Zika Reader

Overview of Zika virus

Last updated: Feb 11, 2016

Share this page

Introduction

Zika virus is an RNA virus which belongs to the Flaviviridae family. It is generally transmitted by mosquito bites. Symptomatic illness associated with Zika virus infection is usually mild and self-limited; however, an ongoing outbreak in Brazil has been associated with reports of Guillain-Barre syndrome and fetal microcephaly. The link to both of these conditions is not yet causally proven. In response, the World Health Organization (WHO) declared that the current outbreak constitutes a Public Health Emergency of International Concern (PHEIC) in February 2016. [1]

Etiology and transmission

Zika virus is a single-stranded RNA virus of the Flaviviridae family (genus: *Flavivirus*) which is transmitted to humans primarily through the bite of an infected *Aedes* species mosquito, most commonly *Aedes aegypti*. The same species of mosquito transmits the chikungunya and dengue viruses. [2] The mosquito vectors typically breed in domestic water-holding containers. They are aggressive daytime biters and feed both indoors and outdoors near dwellings.

Nonhuman and human primates are likely to be the main reservoirs of the virus, and anthroponotic (human-to-vector-to-human) transmission occurs during outbreaks. [2]

Perinatal, in utero, and possible sexual and transfusion transmission events have also been reported. A case of presumed sexual transmission was reported in Texas in February 2016. [3] Zika virus RNA has been detected in body fluids other than blood including breast milk, amniotic fluid, CSF, semen, urine, and saliva; however, transmission via these body fluids has not yet been documented. [2]

[CDC: Zika virus transmission] (external link)

Epidemiology

Zika virus was first discovered in Uganda in 1947 in rhesus monkeys, and was subsequently identified in humans in 1952. Since then, outbreaks have occurred in Africa, the Americas, Asia, and the Pacific. The first large outbreak was reported on the island of Yap (Federated States of Micronesia) in 2007. Another large outbreak was seen in French Polynesia from 2013 to 2014. **[4]**

In the current South American outbreak, the first reports of locally transmitted infection came from Brazil in May 2015. By the beginning of February 2016, local transmission had been reported in 26 countries/territories in the Americas. Due to the magnitude of the outbreak, Brazil stopped counting cases; however, authorities estimated between 497,593 and 1,482,701 cases had occurred since the outbreak started. After Brazil, Colombia reported the largest number of cases (20,297 as of January 23, 2016) since October 2015. **[5]**

There is also an ongoing outbreak in Cabo Verde, West Africa (7081 cases as of January 17, 2016) which started in October 2015.**[5]**

Cases in returning travelers have now been reported in other countries including the US, UK, Australia, and China.

[CDC: Zika virus disease in the US 2015-2016] (external link)

[WHO: disease outbreak news] (external link)

[WHO: Zika situation report] (external link)

[PAHO: Zika epidemiological alerts and updates] (external link)

Case definition

An interim case definition has been published by the Pan American Health Organization (PAHO)/WHO. **[6]**

Suspected case:

- Patient with rash or elevated body temperature >99°F (>37.2°C) with at least one of the following symptoms (not explained by other medical conditions):
  - Arthralgia or myalgia
  - Nonpurulent conjunctivitis or conjunctival hyperemia
  - Headache or malaise.

Confirmed case:

- Suspected case with positive laboratory result for Zika virus.

The Centers for Disease Control and Prevention (CDC) has not published a case definition as yet.

Diagnosis: clinical presentation

About 20% of people infected with Zika virus become symptomatic. [7] The incubation period is believed to be between 3 and 12 days, [7] [8] although this is still unclear.

Characteristic clinical findings include elevated body temperature (>99°F [>37.2°C]) with an itchy, maculopapular rash, arthralgia, or nonpurulent conjunctivitis. The characteristic rash is one of the most distinctive symptoms. Other commonly reported symptoms include myalgia, malaise, and headache. [2] [9] Less common symptoms include vomiting/diarrhea, abdominal pain, anorexia, and retro-orbital pain. No clinical differences have been described between pregnant women and nonpregnant women. [7]

Clinical illness is usually mild with symptoms lasting for 2 to 7 days. [9] Severe disease requiring hospitalization is uncommon and the case fatality is low. [2] However, cases of Guillain-Barre syndrome have been reported in patients following suspected Zika virus infection. The Brazil Ministry of Health is also investigating the possible association between Zika virus and a reported increase in the number of babies born with microcephaly. [2]

Diagnosis: investigations

Laboratory diagnosis is generally accomplished by testing serum or plasma to detect the virus, viral nucleic acid, or virus-specific immunoglobulin M (IgM) and neutralizing antibodies. [2] However, tests may also be done on other body fluids (e.g., urine, saliva).[9] Commercial tests are not generally available as yet.

In the US, testing is done at the CDC Arbovirus Diagnostic Laboratory or at a few local/state health departments. [2] During the first week after the onset of symptoms, Zika virus disease can often be diagnosed by performing reverse transcriptase-polymerase chain reaction (RT-PCR) on serum. Virus-specific IgM and neutralizing antibodies typically develop toward the end of the first week of illness; however, cross-reaction with related flaviviruses (e.g., dengue and yellow fever viruses) is common and may be difficult to discern. Plaque-reduction neutralization testing can be performed to measure virus-specific neutralizing antibodies and discriminate between cross-reacting antibodies in primary

flavivirus infections. **[2]** [CDC: instructions for submitting diagnostic specimens to the DVBD arbovirus diagnostic laboratory] (external link)

PAHO/WHO have produced a diagnostic algorithm for detecting Zika virus. In the acute phase of illness (i.e., 1-5 days after symptom onset), they recommend RT-PCR for the detection of dengue and Chikungunya virus first, and if these results are negative, RT-PCR for the detection of Zika virus. In the convalescent phase (i.e., 6 or more days after symptom onset), they recommend serologic testing for dengue and Chikungunya virus antibodies first, and if these results are negative, serology for Zika virus. Positive RT-PCR or serology for Zika virus confirms the infection. **[10]** Saliva or urine samples collected during the first 3 to 5 days after symptom onset, or serum collected in the first 1 to 3 days, are suitable specimens for detection. **[11]** [PAHO: interim guidance for laboratory detection and diagnosis] (external link)

For nonpregnant returning travelers, diagnostic testing is generally only indicated for a patient who has traveled to or arrived from an area where there is an active outbreak and presents with symptoms within 2 weeks of their return.

Reporting

Zika virus is a nationally notifiable disease in the US. Healthcare providers are advised by the CDC to report to local or state health departments which, in turn, report to the CDC through ArboNET, the national surveillance system for arboviral disease. **[2]**

Zika virus infection may also be a notifiable disease in other countries. Local guidance should be consulted.

Treatment

No specific antiviral treatment is available. Treatment is generally supportive and can include rest, fluids, and use of analgesics and antipyretics (e.g., acetaminophen). Calamine lotion may be used for the itch.

Nondrug measures may be recommended in pregnant women (e.g., damp cloths, lukewarm baths/showers). If these measures fail, acetaminophen can be used. **[7]** Otherwise, supportive measures are the same for these patients.

Because of similar geographic distribution and symptoms, patients with suspected Zika virus infections also should be evaluated and managed for possible dengue or chikungunya virus infection. Aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs) should be avoided until dengue can be ruled out to reduce the risk of hemorrhage. **[2]**

Infected patients should be isolated to prevent the transmission of the virus to other people (especially pregnant women) by preventing contact between the infected patient and mosquitoes. The mosquito bite prevention strategies listed below should be instituted during the first week of infection at least. [7] Healthcare workers caring for patients should protect themselves from mosquito bites by using repellents and wearing long sleeves and trousers.

Prevention

There is currently no vaccine for prevention. Therefore, primary prevention relies on mosquito bite prevention and mosquito population control (e.g., removing or modifying breeding sites). Mosquitoes that spread Zika virus are aggressive and active during the daytime as well as at night.

Mosquito avoidance

- The CDC and WHO recommend the following preventive measures: [2] [9]
  - Wearing clothes that cover as much of the body as possible (e.g., long-sleeved shirts and long pants)
  - Staying in places with air conditioning or that use window and door screens to keep mosquitoes outside
  - Sleeping under a mosquito net (possibly impregnated with insecticide) if outside and not able to protect yourself from mosquito bites
  - Using approved insect repellent (if >2 months of age)
  - Emptying, cleaning, or covering containers that can hold water to reduce areas where mosquitoes can breed.

- During outbreaks, insecticide spraying (using an insecticide recommended by WHO) may be carried out

- People infected with Zika, chikungunya, or dengue virus should be protected from further mosquito exposure during the first few days of illness to prevent other mosquitoes from becoming infected and reduce the risk of local transmission. [2]

Sexual precautions

- Women living in endemic areas should consult local health authorities for advice before becoming pregnant

- Because of the uncertainty surrounding sexual transmission, the CDC recommends that men who have lived in or traveled to an area with Zika virus should abstain from sex or use condoms every time for vaginal, anal, and oral sex for the duration of a pregnancy. Additionally, the CDC

recommends that pregnant women talk with their healthcare providers about their male partner's potential exposures to Zika virus and symptoms of Zika-like illness [CDC: interim guidelines for prevention of sexual transmission of Zika virus] (external link)

Travel precautions (to endemic areas or areas with outbreaks)

- The CDC and WHO produce and regularly update guidance for travelers:
  - [CDC: travel health notices] (external link)
  - [WHO: information for travellers (Zika virus)] (external link)

- Advice varies internationally and travelers should stay informed about Zika virus outbreaks. WHO does not currently recommend any travel or trade restrictions to South America, whereas the CDC recommends that pregnant women should consider postponing travel to areas with ongoing Zika transmission **[2]**

- Pregnant women should consult their local health authority before traveling to areas where there is an ongoing Zika virus outbreak.

Emerging therapies

- Approval is awaited from the Food and Drug Administration (FDA) for trials to be conducted using a genetically modified mosquito.

Complications: Guillain-Barre syndrome

During the current outbreak in South America, an increased incidence of Guillain-Barre syndrome (GBS) has been reported. An increased incidence was also reported in a previous large outbreak in French Polynesia in 2013 and 2014. According to WHO, available data are insufficient to interpret the observed differences in GBS incidence globally and among states in Brazil. **[5]** Case-control studies are ongoing. The CDC is working with Brazil to investigate the association. **[2]**

[WHO: disease outbreak news – Guillain-Barre syndrome] (external link)

Complications: pregnancy-related

The WHO Emergency Committee has agreed that a causal relationship between Zika virus infection during pregnancy and microcephaly in the baby is strongly suspected; however, this is yet to be proven. **[1]**

Zika virus infection has been confirmed in several infants with microcephaly from Brazil. The time frame and geographic location of reports of infants with microcephaly coincides with the outbreak of Zika virus infection in Brazil. The baseline prevalence of congenital microcephaly is difficult to determine because of under-reporting, and the inconsistency of clinical criteria used to define microcephaly. Although population-based estimates of congenital microcephaly in Brazil vary, the number of infants with microcephaly currently being reported in Brazil is greater than would be expected. **[2]** The Ministry of Health reported 4783 cases of microcephaly between October 2015 and January 30, 2016, including 76 deaths. The incidence is usually significantly lower; between 2001 and 2014, 163 cases were reported nationwide per year. Authorities in Brazil are currently investigating the 4783 reported cases. **[5]**

Brain abnormalities reported in infants with microcephaly and laboratory-confirmed congenital Zika infection include microcephaly and disrupted brain growth. Some infants with possible Zika virus infection have been found to have intracranial calcifications **[2]** and abnormal eye findings. **[12]** It is not known if Zika virus infection caused any of these abnormalities, and long-term sequelae are not yet clear. **[2]**

[WHO: disease outbreak news - microcephaly] (external link)

Recommendations for pregnant women:

- The CDC recommends offering serologic (IgM antibody) testing to asymptomatic pregnant women who have traveled to areas with ongoing Zika virus transmission. Testing should be offered between 2 and 12 weeks after pregnant women return from travel to areas with ongoing Zika virus transmission. The CDC notes a negative IgM test result 2 to 12 weeks after known exposure suggests that a recent Zika virus infection did not occur, which may obviate the need for serial ultrasounds. Local health officials should determine when to implement testing of asymptomatic pregnant women on the basis of information about levels of Zika virus transmission and laboratory capacity. In addition, the updated guidance provides recommendations for female residents in areas with ongoing transmission of Zika virus. **[2]** [CDC: interim guidelines for pregnant women during a Zika virus outbreak] (external link)

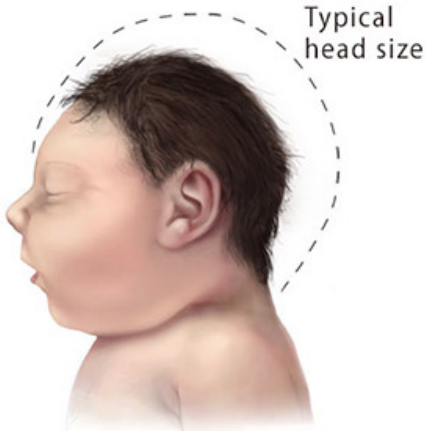
- PAHO/WHO recommend to measure the size of the uterus and volume of the amniotic fluid and evaluate fetal vitality and anatomy in pregnant women with suspected Zika infection. [PAHO: provisional remarks on Zika virus infection in pregnant women] (external link)

Recommendations for infants born to women at risk of Zika virus infection:

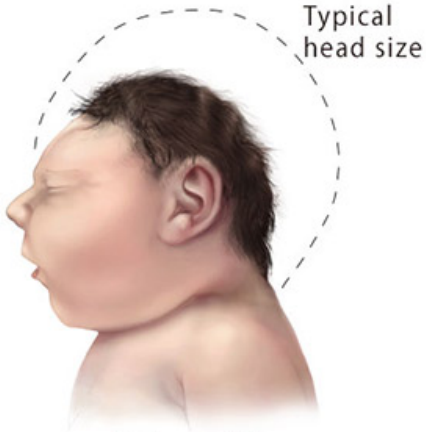
- The CDC advises that testing for Zika virus infection is recommended for infants born to women who traveled to, or resided in, an area with ongoing Zika virus transmission during pregnancy who: (1) were diagnosed with microcephaly or intracranial calcifications detected prenatally or at birth; or (2) have mothers with positive or inconclusive test results for Zika virus infection. Zika virus infection can be diagnosed by performing RT-PCR on infant serum, umbilical cord plasma/serum, CSF when available for other indications, or placenta. Serology assays can also be used to detect Zika virus-specific IgM and neutralizing antibodies. However, since it has not been established which test is most reliable for a diagnosis in infants, RT-PCR and IgM tests should both be performed. Plaque-reduction neutralization testing (PRNT) can also be performed to measure virus-specific neutralizing antibodies and differentiate from other flaviviruses. Histopathologic examination and immunohistochemical staining can be performed. Zika virus RT-PCR on fixed and frozen tissue should also be considered. **[2]**[CDC: interim guidelines for the evaluation and testing of infants with possible congenital Zika virus infection] (external link) [CDC: recommended clinical evaluation and laboratory testing for infants with possible congenital Zika virus infection] (external link)

- PAHO/WHO have produced guidance on the surveillance of microcephaly in settings with risk for Zika virus infection.[PAHO/WHO: preliminary guidelines for the surveillance of microcephaly in newborns in settings with risk of Zika virus circulation] (external link)

Baby with Typical Head Size



Baby with Microcephaly



Baby with
Severe Microcephaly

Facts about Microcephaly

Click here to view a larger image

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 often have smaller brains that might not have developed properly.

What is microcephaly?

Microcephaly is a condition where a baby's head is much smaller than expected. During pregnancy, a baby's head grows because the baby's brain grows. Microcephaly can occur because a baby's brain has not developed properly during pregnancy or has stopped growing after birth, which results in a smaller head size. Microcephaly can be an isolated condition, meaning that it can occur with no other major birth defects, or it can occur in combination with other major birth defects.

What is severe microcephaly?

Severe microcephaly is a more serious, extreme form of this condition where a baby's head is much smaller than expected. Severe microcephaly can result because a baby's brain has not developed properly during pregnancy, or the brain started to develop correctly and then was damaged at some point during pregnancy.

Other Problems

Babies with microcephaly can have a range of other problems, depending on how severe their microcephaly is. Microcephaly has been linked with the following problems:

- Seizures
- Developmental delay, such as problems with speech or otherdevelopmental milestones (like sitting, standing, and walking)

- Intellectual disability (decreased ability to learn and function in daily life)
- Problems with movement and balance
- Feeding problems, such as difficulty swallowing
- Hearing loss
- Vision problems

These problems can range from mild to severe and are often lifelong. Because the baby's brain is small and underdeveloped, babies with severe microcephaly can have more of these problems, or have more difficulty with them, than babies with milder microcephaly. Severe microcephaly also can be life-threatening. Because it is difficult to predict at birth what problems a baby will have from microcephaly, babies with microcephaly often need close follow-up through regular check-ups with a healthcare provider to monitor their growth and development.

Occurrence

Microcephaly is not a common condition. State birth defects tracking systems have estimated that microcephaly ranges from 2 babies per 10,000 live births to about 12 babies per 10,000 live births in the Unites States.[1]

Causes and Risk Factors

The causes of microcephaly in most babies are unknown. Some babies have microcephaly because of changes in their genes. Other causes of microcephaly, including severe microcephaly, can include the following exposures during pregnancy:

- Certain infections during pregnancy, such as rubella, toxoplasmosis, or cytomegalovirus
- Severe malnutrition, meaning a lack of nutrients or not getting enough food
- Exposure to harmful substances, such as alcohol, certain drugs, or toxic chemicals
- Interruption of the blood supply to the baby's brain during development

Some babies with microcephaly have been reported among mothers who were infected with Zika virus while pregnant. Researchers are studying the possible link between Zika virus infection and microcephaly.

CDC continues to study birth defects, such as microcephaly, and how to prevent them. If you are pregnant or thinking about becoming pregnant, talk with your doctor about ways to increase your chances of having a healthy baby.

Zika Virus and Pregnancy

For information about the effects of Zika virus infection during pregnancy, visit CDC's Zika and Pregnancy web page.

Diagnosis

Microcephaly can be diagnosed during pregnancy or after the baby is born.

During Pregnancy

During pregnancy, microcephaly can sometimes be diagnosed with an ultrasound test (which creates pictures of the body). To see microcephaly during pregnancy, the ultrasound test should be done late in the 2nd trimester or early in the third trimester. For more information about screening and confirmatory tests during pregnancy, visit CDC's birth defects diagnosis web page.

After the Baby is Born

To diagnose microcephaly after birth, a healthcare provider will measure the distance around a newborn baby's head, also called the head circumference, during a physical exam. The provider then compares this measurement to population standards by sex and age. Microcephaly is defined as a head circumference measurement that is smaller than a certain value for babies of the same age and sex. This measurement value for microcephaly is usually less than 2 standard deviations(SDs) below the average. Severe microcephaly is defined as a head circumference that is below an even smaller measurement value, usually less than 3 standard deviations (SDs) below the average for babies of the same age and sex. This means the baby's head is extremely small compared to babies of the same age and sex.

Head circumference growth charts for newborns, infants, and children up to age 20 years in the United States can be found on CDC's growth charts website. CDC recommends that health care providers use the WHO growth charts to monitor growth for infants and children ages 0 to 2 years of age in the United States.

Often, healthcare providers should take the head circumference measurement when the newborn baby is at least 24 hours old. This helps make sure that compression due to delivery through the birth canal has resolved. If the healthcare provider suspects the baby has microcephaly, he or she can request one or more tests to help confirm the diagnosis. For example, special tests like a CT scan or an MRI can provide critical information on the structure of the baby's brain that can help determine if the newborn baby had an infection during pregnancy. They also can help the healthcare provider look for other problems that might be present.

Treatments

Microcephaly is a lifelong condition. There is no known cure or standard treatment for microcephaly. Because microcephaly can range from mild to severe, treatment options can range as well. Babies with mild microcephaly often don't experience any other problems besides small head size. These babies will need routine check-ups to monitor their growth and development.

For more severe microcephaly, babies will need care and treatment focused on managing their other health problems (mentioned above). Developmental services early in life will often help babies with microcephaly to improve and maximize their physical and intellectual abilities. These services, known as early intervention, can include speech, occupational, and physical therapies. Sometimes medications also are needed to treat seizures or other symptoms.

Other Resources

The views of these organizations are their own and do not reflect the official position of CDC.

Mother To Baby (on behalf of the Organization of Teratology Information Specialists)
This website provides comprehensive information to mothers, healthcare professionals, and the general public about exposures during pregnancy.

References

1. National Birth Defects Prevention Network. Major birth defects data from population-based birth defects surveillance programs in the United States, 2006-2010. Birth Defects Research (Part A): Clinical and Molecular Teratology. 2013;97:S1-S172.

What is Guillain-Barré syndrome?

Guillain-Barré syndrome (GBS) is a disorder in which the body's immune system attacks part of the peripheral nervous system. The first symptoms of this disorder include varying degrees of weakness or tingling sensations in the legs. In many instances the symmetrical weakness and abnormal sensations spread to the arms and upper body. These symptoms can increase in intensity until certain muscles cannot be used at all and, when severe, the person is almost totally paralyzed. In these cases the disorder is life threatening - potentially interfering with breathing and, at times, with blood pressure or heart rate - and is considered a medical emergency. Such an individual is often put on a ventilator to assist with breathing and is watched closely for problems such as an abnormal heart beat, infections, blood clots, and high or low blood pressure. Most individuals, however, have good recovery from even the most severe cases of Guillain-Barré syndrome, although some continue to have a certain degree of weakness.

Guillain-Barré syndrome can affect anybody. It can strike at any age and both sexes are equally prone to the disorder. The syndrome is rare, however, afflicting only about one person in 100,000. Usually Guillain-Barré occurs a few days or weeks after the patient has had symptoms of a respiratory or gastrointestinal viral infection. Occasionally surgery will trigger the syndrome. In rare instances vaccinations may increase the risk of GBS.

After the first clinical manifestations of the disease, the symptoms can progress over the course of hours, days, or weeks. Most people reach the stage of greatest weakness within the first 2 weeks after symptoms appear, and by the third week of the illness 90 percent of all patients are at their weakest.

What causes Guillain-Barré syndrome?

No one yet knows why Guillain-Barré — which is not contagious — strikes some people and not others. Nor does anyone know exactly what sets the disease in motion.

What scientists do know is that the body's immune system begins to attack the body itself, causing what is known as an autoimmune disease. Usually the cells of the immune system attack only foreign material and invading organisms. In Guillain-Barré syndrome, however, the immune system starts to destroy the myelin sheath that surrounds the axons of many peripheral nerves, or even the axons themselves (axons are long, thin extensions of the nerve cells; they carry nerve signals). The myelin sheath surrounding the axon speeds up the transmission of nerve signals and allows the transmission of signals over long distances.

In diseases in which the peripheral nerves' myelin sheaths are injured or degraded, the nerves cannot transmit signals efficiently. That is why the muscles

begin to lose their ability to respond to the brain's commands, commands that must be carried through the nerve network. The brain also receives fewer sensory signals from the rest of the body, resulting in an inability to feel textures, heat, pain, and other sensations. Alternately, the brain may receive inappropriate signals that result in tingling, "crawling-skin," or painful sensations. Because the signals to and from the arms and legs must travel the longest distances they are most vulnerable to interruption. Therefore, muscle weakness and tingling sensations usually first appear in the hands and feet and progress upwards.

When Guillain-Barré is preceded by a viral or bacterial infection, it is possible that the virus has changed the nature of cells in the nervous system so that the immune system treats them as foreign cells. It is also possible that the virus makes the immune system itself less discriminating about what cells it recognizes as its own, allowing some of the immune cells, such as certain kinds of lymphocytes and macrophages, to attack the myelin. Sensitized T lymphocytes cooperate with B lymphocytes to produce antibodies against components of the myelin sheath and may contribute to destruction of the myelin. In two forms of GBS, axons are attacked by antibodies against the bacteria Campylobacter jejuni, which react with proteins of the peripheral nerves. Acute motor axonal neuropathy is particularly common in Chinese children. Scientists are investigating these and other possibilities to find why the immune system goes awry in Guillain-Barré syndrome and other autoimmune diseases. The cause and course of Guillain-Barré syndrome is an active area of neurological investigation, incorporating the cooperative efforts of neurological scientists, immunologists, and virologists.

How is Guillain-Barré syndrome diagnosed?

Guillain-Barré is called a syndrome rather than a disease because it is not clear that a specific disease-causing agent is involved. A syndrome is a medical condition characterized by a collection of symptoms (what the patient feels) and signs (what a doctor can observe or measure). The signs and symptoms of the syndrome can be quite varied, so doctors may, on rare occasions, find it difficult to diagnose Guillain-Barré in its earliest stages.

Several disorders have symptoms similar to those found in Guillain-Barré, so doctors examine and question patients carefully before making a diagnosis. Collectively, the signs and symptoms form a certain pattern that helps doctors differentiate Guillain-Barré from other disorders. For example, physicians will note whether the symptoms appear on both sides of the body (most common in Guillain-Barré) and the quickness with which the symptoms appear (in other disorders, muscle weakness may progress over months rather than days or weeks). In Guillain-Barré, reflexes such as knee jerks are usually lost. Because the signals traveling along the nerve are slower, a nerve conduction velocity (NCV) test can give a doctor clues to aid the diagnosis. In Guillain-Barré patients,

the cerebrospinal fluid that bathes the spinal cord and brain contains more protein than usual. Therefore a physician may decide to perform a spinal tap, a procedure in which a needle is inserted into the patient's lower back and a small amount of cerebrospinal fluid from the spinal column is withdrawn for study.

How is Guillain-Barré treated?

There is no known cure for Guillain-Barré syndrome. However, there are therapies that lessen the severity of the illness and accelerate the recovery in most patients. There are also a number of ways to treat the complications of the disease.

Currently, plasma exchange (also called plasmapheresis) and high-dose immunoglobulin therapy are used. Both of them are equally effective, but immunoglobulin is easier to administer. Plasma exchange is a method by which whole blood is removed from the body and processed so that the red and white blood cells are separated from the plasma, or liquid portion of the blood. The blood cells are then returned to the patient without the plasma, which the body quickly replaces. Scientists still don't know exactly why plasma exchange works, but the technique seems to reduce the severity and duration of the Guillain-Barré episode. This may be because plasmapheresis can remove antibodies and other immune cell-derived factors that could contribute to nerve damage.

In high-dose immunoglobulin therapy, doctors give intravenous injections of the proteins that, in small quantities, the immune system uses naturally to attack invading organisms. Investigators have found that giving high doses of these immunoglobulins, derived from a pool of thousands of normal donors, to Guillain-Barré patients can lessen the immune attack on the nervous system. Investigators don't know why or how this works, although several hypotheses have been proposed.

The use of steroid hormones has also been tried as a way to reduce the severity of Guillain-Barré, but controlled clinical trials have demonstrated that this treatment not only is not effective but may even have a deleterious effect on the disease.

The most critical part of the treatment for this syndrome consists of keeping the patient's body functioning during recovery of the nervous system. This can sometimes require placing the patient on mechanical ventilatory assistance, a heart monitor, or other machines that assist body function. The need for this sophisticated machinery is one reason why Guillain-Barré syndrome patients are usually treated in hospitals, often in an intensive care ward. In the hospital, doctors can also look for and treat the many problems that can afflict any paralyzed patient - complications such as pneumonia or bed sores.

Often, even before recovery begins, caregivers may be instructed to manually move the patient's limbs to help keep the muscles flexible and strong and to prevent venous sludging (the buildup of red blood cells in veins, which could lead to reduced blood flow) in the limbs which could result in deep vein thrombosis. Later, as the patient begins to recover limb control, physical therapy begins. Carefully planned clinical trials of new and experimental therapies are the key to improving the treatment of patients with Guillain-Barré syndrome. Such clinical trials begin with the research of basic and clinical scientists who, working with clinicians, identify new approaches to treating patients with the disease.

What is the long-term outlook for those with Guillain-Barré syndrome?

Guillain-Barré syndrome can be a devastating disorder because of its sudden and unexpected onset. In addition, recovery is not necessarily quick. As noted above, patients usually reach the point of greatest weakness or paralysis days or weeks after the first symptoms occur. Symptoms then stabilize at this level for a period of days, weeks, or, sometimes, months. The recovery period may be as little as a few weeks or as long as a few years. About 30 percent of those with Guillain-Barré still have a residual weakness after 3 years. About 3 percent may suffer a relapse of muscle weakness and tingling sensations many years after the initial attack.

Guillain-Barré syndrome patients face not only physical difficulties, but emotionally painful periods as well. It is often extremely difficult for patients to adjust to sudden paralysis and dependence on others for help with routine daily activities. Patients sometimes need psychological counseling to help them adapt.

What research is being done?

Scientists are concentrating on finding new treatments and refining existing ones. Scientists are also looking at the workings of the immune system to find which cells are responsible for beginning and carrying out the attack on the nervous system. The fact that so many cases of Guillain-Barré begin after a viral or bacterial infection suggests that certain characteristics of some viruses and bacteria may activate the immune system inappropriately. Investigators are searching for those characteristics. Certain proteins or peptides in viruses and bacteria may be the same as those found in myelin, and the generation of antibodies to neutralize the invading viruses or bacteria could trigger the attack on the myelin sheath. As noted previously, neurological scientists, immunologists, virologists, and pharmacologists are all working collaboratively to learn how to prevent this disorder and to make better therapies available when it strikes.

Where can I get more information?

For more information on neurological disorders or research programs funded by the National Institute of Neurological Disorders and Stroke, contact the Institute's Brain Resources and Information Network (BRAIN) at:

BRAIN
P.O. Box 5801
Bethesda, MD 20824
800-352-9424
http://www.ninds.nih.gov

Information also is available from the following organizations:

GBS/CIDP Foundation International
The Holly Building 104 1/2 Forrest Ave.
Narberth, PA 19072
info@gbs-cidp.org
http://www.gbs-cidp.org
Tel: 610-667-0131 866-224-3301
Fax: 610-667-7036

TECH & SCIENCE

HOW A SMALL TEAM OF DOCTORS CONVINCED THE WORLD TO STOP IGNORING ZIKA

BY LIZ BRAGA ON 2/29/16 AT 9:50 AM

03/11/16

COVER STORY

Mothers and their infants, all born with microcephaly, gather for a group photo during the two-month birthday celebration of Juan Pedro, second baby from right, at the Altino Ventura Foundation, a treatment center that provides free health care, in Recife, Brazil, February 4. With a proven link to Zika, researchers fear an unimaginable potential that the likely deadly disease could become as widespread as the common cold.

Saturday, February 13, 2016, was D-Day in Brazil, the launch of the most important battle yet in the war against Aedes aegypti, the mosquito that transmits the viruses that cause yellow fever, dengue, chikungunya and, most pressing today, Zika. Armed with insecticides and leaflets, and accompanied by thousands of soldiers, the Brazilian government—including President Dilma Rousseff and almost all the ministers—took to the streets to convince people to do everything they could to rid their homes of the mosquito. The country needed to do in a few

months what it has not been able to accomplish in the 30-plus years since the first case of dengue, a potentially lethal, flu-like illness, was registered in Brazil in 1981: close ranks against the vector.

Aedes aegypti is endemic in Brazil—the blood-sucking insect is found in almost all of the more than 5,000 counties in the country. This one species of mosquito is responsible for Brazil's annual epidemic of dengue that kills hundreds and sometimes thousands of people. Brazilians have learned to live with dengue, but in the first months of 2015 infectious disease experts began to see what they believed was a new mosquito-borne illness. It tended to cause flu-like symptoms, a light fever and a pinkish rash that disappeared in a day or two. Most local health care workers were treating it as though it were dengue. But when Dr. Kleber Luz, an infectious disease expert based in Natal, the capital of the state of Rio Grande do Norte, looked at the symptoms patients were presenting with, he quickly suspected it was not dengue. He called up a colleague, Dr. Carlos Brito, a researcher at the Osvaldo Cruz Foundation (Fiocruz) in Pernambuco, one of Brazil's most prominent infectious disease institutions. Its specialty: arboviruses, the viruses transmitted by mosquitoes, ticks or other arthropods, including dengue, yellow fever and West Nile. "We collected more than 500 samples, and we insisted that it was not dengue, that it was something urgent and new," says Luz. After ruling out other options, the two experts concluded it had to be Zika.

Zika has been known for decades in Africa and parts of Asia, but it had never spread in South America, so the doctors' conclusion was met with distrust. The Ministry of Health was contacted, but the Brazilian government wasn't convinced. Whatever was going around had no dangerous symptoms or long-lasting effects, and people weren't dying. So the government chose not to implement mandatory reporting for the infection, and when the summer of 2015 ended, so did any worries about Zika. "There was enormous resistance to the idea that it could be Zika. Health authorities did not believe Zika would come to Brazil," says Luz. "They underestimate the speed diseases spread around the world these days." Frustrated, the doctors decided to form their own group to study the virus.

THE FIRST SIGNS that Brazil was facing a terrifying wave of birth defects came in August 2015, when neuropediatrician Vanessa van der Linden was called in for a consultation in Recife. A woman had just given birth to twin boys; one had a severe case of congenital microcephaly, which results in an abnormally small head that compromises cognitive function. The doctors could not find a cause for it. "It was a private hospital, so I could investigate all the possible causes and do different kinds of tests," says van der Linden. "But nothing showed up, Something was not right there, but I could not find what it was." At the time, it seemed to be an extraordinary occurrence—after all, it was only one baby, a rare case.

But two weeks later, during her regular rounds, van der Linden found three more babies with microcephaly. And in the next week, two more. "I called my mother,

who is also a neuropediatrician, and she had seven cases. It could not be a coincidence," says van der Linden. In just two weeks, the doctor encountered more than 15 cases of microcephaly, more than would normally be found in a whole year. At one point, van der Linden says, "we had three cases in one night, when we would normally pass through four months without a single case. We had to investigate."

Van der Linden was the first doctor to raise the alarm. She reached out to the Pernambuco Health Department. The authorities there searched the local hospitals and concluded that van der Linden was right: The registered cases of microcephaly were much higher than the year before, and none seemed to be due to the more common causes of the illness, such as rubella, cytomegalovirus, toxoplasmosis, HIV or parvovirus. The Ministry of Health in Brasília was informed. Its response was to call in a team of one: Carlos Brito.

Brito started simply. He asked questions, interviewed dozens of mothers, some as young as 14, who had recently given birth to babies with microcephaly so severe that the infants had constant seizures. "It was a very painful and distressing time," says Brito. "What could we say to them if we did not know exactly what was happening? We had to find an answer, and fast."

After a few days of research, the doctor developed a theory: The microcephaly could be caused by the Zika virus. Brito had the evidence. The mothers were of all different ages, were not using similar medications and, perhaps most important, they came from very different places. "The dispersal was too extensive," says Brito. "It could not be an outbreak caused by a disease transmitted by saliva, such as rubella, or a sudden decline in immunity that would allow the spread of cytomegalovirus. It needed a vector." Every mother tested negative for the common causes of the illness, and every one had experienced the Zika symptoms of a rash and a fever during their first trimester, which coincided exactly with the early 2015 Zika outbreak.

THE FEAR OF BEING RIGHT quarreled in Brito's mind with the fear of being wrong. If it was Zika, there was the unimaginable potential that microcephaly could become as widespread as the common cold. Aedes aegypti is in every city in every part of Brazil, and for 30 years the country had tried—and failed—to control the pest. But if Brito was wrong, he could cause a panic and further delay the research needed to unearth the true cause of the microcephaly outburst. Brito called his colleague, Luz, to find out if he was seeing the same pattern in Rio Grande do Norte, where the first cases of Zika had been registered the previous year. "In 12 hours, we found 11 cases," says Luz. "And the time of the pregnancy could be traced to the beginning of the Zika outbreak." Still, the doctors could not find proof that the virus had infected any of the babies.

Symptoms of Zika normally disappear after one or two days. The virus leaves no trace in the body except antibodies, the unique proteins organisms produce to fight an infectious disease, and at the time there was no test that could find the presence of the antibodies in blood samples from either mother or baby.

When news began to spread that there might be a link between Zika and microcephaly, scientists through Brazil searched for signs in affected newborns. In Pernambuco, for example, the scientists at Fiocruz were applying a method called polymerase chain reaction to amplify traces of viral DNA in the hopes of locating Zika DNA remnants in the affected babies, but without success.

The hunt was fruitless until a month later. Dr. Adriana Melo was treating two pregnant women with unborn babies who, in the womb, appeared to have abnormally small heads. Both fetuses also had stunted cerebellums (a part of the brain that controls the muscles, hearing and eyesight), not usually a symptom connected to congenital microcephaly. “In 17 years as a doctor, I had never seen anything like that,” says Melo. “A few days later, I received a [text] in a researcher's group about the suspected link between microcephaly and Zika. And then it hit home: It was the only possible explanation.”

Melo reached out to colleagues in search of a way to test the two women for Zika, but none of the private laboratories she typically used had the tools necessary. “I did not have any contacts at the Ministry of Health and did not know the public ones that were beginning to research Zika. It took almost two months to find a way,” Melo says. Eventually, a friend mentioned a researcher at Fiocruz. “On the day of my birthday [November 5], she called me,” says Melo. “We talked for two hours, trying to figure a way to send amniotic liquid to Rio de Janeiro while my guests celebrated [my birthday] for me.”

When the results came back, Melo’s suspicions were confirmed: There were traces of Zika virus in the amniotic fluid. For the first time, the virus was found in contact with malformed newborns. “This was what we needed to confirm the link between the microcephaly and Zika,” says Brito. The Ministry of Health, however, considered the connection “very likely” but not confirmed. Two weeks later, on November 28, another Brazilian research foundation confirmed that their scientists had found the virus in the brain of a stillborn baby. The Brazilian Ministry of Health released a statement that day saying Zika was the cause of the microcephaly outbreak.

It took another six weeks for the World Health Organization to issue a worldwide alert, despite the pleas of the Brazilian government, which had already declared a national health emergency. Urged on by an independent experts committee,

the WHO finally decreed a global health emergency in February 2016. After weeks of sleepless nights, Brito—the father of three young women—could finally breathe; the world had opened its eyes to the medical crisis that was first uncovered three months ago by a small group of doctors in northeast Brazil.

Public health officials across the Americas are now working feverishly to devise some solution to Zika. There are the research projects that sound halfway between science and fiction, like releasing into the wild lab-made versions of Aedes aegypti that have been genetically modified to quickly render entire populations sterile, or using bacteria that live in the mosquito's gut as a sort of Trojan horse to deliver molecules that could shut off the insect's ability to reproduce. There are the Hail Mary proposals, like bringing back DDT, a powerfully effective neurotoxic insecticide that has widely fallen out of favor since Rachel Carson's 1962 book, Silent Spring, revealed it caused environmental havoc.

Then there are the more mundane answers, like providing citizens with the basic knowledge and tools (environmentally friendly insecticide) they need to avoid infection and recognize Zika if it arrives in their home. Another simple solution is to bring better family planning options, like birth control and legalized abortion, to parts of South America where women with unwanted pregnancies have no legal recourse. Giving women more control over their reproduction, many say, would alleviate the real concern: the heightened risk that an infected woman would give birth to a child stricken with microcephaly.

Speaking of prophylactics—perhaps the real panacea would be a vaccine, distributed to every citizen of every troubled country. And it could be on its way; the U.S. National Institute of Allergy and Infectious Diseases, for one, is ramping up its efforts, focusing on adapting a West Nile virus vaccine that was recently successful in Phase I trials. Butantã, a Brazilian public lab, is in the last phase of a trial for a dengue vaccine in a partnership with NIH and they believe their protocol could be used to develop a vaccine for Zika. Fiocruz is working with a consortium of European labs to develop a vaccine as well. Big Pharma is looking into it too; Sanofi Pasteur, for example, has launched an initiative to leverage the work it has done with a recently approved dengue vaccine to quickly develop one for Zika. Quickly, though, is a relative term here. Realistically, a vaccine could take millions of dollars and several years to design, test and distribute.

So far, there have been 3,893 suspected and 508 confirmed cases of microcephaly in Brazil; in 41 of these, the link to Zika infection has been verified. On February 19, the WHO announced that a group of researchers from the U.S. Centers for Disease Control and Prevention and a Brazilian biotechnology company in the northeastern states of Bahia and Paraíba had found evidence of the Zika virus in autopsies conducted on infants with microcephaly, further solidifying the connection between the two health issues. Nevertheless, conspiracy theories abound in Brazil about the "true" cause of the microcephaly

outbreak, ranging from expired vaccines to the use of larvicides or transgenic mosquitoes. These are fed by the fact that other countries, such as Colombia, have found the presence of Zika but no microcephaly.

“We do not have all the answers yet, of course. It is an ongoing investigation,” says Luz. “Perhaps the virus had a mutation before coming to Brazil? What we cannot do is to wait months to be 100 percent sure. We have to do something now.”

The Zika virus foreshadows our dystopian climate future

Bill McKibben

I've spent much of my life chronicling the ongoing tragedies stemming from global warming: the floods and droughts and storms, the failed harvests and forced migrations. But no single item on the list seems any more horrible than the emerging news from South America about the newly prominent Zika disease.

Spread by mosquitoes whose range inexorably expands as the climate warms, Zika causes mild flu-like symptoms. But pregnant women bitten by the wrong mosquito are liable to give birth to babies with shrunken heads. Brazil last year recorded 4,000 cases of this "microcephaly". As of today, authorities in Brazil, Colombia, Jamaica, El Salvador and Venezuela were urging women to avoid getting pregnant.

Think about that. Women should avoid the most essential and beautiful of human tasks. It is unthinkable. Or rather, it is something out of a science fiction story, the absolute core of a dystopian future. "It is recommended that women postpone – to the extent possible – the decision to become pregnant until the country can move out of the epidemic phase of the Zika virus," the Colombian health authorities said, adding that those living in low altitude areas should move higher if possible, out of the easy range of mosquitoes.

Now think about the women who are already pregnant, and who will spend the next months in a quiet panic about whether their lives will be turned upside down. Try to imagine what that feels like – the anger, the guilt, the pervasive anxiety at the moment when you most want to be calm and serene.

And now think about the larger, less intimate consequences: this is one more step in the division of the world into relative safe and dangerous zones, an emerging epidemiological apartheid. The CDC has already told those Americans thinking of becoming pregnant to avoid travel to 20 Latin American and Caribbean nations.

Eventually, of course, the disease will reach these shores – at least 10 Americans have come back from overseas with the infection, and one microcephalic baby has already been born in Hawaii to a mother exposed in Brazil early in her pregnancy. But America is rich enough to avoid the worst of the mess its fossil fuel habits have helped create.

As usual, it's the most poor and most vulnerable who bear the brunt. In Brazil army troops are going door to door draining puddles and flowerpots of stagnant water where mosquitoes might breed; in Jamaica the minister of health said plaintively "I'm going to be very frank, we don't have enough fogging machines to fog every single community in Jamaica" with the pesticides that might help control the outbreak.

And so the residents of the rich world will, inevitably, travel less frequently to the places just beginning to emerge from poverty. The links that speed development will start to wither; even the Olympics, theoretically our showcase of international solidarity, is likely to be a fearful fortnight in Rio this August.

Zika's not the only force tending in that direction, of course. It's hard to imagine who's going to visit Burkina Faso or Mali any time soon, after al-Qaida and Isis have blown up the major western hotels. Expats are starting to desert Beijing and New Delhi because who wants to raise their kids in smog so bad that a facemask is a fashion accessory.

Obviously we need to extend every possible aid to people across the Americas – we need to make sure they have fogging machines and testing equipment and teams of doctors who can help. But even more obviously we need to face up to the fact that pushing the limits of the planet's ecology has become dangerous in novel ways. The Paris climate accords already seem dated and timid in the face of this news. We're in an emergency, one whose face morphs each week into some new and hideous calamity.

A civilization where one can't safely have a baby is barely a civilization.

Asking Women To Avoid Pregnancy Is Absurd, Even In The Face Of Zika

By ANNA MARIA BARRY-JESTER

Whose responsibility is it to stop Zika? The largely mosquito-borne[1] virus has spread to more than 20 countries and territories in the Americas since it arrived in Brazil about a year ago, and there's concern that it's threatening the fetuses of pregnant women. Zika's symptoms for those infected are typically mild, but it has been linked to an increase in birth defects and neurological conditions. That has led officials to try to limit what women do in the affected regions.

In addition to declaring a "public health emergency of international concern," the World Health Organization has said pregnant women should aggressively avoid getting bitten by mosquitoes. The U.S. Centers for Disease Control and Prevention, as well as the Public Health Agency of Canada and several European countries have issued advisories for pregnant women who are considering traveling to the majority of countries in Latin America and the Caribbean.

Several Latin American countries — including Brazil, Colombia, Ecuador, El Salvador and Jamaica — have made far more dramatic asks, saying women should delay getting pregnant altogether. History and experts say this is misguided; not only will officials' requests fail to prevent the majority of pregnancies, they place

the burden on society's most vulnerable women. The numbers we have (and we don't have perfect data) paint a relatively clear picture: For many women, pregnancy is not a choice.

Let's begin with the basics: As is the case in the United States, plenty of women who get pregnant in Latin America and the Caribbean don't intend to.[2] The Guttmacher Institute, a policy and advocacy organization focused on reproductive health, estimates that 56 percent of pregnancies in Latin America — 62 percent in South America and 40 percent in Central America — are unwanted or mistimed. Although those numbers are already large, they mask much higher rates among certain groups. "These averages aren't telling the fuller story," said Jen Kates, who runs global health research for the Kaiser Family Foundation. Kates says women in rural areas, poor women, young women and victims of sexual violence have all been known to have even higher rates of pregnancies they didn't plan.

These numbers are high in part because access to contraceptives varies greatly depending on where you are — and who you are. The United Nations Population Fund estimates that 11 percent of women in Latin America have an "unmet need for family planning," which in reproductive health lingo means 11 percent of women *married or in a union* want to delay or prevent future pregnancies but aren't using a method of contraception. That's relatively low compared with other parts of the world, such as sub-Saharan Africa, where it's 25 percent.[3]

Of course, it's not just married women who get pregnant. Unmarried teenagers and single women aren't always surveyed, but when they are, they also report high rates of unplanned pregnancy. Studies conducted over the past decade found that unmet need for sexually active but unmarried women ages 15 to 49 in most Latin American countries ranged from 32 percent to 55 percent, according to a review by the Guttmacher Institute. That suggests it's harder for unmarried women to get contraceptives when they want them.

Cultural factors are part of the reason. "Some health workers are afraid they will promote sexual activity by bringing up the topic or offering contraception to teenagers," said Dr. Guillermo Antonio Ortiz, who used to be chief of obstetrics at the National Women's Hospital in El Salvador and now works in the U.S. for Ipas, an abortion advocacy organization. Others won't provide contraceptives without permission from parents. But equally important, the kinds of contraceptives most commonly available aren't necessarily the best methods for young women to prevent pregnancy. An injection every three months is the method most commonly available in government clinics, which service about 90 percent of the population.[4] It's harder to get pills, the method that more than 50 percent of sexually active female teenagers in the U.S. have used, according to Guttmacher. And although intrauterine devices have become more popular in the U.S., they are almost non-existent in government clinics in El Salvador, Ortiz said.

Ortiz says sex education is also extremely limited, particularly in rural and poor communities, meaning young men and women don't know a lot about the options for preventing pregnancy.

This adds up to a lot of teenage pregnancy: Almost a third of babies born in El Salvador are born to teenagers.

In other words, the people who are being asked to avoid getting pregnant often lack the tools to do so. Which is why several international groups have not-so-quietly disagreed with the recommendation to delay pregnancy. "How are women supposed to follow a recommendation to delay pregnancy if they lack information and access to contraception?" Dr. Suzanne Serruya, director of the Pan American Health Organization's Latin American Center for Perinatology, Women and Reproductive Health, wrote in Spanish on the organization's website. "And if contraception fails, what are they supposed to do if they become pregnant?"

Serruya was referring to the very strict abortion laws in the region, which rarely allow women to choose an abortion except in cases of incest, rape or endangerment to the woman's life. Some countries, including El Salvador, don't allow abortions under any circumstance, and women there are regularly prosecuted for suspected abortions, even when there is clear evidence that a woman has suffered a miscarriage. Women who have been raped are allowed to have the morning-after pill (by prescription), but as in most countries, many women don't report sexual assault. It's hard to say what percentage of assaults go unreported, but we do know the percentage of women who have been abused is high. The country's 2008 National Family Health Survey found that 13.4 percent of women ages 15 to 49 had been victims of sexual violence, and 7.8 percent had been raped.

Across the Americas, Zika has renewed conversations about whether laws around abortion need to change. Cases of microcephaly, a condition where the head is smaller than average, in Brazil kicked off a passionate debateover the country's strict abortion laws. Although several conservative politicians had been trying to push through more restrictive policies around abortion before the Zika outbreak, some politicians are now pushing back, saying women with Zika should be allowed to have an abortion.

Even with less restrictive laws, though, the decision to have an abortion would be a complicated one under the circumstances presented by Zika. Microcephaly isn't a health concern itself; it's more often a symptom of an underlying problem and can occur in tandem with a range of more serious health issues. For some infants, it's life-threatening. Others will have no associated health concerns. It isn't generally detectable until late in the second trimester, and it's often impossible to say how severe the problem is at that point. Abortions performed that late in pregnancy also require more specialized equipment and training than early-term abortions. Among the countries calling for women to delay pregnancy, Colombia allows for abortion in the case of any fetal abnormality, but that is rare in Latin

America and the Caribbean. Regardless, any number of factors could go into the decision to have an abortion.

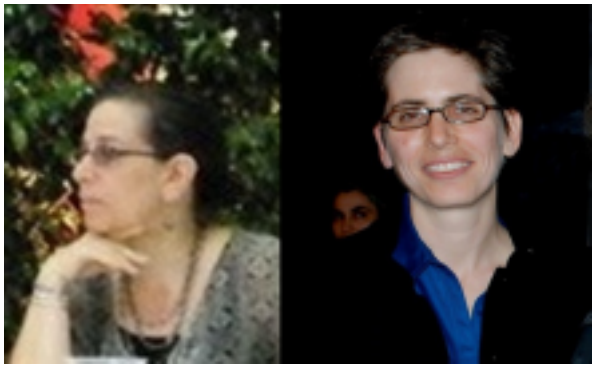
That includes deciding what to do when you've spent years preparing to get pregnant. In Brazil, people who used in vitro fertilization are struggling withthe complicated question of whether to throw away the financial and emotional investment they have made so far trying to get pregnant. For older women, delaying a year or two could mean they risk losing the opportunity to get pregnant altogether.

El Salvador finally expanded its Zika interventions this week, nearly two weeks after asking women not to get pregnant. The government has said it will provide pregnant women with insect repellant and work on reducing the mosquito population. It doesn't appear that those plans include anything to help women prevent unintended pregnancies.[5]

Finally, there's the question of whether women need to fight Zika on their own. There has been very little policy that tries to involve men in delaying pregnancies in areas concerned about Zika transmission. As Anu Kumar, an executive vice president at Ipas, said, "Is it all immaculate conception that's taking place? Why is this all directed at women?"

What the solution isn't: the parallel of the Zika and HIV viruses for women

World Bank Photo Collection



Author :
Susana T. Fried and Debra J. Liebowitz
Susana T. Fried is a Visiting Fellow at the Yale University Global Health Justice Partnership. Debra J. Liebowitz is a Professor of International Relations and Women's & Gender Studies at Drew University.

Sudden outbreaks of uncommon diseases do not lend themselves to easy solutions. However, there is one solution we know will not work: resting the responsibility for slowing the Zika virus in the wombs of women. Unfortunately, this seems already to have become the clarion call of departments of health grasping for a remedy.

The World Health Organization (WHO) warns that the Zika virus is likely to spread to every country in the Americas, save Canada and Chile (both countries have climates that are inhospitable to the Aedes mosquito, which can transmit the virus). Alerts have been raised in countries as distant from the Americas as Fiji and Uganda. Although the science is inexact, Zika may be linked to microcephaly, a condition associated with incomplete brain and head development in babies. No vaccine against the Zika virus exists and recommended treatment is non-specific: rest, fluids, and keeping the fever down.

In response to the outbreak, some countries, for instance, Colombia, Ecuador, and Jamaica, have recommended that women delay pregnancy. This is eerily reminiscent of abstinence education as a primary means of HIV prevention. Indeed, abstinence will prevent sexually transmitted HIV just as remaining “unpregnant” will prevent Zika from causing fetal harm if it is indeed causing microcephaly. Neither solution is grounded in the realities of women’s lives.

The ability to control when, where, with whom, and under what conditions to have sex is, for many women, the exception, rather than the rule. Women's ability to delay pregnancy requires that they have control over their bodies, their sexuality, and their reproductive decision-making. Yet, some women, in the Americas and elsewhere, have no such control. The Guttmacher Institute reports that, worldwide, 40% of all pregnancies in 2012 were unintended, with 50% resulting in abortions, 38% in unplanned births, and 13% in miscarriage. Fear of violence or other negative consequences, and even common gender roles and stereotypes, prevent many women from negotiating for safer sex.

Pregnancy prevention is no simple matter. The UN population fund (UNFPA) notes that 225 million women have an unmet need for family planning, for reasons ranging from lack of access to information or services to lack of support from their partners or communities. Amanda Klasing from Human Rights Watch points out that some of the countries that are responding to the spread of the Zika virus by suggesting women delay pregnancy, Ecuador in particular, have strict anti-abortion laws. Contraception may not be readily available, especially for adolescents and young women, and women in rural areas. Finally, reproductive health, as Sonia Corrêa observes, is frequently the victim of health systems in disarray.

Taking a page from the HIV-response, public health would be better served by engaging in distribution of contraception and education campaigns rather than going door-to-door telling women to delay getting pregnant as they have been doing in Brazil.

Brazil's HIV response can set an example for the Zika response. While there are certainly critiques to be made, observers agree that Brazil took early leadership in the global HIV response. It was the first developing country to provide free universal medical treatment for people living with HIV. The Brazilian government's struggle with the pharmaceutical industry to ensure domestic production of low-cost anti-retroviral drugs was paired with a large-scale education and condom distribution campaign. In 2004, the Joint United Nations programme on HIV/AIDS (UNAIDS) reported that Brazil was one of the few countries that had successfully increased the distribution of not just male, but also female condoms. Unlike in some countries documented by the Global Commission on HIV and the Law, Brazil's programme did not shy away from reaching out to groups that were at high risk for contracting HIV but who were also facing stigma and discrimination, such as sex workers, drug users and gay men. As a result of these efforts, the rates of HIV were, as UNAIDS observed at the time, substantially less than what had previously been projected.

Uganda also had a similar success story early in the HIV pandemic; however, this was short-lived. When the country wholeheartedly embraced the

“Abstain” and “Be Faithful” portions of U.S. President George W. Bush administration’s “ABC” strategy and moved away from mass education and condom distribution, rates of infection began to rise. In 2005, Uganda’s First Lady, Janet Musevani, even called for a national “virgin census” to support her abstinence agenda.

In the case of the global response to Zika virus, there are numerous lessons to be learnt from the response from Brazil and Uganda to HIV; but it seems these are being ignored at present. The HIV programme in Brazil set an encouraging example of preventative measures being effective with appropriate large-scale education and condom distribution. Experiences in Uganda suggest that the implementation of abstinence as a prevention strategy is unreasonable and ignores what we know about gender, sexuality, and public health.

If we are to apply the lessons learned about HIV prevention to the Zika virus, states should urgently engage in massive condom distribution and education campaigns, and eliminate restrictive abortion laws. This suggestion is particularly salient given reports, confirmed by the U.S. Centers for Disease Control, that the virus may be sexually transmitted. As Monica Roa from Women’s Link Worldwide in Colombia comments “In a crisis like the Zika outbreak, the lack of sexual education is exposed…Health ministries should inform rather than recommend." A recent health protocol in Brazil moves in the right direction, directing health workers to provide information about contraception. However, it falls short of calling for removal of restrictions to abortion. As the Zika virus is now spreading globally, with new reports from the South Pacific, it is worth heeding the call from the UN High Commissioner for Human Rights, who, on 5 February called on countries with Zika cases to “make available sexual and reproductive health counselling to women and uphold their right to terminate pregnancies.” Effective and sustainable public health responses require respecting and protecting the rights of women living with Zika.

Prepare for ‘Guerrilla Warfare’ With Zika-Carrying Mosquitoes, Experts Warn

Patti Sprague, a field inspector for the Florida Keys Mosquito Control District, shifted some standing water where mosquitoes were breeding.
MAX REED FOR THE NEW YORK TIMES

By SABRINA TAVERNISE
FEBRUARY 12, 2016

SAVANNAH, Ga. — It was standing room only at the annual conference of the American Mosquito Control Association this week.

In a chilly convention center ballroom here, the leading lights of mosquito control

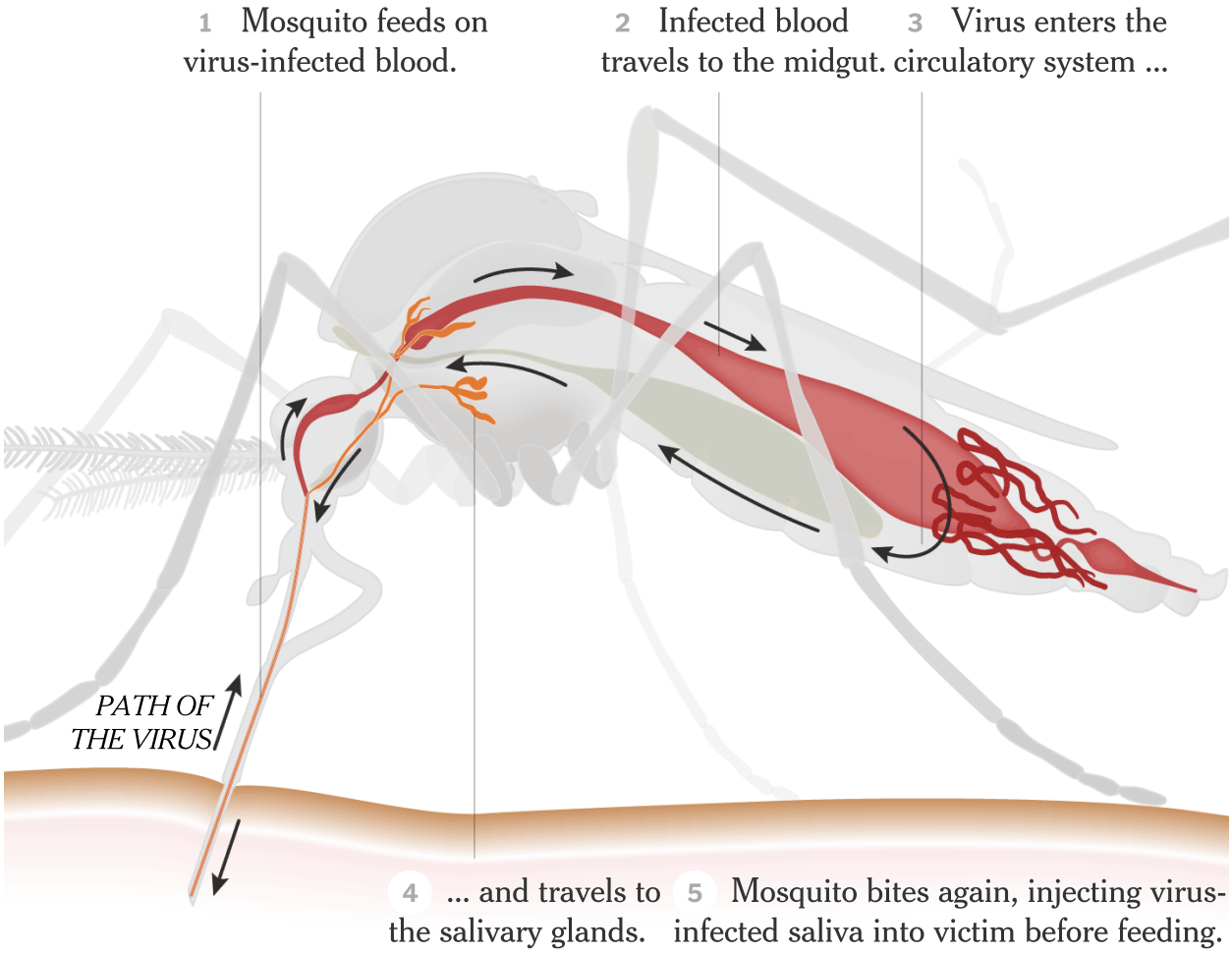
gathered, as they do every year, to talk about bugs and new ways to get rid of them. But this year an ominous urgency infused the session. Mosquitoes in this hemisphere have an unpredictable new weapon, the Zika virus — a threat that left the participants comparing notes like field commanders before summer battle.

Nearly a year after the first cases of Zika were diagnosed in Brazil, the virus, which is suspected to cause birth defects and other neurological problems, is bearing down on American shores. It is already in Puerto Rico and the United States Virgin Islands. There have been more than 50 cases of Americans infected abroad, and most experts believe that by summer, the continental United States will have some of its own homegrown cases, meaning that domestic mosquitoes will have the virus.

“It’s like preparing for a hurricane,” said Dennis Moore, director of mosquito control in Pasco County, Fla. “You know it’s coming from across the Gulf, but

How Mosquitoes Spread Zika

The Aedes aegypti mosquito is thought to be responsible for most of the spread of Zika. The virus is carried by female mosquitoes (males do not bite) that have fed on infected blood.



By Sarah Almukhtar and Mika Gröndahl | Sources: Dr. W. Augustine Dunn; Oxitec; The Anatomical Life of the Mosquito, R. E. Snodgrass

Scientists say an explosive spreading of Zika is extremely unlikely in the continental United States. But Aedes aegypti, the mosquito that carries the virus, is tenacious and relatively impervious to broad outdoor spraying. Techniques for tracking it are outdated and underfunded. Experts interviewed here this week said fighting Zika will require a major shift in this country's approach to mosquito control, namely more door-to-door action, a painstaking and expensive practice that many say is a tall order in an era of shrinking budgets and wariness of government intrusion.

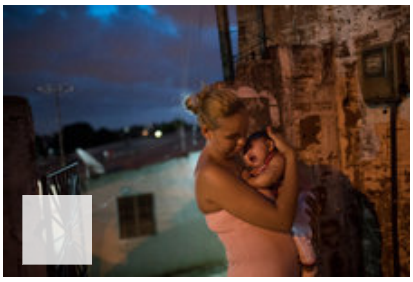
"This guerrilla warfare house-to-house method is still very new and I'm not convinced that many places are prepared for it," said Michael Doyle, the head of mosquito control for the Florida Keys, a district that used such tactics during an outbreak of the dengue virus in 2009 and 2010, one of the first major outbreaks in the United States since the 1930s.

The traditional technique of spraying from trucks and planes "is like fighting Al Qaeda with an old-fashioned army," he said.

The United States' best defense against Zika is its air-conditioning and window screens, scientists said. Yellow fever and malaria killed tens of thousands of Americans through the end of the 19th century, but higher living standards helped stop it. Screens and round-the-clock air conditioning block virus transmission by keeping healthy mosquitoes from biting infected people and spreading the virus. They also prevent infected mosquitoes from biting healthy people.

"You won't see anything like what you see in the tropical countries," said Scott Ritchie, a medical entomologist at the Australian Institute of Tropical Health and Medicine, sitting among booths here displaying insecticide blowers and mosquito bait that uses date juice. (A mosquito wine stopper was given away in a conference raffle.) "Americans have hermetically sealed, air-conditioned houses. Explosive transmission with aegypti only takes place in these tropical areas that have a lot of unscreened housing."

Interactive Feature | Short Answers to Hard Questions About Zika Virus Why scientists are worried about the growing epidemic and its effects on pregnant women, and advice on how to avoid the infection.



Even so, businesses in the United States have been rattled. And some experts are worried that some poor neighborhoods, where air-conditioning is less ubiquitous, may be more vulnerable.

“There’s big concern,” said Dan Ariaz, who was displaying wares from his Las Vegas company, Arro-Gun Spray Systems, in the back of a 1934 Chevrolet pickup. His phone has been ringing off the hook, including calls from resorts needing advice. “We tell them not to panic,” said Mr. Ariaz, whose shirt collar was embroidered with the words, “Bite Me.”

At first glance, Aedes aegypti may not seem like a formidable foe. It has traditionally stayed in a corner of the American South, rarely venturing farther north than South Carolina. It does not fly farther than a city block, and usually lives less than two weeks.

“It’s the cockroach of mosquitoes,” said Dr. Thomas R. Frieden, the director of the Centers for Disease Control and Prevention. “It lives indoors around people and hides in dark places.”

That makes it much harder for droplets sprayed from airplanes or trucks to come into contact with it to kill it. (Floodwater mosquitoes, the ones that bother Americans on summer nights, rarely spread disease. Spraying works on them because they are often flying.)

“There’s going to be a lot of pressure for districts to go out and spray, but that is not very likely to work against these mosquitoes,” said Joseph Conlon, a retired Navy entomologist who is a technical adviser to the American Mosquito Control Association.

One key test of Americans’ ability to fight this mosquito came in 2009, when it brought the dengue virus into the homes of people on Key West. Within hours, a SWAT team of 30 mosquito experts was going house to house, dumping standing water from flowerpots, ashtrays, children’s swimming pools, recycling containers, bottle caps and trash cans. They worked 10 hours a day, six days a week, for six

weeks, marking their progress on maps.

The effort was scrupulous because “you need remarkably few mosquitoes to keep up transmission,” said Mr. Doyle. “One recalcitrant neighbor will grow enough adult mosquitoes to cause an outbreak for the whole neighborhood.”

In all, Key West had at least 85 cases of dengue in 2009 and 2010. The virus never spread beyond the island and the outbreak eventually died out. The district spends $1 million a year just on fighting the Aedes aegypti mosquito, about a tenth of its mosquito control budget and as much as some counties spend in total. Miami-Dade, with a far larger population, has a budget of just $1.8 million.

Some departments get creative. The mosquito control team in New Orleans got firefighters to help knock on doors when cases of West Nile virus began surfacing in 2012.

Zane McCallister, left, talked with Scott Monsen at the annual conference of the American Mosquito Control Association in Savannah, Ga., on Wednesday.
RICH BURKHART FOR THE NEW YORK TIMES

"Manpower, that's the main thing," said Claudia Riegel, director of the city's Mosquito, Termite and Rodent Control Board.

Tracking the mosquito is critical, but the country's ability to do that is spotty. Mosquito control departments, often called districts, range from "the enormously sophisticated to the sanitation guy spraying a few places when he thinks about it," Dr. Frieden said. Mr. Conlon estimates there are about 700 across the country with the ability to track mosquitoes and another 1,100 smaller ones that probably cannot afford to.

Mosquito control for Chatham County, which includes Savannah, traps extensively, with records going back years. But Jeffrey Heusel, its director, said it is unusual: Of about 60 counties in Georgia that once had some ability to trap, now only about six do. According to the C.D.C., epidemiology and laboratory funding for so-called vector-borne diseases (those spread by mosquitoes, ticks, fleas and other creatures) dropped to just $9.5 million in 2015 from about $24 million in 2004.

The aegypti maps that the C.D.C. uses are outdated and part of the $1.8 billion that President Obama requested for Zika this week would go to improving them, Dr. Frieden said.

"The first thing you have to do is monitoring so we know where they are," he said.