state, tribal, territorial, and local agencies before, during, and after public health and medical incidents.
- [Insect Repellant Use and Safety](#).
- [Insect Repellant Use During Pregnancy and DEET Use While Pregnant](#).
- [Executive Orders and Emergency Declarations for the West Nile Virus: Applying Lessons from Past Outbreaks to Zika](#). (Included March 9, 2016.)
- [Zika Communication Planning Guide for States](#) (Updated May 6, 2016)
- [Zika Community Action Response Toolkit \(Z-CART\)](#). (Updated August 5, 2016)
- [Top 10 Zika Response Planning Tips: Brief Information for State, Tribal, Local, and Territorial Health Officials](#). (Updated April 8, 2016)
- [Zika Recommendations for State and Local Health Departments](#). (Updated May 9, 2016)
- [Zika Virus Response Planning: Interim Guidance for District and School Administrators in the Continental United States and Hawaii](#) (Updated August 5, 2016)
- [Guidelines for US Citizens and Residents Living in Areas with Ongoing Zika Virus Transmission](#). (Updated July 7, 2016)
- [CDC Emergency Vector Control Request Form](#). (Updated July 7, 2016)
- [Zika Virus Planning Considerations for Healthcare Facilities and Coalitions](#). (Updated September 2, 2016)
- [Final Environmental Assessment for Genetically Engineered Mosquito](#). (Updated September 2, 2016)
- [Medical Reserve Corps Resources](#)
 - [Partner with the Medical Reserve Corps for a More Effective Zika Response](#). (Updated September 2, 2016)
 - [Zika Outreach Guide](#). (Updated September 2, 2016)
 - [Zika Tracking Spreadsheet](#). (Updated September 2, 2016)
 - [Promotion of Zika Activities Form](#). (Updated September 2, 2016)

Veterinarians/ Animal Care Professionals

- At the time this report was published, animals do not appear to be involved in the spread of Zika virus. While Zika virus was first discovered in a monkey with a mild fever

in the Zika Forest of Uganda in the 1940s, the current prevalence of Zika virus in monkeys and other nonhuman primates is not known. At this time there have been no reports of other animals becoming sick with Zika or of being able to spread Zika to people or other animals.

- For more information:
 - [Zika Virus and Animals.](#)

Plans and State- and Locally-Developed Resources

Please note these plans are public health plans concentrating on vector management and risk communications but do not reflect many of the clinical issues nor involvement by coalition partners, both of which are encouraged to be included in plans.

If your jurisdiction or healthcare entity has a Zika Response Plan that you would like included in ASPR TRACIE, please send the plan to askasprtracie@hhs.gov for consideration.

- National and International Plans
 - [Zika: CDC Draft Interim Response Plan \(Updated October 7, 2016\)](#)
 - [WHO: Zika Strategic Response Plan \(Updated July 7, 2016\)](#)
- State and Locally Developed Plans and Resources (Updated July 7, 2016)
 - Alabama
 - [A Guide for Public Health Environmentalists, Municipalities, and County Commissions. \(Updated October 7, 2016\)](#)
 - Florida
 - [Sample Clinical Protocol for Suspected Zika Virus Infection. \(Updated August 5, 2016\)](#)
 - [Department of Health Daily Zika Update \(Updated October 7, 2016\)](#)
 - Kentucky
 - [Louisville Zika Response Plan \(Updated July 7, 2016\)](#)
 - Louisiana
 - [City of New Orleans Zika Virus Plan \(Updated July 7, 2016\)](#)
 - Maryland
 - [Zika Public Service Announcements \(Updated October 7, 2016\)](#)
 - Pennsylvania
 - [Zika Virus Response Plan \(Updated July 7, 2016\)](#)
 - Texas
 - [Regional Response Teams: Zika Response. \(Updated July 7, 2016\)](#)
 - [Texas Integrated Vector Management Capacity. \(Updated July 7, 2016\)](#)
 - [Zika Communications Toolkit. \(Updated October 7, 2016\)](#)
 - [Zika in Texas Website. \(Updated July 7, 2016\)](#)
 - [Zika Virus Preparedness and Response Plan \(Updated July 7, 2016\)](#)

- Virginia
 - [Zika Virus Disease Response Annex](#) (Updated July 7, 2016)

Research/Development Agenda

- Development of a vaccine and pharmaceutical countermeasure or antiviral treatment.
- Develop laboratory tests (including point-of-care, real-time) to specifically diagnose Zika, Chikungunya, and Dengue fever.
- Define effective risk communication and behavior change methodologies for the U.S. public. (Updated May 9, 2016)
- Define transmissibility risks and duration, especially non-vector transmission via sexual and other means.
- Further define linkage to Guillain-Barré syndrome, microcephaly, and other potential effects.
- Define period of viremia and establish “safe period” of waiting prior to becoming pregnant after visiting endemic areas.

*Contributors and reviewers of this document include **Marion Danis**, MD, Department of Bioethics, National Institutes of Health, **Dan Hanfling**, MD, Contributing Scholar, UPMC Center for Health Security; Member, InterAgency Board, Health and Medical Responder Safety; Attending Physician, BestPractices, Inc. (a division of EmCare); Clinical Professor of Emergency Medicine, George Washington University; Strategic Adviser, HHS/ASPR, Hospital Preparedness Program, **John Hick**, MD, HHS ASPR and Hennepin County Medical Center, **Alicia Livinski**, Biomedical Librarian, HHS National Institutes of Health, **Gavin Macgregor-Skinner**, BVSc, MSc, MPH, MRCVS, Global Projects Manager, Elizabeth R. Griffin Foundation; Director of Global Response, BIDMC/HHI Fellowship in Disaster Medicine, Harvard Medical School Teaching Hospital; Assistant Professor, Penn State College of Medicine, **Anthony Macintyre**, MD, The George Washington University Department of Emergency Medicine, **Nancy Petit**, MD, Head, Division of Obstetrics; Trinity Health, SFDE, **Mary Russell**, EdD, MSN, Emergency Services, Boca Raton Regional Hospital; **Meghan Treber**, MS, Principal, Public Health Preparedness Practice, ICF International, ICF ASPR TRACIE Project Director; and **Ty J. Vannieuwenhoven**, DVM, MPH, MSS, DACVPM, Chief Veterinary Officer, National Disaster Medical System (NDMS), U.S. Department of Health and Human Services, Office of the Assistant Secretary for Preparedness and Response.*

Appendix A: ASPR Resources

PHE.Gov serves as the key one-stop website for all federal public health and medical information sources and assets. The site is searchable for multiple resources.

<http://www.phe.gov>

The Technical Resources, Assistance Center, and Information Exchange (TRACIE) is a healthcare emergency information gateway that provides timely access to resources and promising practices, identifies and remedies knowledge gaps, and connects users with responses to a range of requests for technical assistance. <https://asprtracie.hhs.gov/>

The HHS Response and Recovery Resources Compendium is an easy to navigate, comprehensive, web-based repository of HHS resources and capabilities available to federal, state, local, territorial and tribal stakeholders before, during, and after public health and medical incidents.

<http://www.phe.gov/emergency/hhscapabilities/Pages/default.aspx>

Appendix B: Full References with Annotations

Adams, L., Bello-Pagan, M., Lozier, M., et al. (2016) [Update: Ongoing Zika Virus Transmission – Puerto Rico](#). Morbidity and Mortality Weekly Report. (Included August 5, 2016)

This report provides an update on the continued transmission of Zika virus disease in Puerto Rico including a review of the epidemiology of the outbreak and the public health response.

American College of Obstetricians and Gynecologists. (2016). [Practice Advisory: Interim Guidance for Care of Obstetric Patients During a Zika Virus Outbreak](#).

This joint message from the American College of Obstetricians and Gynecologists and the Society for Maternal Fetal Medicine mirrors the Interim Guidance issued by the Centers for Disease Control and Prevention (CDC) for the management of pregnant women presenting with symptoms consistent with Zika virus disease infection. This publication includes an algorithm for assessment, diagnosis, and treatment of a pregnant woman.

American Medical Association. (2016). [Zika Virus Resource Center](#).

This webpage provides a compilation of resources related to Zika virus disease.

Bingham, A., Cone, M., Mock, V., et al. (2016). [Comparison of Test Results for Zika Virus RNA in Urine, Serum, and Saliva Specimens from Persons with Travel-Associated Zika Virus Disease – Florida, 2016](#). Morbidity and Mortality Weekly Report. 65(18).

The Florida Department of Health Bureau of Public Health Laboratories conducted testing on samples from 913 persons who met the state criteria for testing. Results for urine and serum samples showed that approximately twice as many urine specimens tested positive for Zika virus than serum specimens, suggesting that urine might be a more useful specimen for identifying acute Zika virus infection.

Bogoch, I., Brady, O.J., Kraemer, M., et al. (2016). [Anticipating the International Spread of Zika Virus from Brazil](#). The Lancet. 387:335-336.

Through evaluation of travel patterns from current countries with Zika virus disease spread and mosquito habitation patterns, the authors have predicted possible Zika virus disease spread throughout the Americas, including the U.S. The authors also included a predictive map.

Boulet, S., D'Angelo, D., et al. (2016) [Contraceptive Use Among Non-pregnant and Postpartum Women at Risk for Unintended Pregnancy, and Female High School Students, in the Context of Zika Preparedness](#). Morbidity and Mortality Weekly Report. (Included August 5, 2016)

This study is a review of surveys and studies that aims to provide State-based estimates of contraception use among nonpregnant and postpartum women at risk for unintended pregnancies and sexually active female high school students. This data can be used to target campaigns for effective use of contraception.

Brasil, Patricia, et al. (2016). [Zika Virus Infection in Pregnant Women in Rio de Janeiro – Preliminary Report](#). The New England Journal of Medicine.

Researchers in Rio de Janeiro enrolled 88 pregnant women in a prospective study, where they were tested for Zika virus and then followed throughout their pregnancies. Seventy-two of the 88 women enrolled tested positive for Zika virus infection. The authors concluded that “despite mild clinical symptoms, Zika virus infection during pregnancy appears to be associated with grave outcomes, including fetal death, placental insufficiency, fetal growth restriction, and CNS injury.”

Center for Infectious Disease Research and Policy. (2016.) [Zika Resource Page](#).

This webpage offers a compilation of resources on Zika virus disease including governmental publications, academic publications, research pieces, and popular media mentions. The compilation is updated regularly.

Centers for Disease Control and Prevention. (2016). [Executive Orders and Emergency Declarations for the West Nile Virus: Applying Lessons from Past Outbreaks to Zika](#).

This document provides an overview of Executive Orders and Emergency Declarations issued by states and territories in the past (specific to West Nile Virus), and how those authorities may be used to support prevention, response, and recovery actions for Zika virus.

Centers for Disease Control and Prevention. (2016). [Possible Zika Virus Infection Among Pregnant Women – United States and Territories, May 2016](#). Morbidity and Mortality Weekly Report. 65(20).

This article discusses the establishment of a comprehensive surveillance system to monitor pregnant women with Zika virus in the United States.

Centers for Disease Control and Prevention. (2016). [Top 10 Zika Response Planning Tips: Brief Information for State, Tribal, Local, and Territorial Health Officials.](#)

This summary of key Zika virus resources is a ready reference and aid for response planning for state, local, and territorial public health officials.

Centers for Disease Control and Prevention. (2016). [Zika Virus.](#)

This website provides the Centers for Disease Control and Prevention resources related to Zika Virus disease including current transmission and spread information, current clinical recommendations, and prevention and mitigation information. This page is updated regularly.

Centers for Disease Control and Prevention. (2016). [Zika Virus Action Planning.](#)

This website includes links to the video and presentations from the day-long workshop “Zika Virus Action Planning” held April 1, 2016.

Centers for Disease Control and Prevention. (2016). [ZAP Summit Follow-Up.](#)

This website includes links to videos and presentations for ZAP Summit Follow-up teleconferences.

Da Silva, A., Ganz, J., Sousa, P., et al. (2016). [Early Growth and Neurologic Outcomes of Infants with Probable Congenital Zika Virus Syndrome.](#) Emerging Infectious Diseases. 22(11). (Included October 7, 2016)

This article describes findings from a study of 48 infants up to eight months of age with probable congenital Zika virus syndrome. The study found that additional neurological symptoms emerged with age and that head circumference measurements fell further from the mean, suggesting that affected infants may continue to fall further behind non-affected children.

Goodman, A, Dziuban, E., Powell, K., et al. (2016). Characteristics of Children Aged <18 Years with Zika Virus Disease Acquired Postnatally – U.S. States, January 2015-July 2016. Morbidity and Mortality Weekly Report. (Included October 7, 2016)

This MMWR early release examined 158 cases of confirmed or probable Zika virus disease in children under 18 reported to the CDC by 30 states. All cases were acquired postnatally and most had mild symptoms, with 2 hospitalizations and no deaths reported. Nearly half of the cases were aged 15-17, which the authors attributed to healthcare-seeking or testing bias (five cases were pregnant) or a greater likelihood of exposure through travel.

Lima, A, Lovin, D.D., Hickner, P.V., et al. (2015). [Evidence for an Overwintering Population of *Aedes Aegypti* in Capitol Hill Neighborhood, Washington, DC](#). The American Journal of Tropical Medicine and Hygiene. 94(1):231-5.

This article describes a research study demonstrating that *Aedes aegypti* mosquitoes were present in samples taken in Capitol Hill, Washington, DC throughout 2011-2014. These mosquitoes were not previously thought to travel further north than the average 10 degree Celsius isotherm.

Lucey, D. (2016). [Will Zika Virus and Microcephaly Epidemics Emerge After Ebola in West Africa? The Need for Prospective Studies Now](#). Health Security.

The author discusses the emerging cases of Zika virus in Cape Verde, West Africa and the need to begin surveillance and mosquito control to prevent more transmission. The author also discusses the timeline of the epidemic, beginning in October 2015 and predicting an increase in cases of microcephaly in May/June 2016, from mothers infected with Zika virus who have not been properly screened and evaluated.

Lucey, D.R. and Gostin, L.O. (2016). [The Emerging Zika Pandemic: Enhancing Preparedness](#). Journal of the American Medical Association. 315(9):865-866.

The authors discuss the current outbreak of Zika virus disease and why it is a concern for the U.S. public health and healthcare systems. They also describe steps that should be taken now to prevent and mitigate spread and steps that should be taken to prepare. The article also includes an outline for a Zika virus disease research agenda.

Marston, H., Lurie, N., Borio, L., and Fauci, A. (2016). [Considerations for Developing a Zika Virus Vaccine](#). The New England Journal of Medicine. 375:1209-1212. (Included October 7, 2016)

This articles presents the perspective of federal officials on three potential strategies for investigators to consider when conducting clinical trials on Zika vaccine candidates. The strategies are following the traditional 3 phase vaccine development approach,

conducting human challenge studies after phase 2 studies, and relying on the FDA's Animal Rule. The officials advise selecting a pathway based on disease incidence and its effect on the generation of reliable safety and efficacy data as well as active engagement with affected communities in trial design and execution.

Mlakar, J., Korva, M., Tul, N., et al. (2016). [Zika Virus Associated with Microcephaly](#). *New England Journal of Medicine*. 374(10): 951-958.

This article discusses a case report of an expectant mother infected with Zika during the end of her first trimester while in Brazil. Serial ultrasounds at 14 and 20 weeks showed normal fetal growth and anatomy. An ultrasound performed at 29 weeks confirmed intrauterine growth retardation and fetal anomalies. Medical termination of the pregnancy occurred at 32 weeks of gestation. Fetal autopsy findings detail the severe brain injury and placental damage associated with the infection. Genome sequence identity was also performed.

National Library of Medicine. (2016). [Zika Virus Health Information Resources](#).

This resource is a comprehensive collection of Zika virus disease-related resources from the U.S. and abroad. It is compiled and updated regularly from the National Library of Medicine.

Pan American Health Organization. (2016). [Epidemiological Update: Neurological Syndrome, Congenital Anomalies, and Zika Virus Infection](#).

This document is the latest in a series of epidemiological updates provided by the Pan American Health Organization. It highlights the specific issues related to the correlation between Zika virus disease outbreaks and the increase in neurological syndromes, including Guillain-Barre syndrome and congenital anomalies, specifically microcephaly. The document details recommendations for management, increased surveillance and other public health recommendations.

Pan American Health Organization. (2016). [Zika Virus Infection](#).

This website provides an outline of the disease and its progression specifically in the Americas. It provides information for the general public and health professionals on disease spread, identification, treatment and prevention.

Rasmussen, S., Jamieson, D., Honein, M., and Petersen, L. (2016). [Zika Virus and Birth Defects – Reviewing the Evidence for Causality](#). The New England Journal of Medicine. 374:1981-1987.

The authors evaluated available data to determine causality of Zika infection and birth defects, most notably microcephaly. This evidence included Zika virus infection during specific times in pregnancy, a specific rare phenotype involving microcephaly, and data that support biologic plausibility. The researchers concluded that the evidence supports a causal relationship between Zika virus infection and birth defects.

Reefhuis, J. Gilboa, S., Johansson, M., et al. (2016). [Projecting Month of Birth for At-Risk Infants after Zika Virus Disease Outbreaks](#). Emerging Infectious Diseases. 22(5).

This article looked at Zika virus occurrence and surges of microcephaly births to determine if projections could be made. Researchers developed a [modifiable spreadsheet tool](#) that public health officials can use to plan for delivery of infants from mothers infected with Zika virus.

Rosa, R., Abbo, L., Kapur, G., et al. (2016). [Development and Implementation of a Zika Virus Disease Response Protocol at a Large Academic Medical Center](#). Disaster Medicine and Public Health Preparedness. (Included August 5, 2016)

The authors describe the process used to develop a Zika response protocol at a large academic medical center.

Schuchat, A. (2016). [Zika 101](#). Centers for Disease Control and Prevention.

Written by Dr. Anne Schuchat, Principal Deputy Director of the CDC, this blog provides a clear and easy-to-read question and answer format on Zika virus disease. The blog describes Zika virus disease, how it is spread, signs and symptoms, prevention and protective measures, spread in the U.S., and what the Department of Health and Human Services is doing to prepare for Zika virus disease in the US.

Tang, H., Hammack, C., Ogden, S., et al. (2016). [Zika Virus Infects Human Cortical Neural Progenitors and Attenuates Their Growth](#). *Cell Stem Cell*. 18(5):1–4.

Researchers working with Zika virus and human neural cells demonstrated that Zika virus does infect the neural cells and affects their ability to replicate and survive.

The Network for Public Health Law. (2016). [Primer: Emergency Legal Preparedness Concerning Zika Virus](#).

This primer, presented in a PowerPoint format, outlines public health concerns from Zika Virus disease and discusses potential legal issues in the U.S. and abroad.

Vasquez, Amber, et al. (2016.) [Survey of Blood Collection Centers and Implementation of Guidance for Prevention of Transfusion-Transmitted Zika Virus Infection – Puerto Rico, 2016](#). *Morbidity and Mortality Weekly Report*. 65(14):375–378.

The authors have gathered information on blood collection operations in Puerto Rico to assess the impact the Zika-related restriction on blood collection is having and what would be needed to replace the affected products.

Vestin, Natalie. (2016). [Zika Outbreak Expands in West Africa, Americas](#). Center for Infectious Disease Research and Policy.

This article highlights the Zika virus outbreak in Cape Verde, and includes information on the outbreak in Panama and Honduras.

World Health Organization. (2016). [Zika App](#). Android. iOS.

Healthcare providers and others can download this app to access the latest World Health Organization information Zika virus disease.

World Health Organization. (2016). [Zika Virus and Complications: Questions and Answers](#).

This webpage provides responses to commonly asked questions about Zika virus and mosquito protection and surveillance, sexual transmission, travel, neurological syndromes, pregnancy, and government response.

World Health Organization. (2016). [WHO Announces a Public Health Emergency of International Concern.](#)

This page includes the official statement from the World Health Organization Director-General declaring Zika virus disease a Public Health Emergency of International Concern. The declaration was made on February 1, 2016 after a meeting of the International Health Regulations (2005) Emergency Committee.

World Health Organization. (2016). [Zika Virus.](#)

This World Health Organization website provides an outline of Zika and an overview of its progression around the world. Links to information on signs and symptoms, transmission, diagnosis, treatment, and prevention along with Situation Reports are included on the page.