

SPREAD OF ZIKA: IMPACT ON SOUTHERN STATES

A REGIONAL RESOURCE FROM THE SLC



by Roger Moore, Policy Analyst

Introduction

The Zika epidemic has garnered extensive international attention since the current outbreak was first confirmed in Brazil in May 2015. Since then, active Zika transmissions have been documented in more than 30 countries across the Americas region – including South, Central and North America and the Caribbean – with more cases in new areas expected to follow in the coming weeks and months.¹ In response to the sudden outbreak of the Zika virus and the health complications associated with it, the World Health Organization declared, on February 1, 2016, that the virus constitutes a Public Health Emergency of International Concern.² By some estimates, up to 4 million people* in the Americas may contract the virus by the end of 2016.³

In the United States, the only reported cases of the Zika virus have been associated with those who recently traveled to countries with known outbreaks. However, health

* Determining the exact number of people infected with the Zika virus is difficult. It generally survives in the body of an infected person for a few days and the majority of victims remain asymptomatic. According to recent World Health Organization data, the number of new infections in certain parts of Latin America may be declining, which, if true, could lower the overall impact of the virus. It is not yet clear why infections in some areas may be declining, but officials have speculated that sanitation campaigns to eliminate mosquito breeding sites may have helped. Health officials have warned that it is far too early to determine whether the epidemic has started to ebb in certain areas.

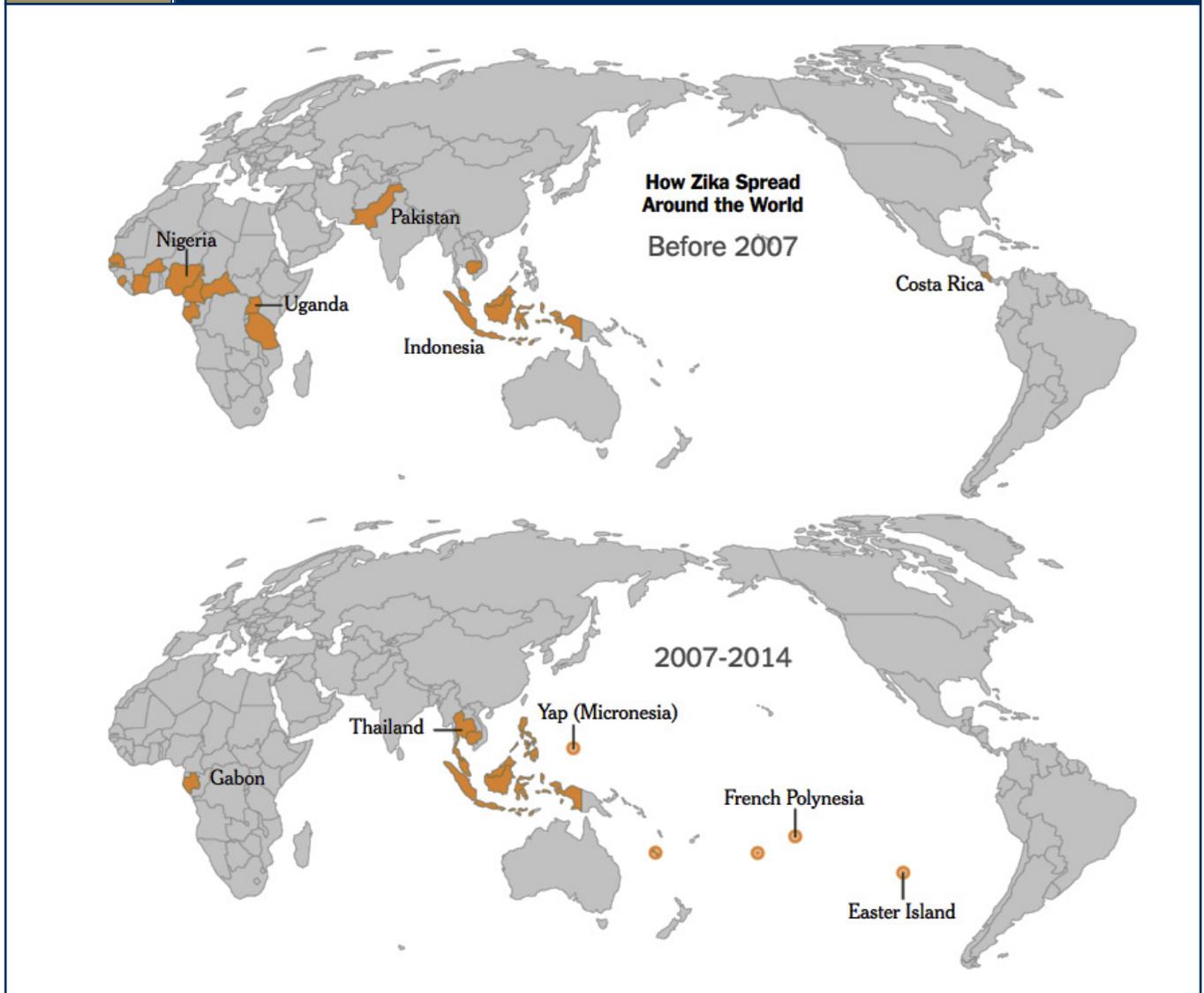
experts have warned that localized transmissions in the United States are probable in the coming months as temperatures rise and mosquitoes carrying the virus expand into new territories. As a result of relatively favorable climate conditions for the disease-carrying *Aedes* mosquitoes, many SLC member states are particularly vulnerable to limited outbreaks over the next several months.

Background

Although the Zika virus is not new – it was first identified in 1947 in Uganda’s Zika forest[†] – until recently it received relatively little attention outside the scientific community, primarily because, historically, the number of confirmed human infections has been extremely small. In fact, from the virus’s discovery in 1947 until 2007, there were no confirmed outbreaks and only 14 confirmed human infections worldwide.⁴ No outbreak officially was confirmed until 2007, when the virus was identified on the Pacific island of Yap, located in the Federated States of Micronesia, followed by outbreaks in 2013 and 2014 in a group of Pacific islands located thousands of miles away, including French Polynesia, Easter Island, Cook Islands, and New Caledonia (See Figure 1).⁵

[†] Scientists inadvertently identified the Zika virus while researching yellow fever in Uganda. A rhesus monkey in the Zika Forest developed a fever, which, after testing of blood samples, revealed an unknown virus that became known as Zika, named after the forest in which it was first isolated.

Figure 1 Spread of the Zika Virus



Source: *The New York Times*, 2016

While no confirmed outbreaks were reported prior to 2007, scientists have since identified Zika-specific antibodies among populations across parts of Africa and Asia, including India, Pakistan, Malaysia, Vietnam, Thailand, Indonesia and the Philippines, suggesting a widespread presence that largely went unnoticed due to the virus's relatively mild symptoms.* For reasons that remain unknown, not until recently has the virus appeared to have associated health complications that

* Since the symptoms of Zika are similar to other mosquito-borne viruses, particularly dengue fever, some scientists have suggested previous Zika infections may have been misclassified.

are now causing much alarm across the Americas. One theory postulates that it has evolved overtime with a more severe mutation occurring prior to arriving in Brazil.⁶ Another hypothesis is that populations in Africa and Asia have had years to build up a resistance to the Zika virus, whereas in the Americas and on the Pacific islands the population lacked any sort of immunity that could mitigate its virulence.⁷ Regardless, the lack of any clear causal relationship between the virus and other health complications prevented an in-depth examination of Zika's side effects until 2013, when an outbreak occurred on French Polynesia.

Scientists suspect the virus first arrived in Brazil from French Polynesia. It may have been introduced as early as 2013 during the Confederations Cup, a soccer tournament that featured a team from Tahiti, a French Polynesian island. Others suspect the virus was introduced later on, in 2014, during the World Cup, or perhaps during the August 2014 Va'a World Sprint Championship canoe race, which included competitors from French Polynesia and other Pacific islands affected by the virus.

Zika Transmission and its Effects

The Zika virus primarily is transmitted by mosquitoes from the *Aedes* genus, the same mosquitoes responsible for carrying other related scourges, including dengue, chikungunya and yellow fever.⁸ It spreads when a mosquito bites an infected person during the first week of infection when the virus can be found in the victim's blood. The infected mosquito will then have to live long enough to bite another person, who in turn will become infected with the virus. Once the cycle has been repeated multiple times, an outbreak becomes increasingly likely. *Aedes aegypti*, the primary vector during the current outbreak, poses the biggest threat at this point, though *Aedes albopictus*^{*} also has been implicated in previous outbreaks and is, therefore, capable of transmitting the virus.⁹ Both mosquitoes frequently feed on humans and often are found in a variety of natural and man-made aquatic habitats, including discarded tires, buckets, garbage cans, and flower pots.

Although less common, the virus also can be transmitted from mother to child, through sexual contact, and during blood transfusions. A pregnant woman infected with the virus near the time of delivery can pass it on to her newborn around the time of birth. Sexual transmission can occur when a man passes it on to his partner(s) while symptoms are present, before symptoms start and after symptoms resolve. Scientists postulate that a person, once infected, is likely immune from future Zika infections, although it is not yet clear how long immunity lasts.

^{*} On April 21, 2016, the Pan American Health Organization reported that tests of the *Aedes albopictus* mosquitoes in Mexico came back positive for Zika, the first confirmation of the virus's presence in *Aedes albopictus* mosquitoes in the Americas.

A large majority of people who contract the virus – approximately 80 percent – remain asymptomatic. For those who do develop symptoms, the incubation period – the time from exposure to symptoms – is believed to be anywhere between a couple of days to a week, though the exact timeframe remains unknown.¹⁰ Symptoms, which normally last only a few days, are generally mild and include fever, rash, joint pain and conjunctivitis (pinkeye).¹¹

However, while the virus does not pose a major physical threat for the majority of those who become infected, leading health authorities agree that it can cause microcephaly and other severe fetal abnormalities. Microcephaly – from Greek “mikrós” (small) and “kephalé” (head) – is a rare birth defect whereby incomplete brain development during pregnancy results in an abnormally small head. The defect has been linked to a host of other developmental problems that vary depending on the severity of the condition.¹² It is important to note that many questions regarding the link between microcephaly and the virus remain unanswered. Not all babies born to mothers who had the Zika virus have been born with abnormalities. In addition, scientists continue to study whether the stage of pregnancy at the time of infection can have an impact. Research published in March 2016 in *The Lancet* medical journal, based on the previous Zika outbreak in French Polynesia in 2013-2014, suggested that approximately one in 100 women infected with Zika during the first trimester developed a fetus with microcephaly.¹³

There also is scientific consensus that the virus is a cause of Guillain-Barré Syndrome (GBS), a rare illness of the nervous system which causes a person's own immune system to damage the nerve cells, leading to muscle weakness and, on occasion, paralysis.¹⁴ Much like the connection with microcephaly, the link between Zika virus and GBS still requires further research in order to fully understand the causal relationship.

Zika in the United States

As of April 2016, no local transmissions of the Zika virus have been reported in any U.S. state, meaning there have been no confirmed cases in which an individual contracted the virus after being bitten by an infected mosquito in the United States. However, there have been hundreds of travel-associated infections after

U.S. citizens returned from countries with active Zika outbreaks, including 36 in pregnant women and eight that were transmitted sexually. One person was diagnosed with GBS.*

The probability of locally transmitted cases occurring in the United States will increase over the next few months as warmer temperatures sweep across the country, creating more hospitable climate conditions for the *Aedes* mosquitoes to breed and survive in new territories. Although *Aedes albopictus* has a much larger presence in the United States, *Aedes aegypti*, which poses a greater threat of transmitting the virus, also is widely found, including in all SLC member states.† In fact, according to the CDC, the presence of *Aedes aegypti* may cover a broader swath of the country than previously thought, stretching across the South into the Midwest and Northeast (See Figure 2).¹⁵

Due to the threat of a potential Zika outbreak in the future, many SLC member states have taken action and begun implementing a host of preventive measures to combat the virus. The following sections provide a brief account of the efforts currently underway to mitigate the threat of the virus and details on the number of confirmed infections in each state (See Table 1).‡

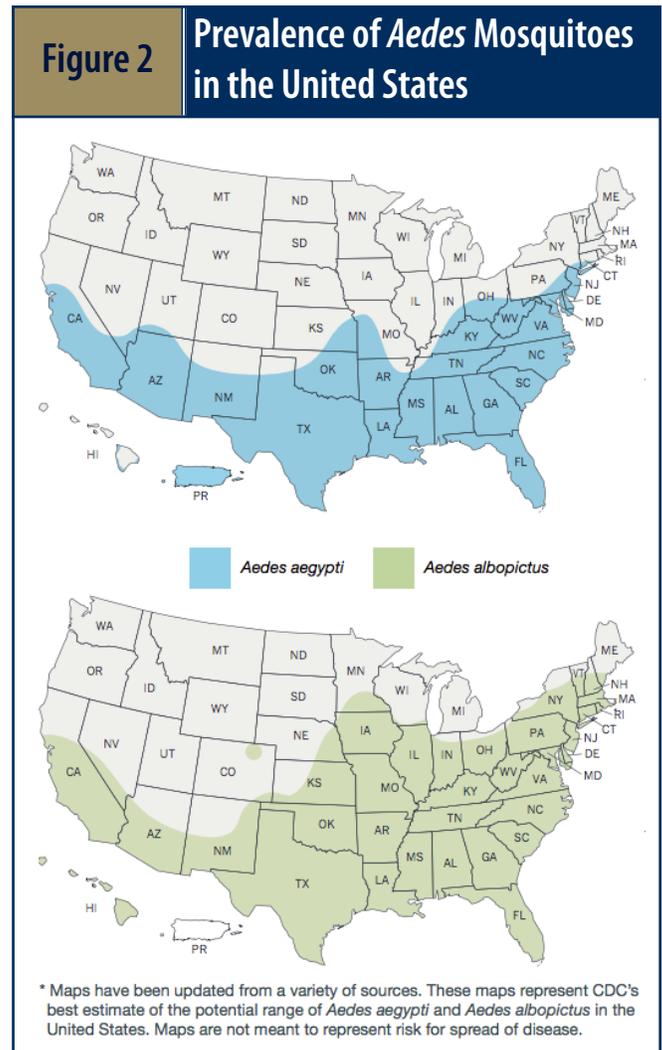
Alabama

There have been two cases of the Zika virus identified in Alabama, with an additional eight pending results. Healthcare providers in the state have been asked to contact the Department of Public Health’s Infectious

* As of April 27, 2016, there have been a total of 426 cases of Zika confirmed in the United States, according to the Centers for Disease Control and Prevention (CDC). The number of infected people continues to rise each week, with hundreds more expected over the next several months as people return from countries with active Zika outbreaks.

† Even though the CDC believes *Aedes aegypti* can be found across a large swathe of the country, it does not necessarily mean the mosquitoes are found in large numbers in all areas of a particular state. Naturally, some places will have large concentrations of *Aedes aegypti* mosquitoes, while in others their presence will be relatively minimal.

‡ Since the number of U.S. citizens with confirmed Zika infections changes frequently, the numbers for each state listed in this report may not reflect the latest totals. The data recorded comes from the CDC and was last confirmed on April 27, 2016.



Source: Centers for Disease Control and Prevention, 2016

Diseases and Outbreaks Division if they encounter patients who have both a history of travel to countries with known Zika outbreaks and symptoms consistent with the virus. In addition, physicians and other healthcare providers have been asked to evaluate all pregnant women, even if they are asymptomatic, who recently have traveled to affected countries.

In Birmingham, Zika prevention measures include spraying pesticides whenever afternoon or evening temperatures surpass 50 degrees.¹⁶ Residents with standing water on their properties also will be given larvae briquettes from the city’s Department of Public Works. As preventative measures continue during the spring and summer months, public service announcements will be used to disseminate the latest updates regarding the virus.¹⁷

Table 1		Confirmed Zika Infections in SLC States													
SLC States	AL	AR	FL	GA	KY	LA	MS	MO	NC	OK	SC	TN	TX	VA	WV
Number of Confirmed Zika Cases	2	2	90	13	5	4	3	3	10	4	0	2	30	12	6

Arkansas

Two cases of the virus have been reported. In early March, the director of the Department of Health updated state legislators on the actions underway to monitor the virus and, if necessary, address a future outbreak in the state. Among other things, the Department currently is carrying out active surveillance and regular tests on the mosquito population.¹⁸ Additionally, pregnant women in the state have been asked to reconsider their need to travel to countries where the virus is active.*

Florida

With 90 confirmed Zika infections – approximately 22 percent of the total number of cases in the United States – Florida leads the nation in the number of people who have tested positive for the virus. On February 3, 2016, after the virus was first confirmed in Miami-Dade, Hillsborough, Lee and Santa Rosa Counties, Governor Rick Scott signed Executive Order 16-29, which directed the state’s surgeon general to declare a public health emergency in those counties that had been affected up to that point. Since then, public health emergencies have been declared in 15 of the 67 counties in Florida.¹⁹

Georgia

There have been 13 confirmed cases. State officials are promoting the “Tip and Toss” campaign, encouraging people to tip out containers with standing water and toss trash in order to eliminate as many potential mosquito breeding grounds as possible.²⁰ Georgia, and Atlanta in particular, is believed to be at a slightly higher risk of a Zika outbreak, largely due to the high volume of international travelers flying into and out of Hartsfield-Jackson International Airport on a daily basis.²¹

* Following the recommendation of the CDC, all SLC member states now are advising pregnant women to reconsider their travel plans to countries with active Zika outbreaks.

Kentucky

Five cases of the virus have been confirmed. Officials at the Department of Public Health confirmed they have held frequent webinars and conference calls with the CDC about the state’s Zika action plan. State officials have been advised by the CDC to partner with Kentucky Emergency Management and the Department of Agriculture as part of their efforts to prevent a future outbreak of the virus. As a result of months-long preparations and a plan developed for communicating with residents, Governor Matt Bevin and leading health authorities have said they are well prepared for an outbreak.²²

Louisiana

There have been four confirmed Zika infections. Parts of the state, particularly in the south, have been identified as potential “hotspots” for a Zika outbreak due to the high number of *Aedes aegypti* mosquitoes already present in the state.²³ However, despite the relatively high number of mosquitoes, state officials do not believe a widespread outbreak is likely. The Department of Health and Hospitals has a network of ways, including statewide mosquito control programs, to detect if the Zika virus is present in the state. Many of the measures previously were established as a result of Louisiana’s past experiences with dengue and chikungunya.²⁴

In New Orleans, where the risk of the Zika virus is higher than it is in the state’s other cities due to the high number of frequent international visitors, mosquito monitoring programs are being ramped up in order to better determine what types of mosquitoes are present and where. Among other things, New Orleans, as part of a tropical medicine research project with Tulane University, has established more than 100 monitoring devices around the city.²⁵ Additionally, on April 18, the mayor’s office released a 48-page “Zika Action Plan” that details steps to be enacted in the event of localized Zika transmissions.²⁶

Mississippi

Three Zika infections have been confirmed. The Department of Health is working with healthcare providers in the state to actively monitor potentially affected travelers and, in the event of a confirmed infection, limit their exposure to Mississippi mosquitoes.²⁷ Among other things, those with confirmed infections or who recently have traveled to countries with active Zika outbreaks are advised to wear protective clothing and avoid suspected mosquito breeding grounds for approximately three weeks.²⁸

Missouri

Three cases of Zika have been confirmed. Although Missouri, like all other SLC member states, is at risk of potential localized Zika transmissions during the summer months, state health officials have indicated they are not overly concerned about a significant Zika outbreak.²⁹

North Carolina

Ten people have been infected with the virus. On March 8, testifying before a joint legislative committee, the secretary of the Department of Health and Human Services outlined Zika preparedness measures taken by the state.³⁰ Though the *Aedes aegypti* is not widely found throughout North Carolina, the Department, in an effort to proactively tackle a potential future outbreak, has hired two medical entomologists to oversee surveillance and monitoring of mosquitoes, as well as consult with local programs on best practices to control the mosquito population.³¹ At the hearing, the secretary indicated there currently are no major concerns of a Zika outbreak in North Carolina.

Oklahoma

Four cases of the virus have been confirmed. On January 20, the Oklahoma State Department of Health issued an official Health Advisory providing information to healthcare providers and other public health partners that outlined how to recognize, manage and report Zika infections in patients. A second Health Advisory was disseminated in February, which provided guidelines for preventing sexual transmission of Zika.³²

South Carolina

No Zika cases have been reported in South Carolina, the only SLC member state without at least one infection. While areas along South Carolina's coast, including Charleston, are likely to see a high concentration of *Aedes aegypti* mosquitoes by midsummer, leading health experts in the state previously have indicated an outbreak is unlikely.³³ Nevertheless, as a precautionary measure, all communities in South Carolina have been advised by the Department of Health and Environmental Control to implement mosquito treatment plans. Some cities already have begun enacting such measures by spraying pesticides and placing anti-mosquito tablets into bodies of water to kill mosquito eggs before they hatch.³⁴

Tennessee

Two cases of the virus have been reported. On March 15, the Department of Health hosted a teleconference with mayors around the state to discuss the virus, including how it is spread as well as preventative steps that can be taken to reduce the probability of future outbreaks.³⁵

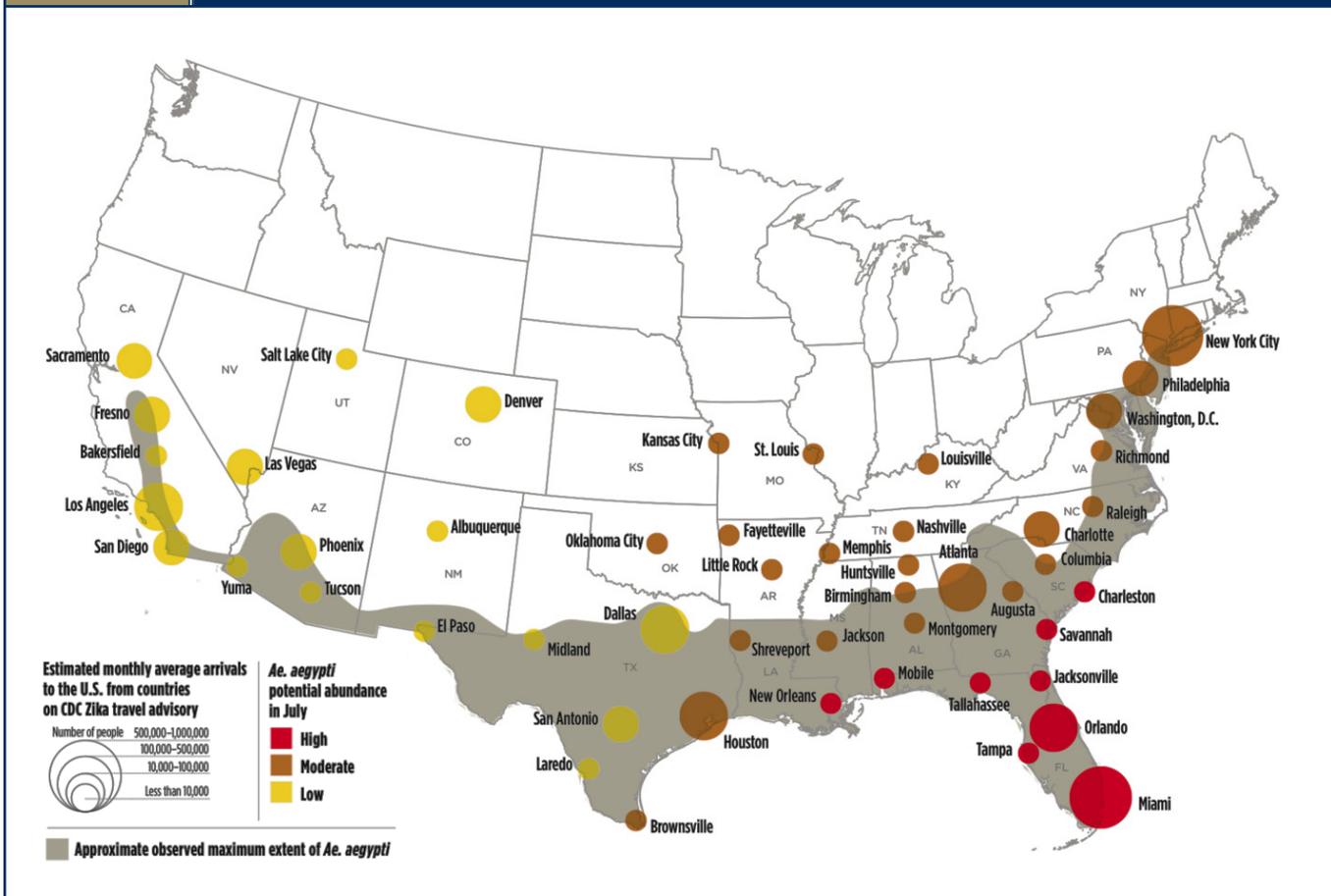
Texas

There have been 30 confirmed infections in Texas. On February 4, in response to rising concerns about the virus, Governor Greg Abbott reconvened the state's Task Force for Infectious Diseases, which comprises more than 30 experts and professionals from academic, medical and governmental institutions across the state.³⁶ Southern Texas in particular, much like parts of Florida, is at the highest risk of localized Zika outbreaks due to the year-round hospitable climate conditions that allow mosquitoes to survive.³⁷ The Department of Health Services is actively monitoring mosquito populations both in Texas and northern Mexico.³⁸

Virginia

There have been 12 confirmed Zika cases in Virginia. The Department of Health currently is coordinating with public and private partners to raise awareness of the virus among physicians and the general public.³⁹ Among other measures, all suspected and confirmed cases are required to be reported to local health

Figure 3 Zika Risk Levels for U.S. Cities



Source: National Center for Atmospheric Research, 2016

departments. If necessary, health departments in the state can facilitate lab testing, which presently is focused on pregnant women who recently have traveled to countries with active Zika outbreaks. Governor Terry McAuliffe established a statewide Zika virus task force, which first convened on February 26.⁴⁰ At present, mosquito control in Virginia is locally funded and limited to the state’s most densely populated counties and cities.⁴¹

West Virginia

Six West Virginia citizens have tested positive for the virus. On February 11, the Department of Health and Human Services issued a health advisory, the second one related to the Zika virus, that was distributed to community health providers, hospital-based physicians, infection control specialists, laboratory directors, and other applicable parties. The alert recommended Zika tests for pregnant women who recently had traveled to

Zika-infected countries, even if they are asymptomatic, between two and 12 weeks after returning.⁴²

Vulnerabilities Among SLC States

Aside from having favorable climate conditions that allow *Aedes aegypti* mosquitoes to breed and survive, Southern states also must deal with relatively high levels of poverty that make people more susceptible to mosquito bites. According to recent data by the U.S. Census Bureau, the South – which includes 14 of SLC’s 15 member states* – has higher levels of poverty than other regions in the country, with an overall poverty rate of 16.5 percent.⁴³ Those residing in dwellings in

* Missouri is the only SLC state not included in the U.S. South, according to the Census Bureau. It is considered part of the Midwest in the Bureau’s statistics. Overall, poverty rates for the West, Midwest and Northeast are 15.2 percent, 13 percent and 12.6 percent, respectively.

which air conditioning is not as prevalent or affordable to operate and windows are not properly outfitted with screening – issues that are more pronounced in low-income neighborhoods – are much more susceptible to mosquito bites. Additionally, a lack of proper water sanitation, which increases the probability of mosquito breeding in stagnant pools of water, also can exacerbate the problem in impoverished areas.⁴⁴

Together, these factors create an environment within which localized Zika outbreaks are more likely to occur. As such, many health experts previously have indicated it is only a matter of time before localized transmissions are documented, most likely by midsummer. Many of the cities at the greatest risk of seeing local transmissions are located within the SLC region (See Figure 3).⁴⁵

Budgeting Issues

Despite assurances from state officials that they have adequate resources to deal with a potential rise in local Zika infections, there are concerns that many states, including several SLC states, are not adequately prepared to tackle the virus's potential spread. In many areas with active *Aedes aegypti* populations, reports have raised concerns about the lack of mosquito control and surveillance programs.⁴⁶ With the onset of the Great Recession in 2008, many states, both within the SLC and beyond, began reducing spending on public health significantly, exceeding more than \$1 billion nationally between 2008 and 2014.⁴⁷ These budget cuts effectively amounted to a 25 percent reduction in public health personnel at the state and local levels, positions that have not yet been renewed.⁴⁸ Among those cuts was a 41 percent drop in the number of people working at least part-time in mosquito surveillance.

As a result, many state and local public health departments now are less prepared to track and contain infections carried by mosquitoes than at any time since the early 2000s, according to a report by the Council of State and Territorial Epidemiologists.⁴⁹ Furthermore,

according to the American Mosquito Control Association, between 2002 and 2012, CDC federal funding to support state and local efforts to monitor and control mosquito- and tick-borne diseases was cut by approximately 74 percent, despite localized cases of West Nile virus, dengue fever and chikungunya occurring during those years.⁵⁰

In early February 2016, President Obama asked Congress for approximately \$1.9 billion in emergency funding to help combat the virus. The money would be used for mosquito control programs; vaccine research and development; education; and improving access to healthcare for low-income pregnant women.⁵¹ As of April 2016, the president's request for funding had not been approved, which prompted federal agencies, including the Office of Management and Budget, Department of Health and Human Services, and Department of State, to reprogram approximately \$600 million – funds originally earmarked for the Ebola outbreak – for Zika emergency funding.* The Obama administration initially asserted that Ebola funds would not be used to address the virus, but reassessed their position due to strong opposition in Congress to any new funding measures while more than \$1 billion in Ebola funds remained available.⁵²

As of April 2016, Congress had not approved the president's request. There were indications of a breakthrough in the Senate, though House leaders indicated any additional funding may not be granted until October 2016, when the regular appropriations process take place.⁵³ On April 24, members of the House introduced a bill providing \$2 billion in emergency funds.⁵⁴

* While redirecting the Ebola funds to combat the Zika virus, the Obama administration also moved approximately \$44 million in federal emergency preparedness grants that state and local public health departments were expecting to receive this summer. The grants are used for a broad range of events, including natural and human disasters as well as terrorist attacks. Some public health departments reportedly will lose 9 percent of their grants.

Zika Diagnoses and Prevention

On February 26, 2016, the CDC announced that the Food and Drug Administration granted approval for a new diagnostic test that can detect a host of mosquito-borne viruses including Zika, dengue, and chikungunya without going through multiple tests.⁵⁵ Though the test currently is not available in U.S. hospitals and other primary care settings, its distribution to qualified laboratories certified to perform high-complexity tests will open up more opportunities in the future to effectively diagnose Zika for those suspected of contracting the virus. For many countries in Latin America, determining whether someone is infected with the Zika virus has been one of the toughest challenges due to its relatively short lifespan and ability to go undetected in many victims.⁵⁶

While no vaccine currently is available for Zika, efforts are underway to develop a potential vaccination as quickly as possible. On March 31, 2016, reports emerged indicating that a U.S. team of scientists, based at Purdue University, Indiana, outlined the virus's structure for the first time, making it possible to identify its unique properties. Having such information may allow researchers to soon identify particular treatments which could counter the properties that make the virus dangerous.

It is possible, though not guaranteed, that a potential vaccine could be ready for human trials by the end of 2016. Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, previously indicated a vaccine may be ready for testing sometime around September, though he cautioned that, even if this were the case, it will only be the first step in a lengthy process toward finding a vaccination.⁵⁷ Even if initial tests prove successful, a widely distributed vaccine will not be available until 2018 or later, according to health experts.⁵⁸

Conclusion

Although the Zika virus is not physically detrimental for the majority of those infected, there are serious public health concerns as a result of the medical complications associated with the virus. As of April 27, 2016, no localized transmissions of the virus have been documented within the United States, though it is probable that limited outbreaks will occur in the future as warm temperatures create favorable climate conditions for the disease-carrying *Aedes* mosquitoes.

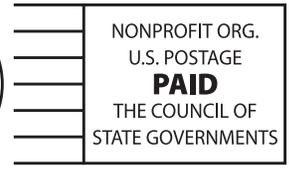
The emergence of Zika highlights important concerns regarding the funding of public health in the United States. Policymakers whose state constitutions require a balanced budget routinely face the unenviable task of crafting budgets that must allocate resources for known or anticipated expenditures. Unfortunately, they often find themselves ill-equipped to appropriate funding for unexpected developments, such as the sudden outbreak of the Zika virus, particularly at times when states' revenues fall below projections or are crippled by external crisis such as the Great Recession.

In light of the increased mobility of the world's population, infectious diseases such as the Zika virus have the ability to spread rapidly across much of the globe with little advanced warning. As a result, it is becoming increasingly important for state policymakers and federal officials to appropriate more resources for public health departments so they may adequately tackle both anticipated and unanticipated developments. Deploying limited resources from one crisis to the next is not an effective long-term solution for disease control and prevention. While a large-scale introduction of the Zika virus in the United States is predicted to be unlikely, another public health emergency inevitably will arise in the future, one potentially more pervasive and dangerous than Zika. What would happen if two public health emergencies occurred simultaneously? In such an event, inadequate resources due to underfunding could have severe ramifications.

Endnotes

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Southern Office of
The Council of State Governments
 P.O. Box 98129
 Atlanta, Georgia 30359
www.slcatlanta.org

Colleen Cousineau
 Director, SLC
 Deputy Executive Director, CSG

SOUTHERN LEGISLATIVE CONFERENCE

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REGIONAL VIEW NATIONAL REACH

This report was prepared by Roger Moore, Policy Analyst for the Human Services & Public Safety Committee of the Southern Legislative Conference (SLC) of The Council of State Governments (CSG), under the chairmanship of Representative Joni Jenkins of Kentucky. This report reflects the body of policy research made available to appointed and elected officials by the Southern Office.

The Southern Office of The Council of State Governments, located in Atlanta, Georgia, fosters and encourages inter-governmental cooperation among its 15 member states. In large measure, this is achieved through the ongoing work of the standing committees of its Southern Legislative Conference. Through member outreach in state capitols, policy research, international member delegations, staff exchange programs, meetings and fly-ins, staff support

state policymakers and legislative staff in their work to build a stronger region.

Founded in 1947, the SLC is a member-driven organization and the largest of four regional legislative groups operating under CSG and comprises the states of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia.

The SLC's six standing committees provide a forum which allows policymakers to share knowledge in their area of expertise with colleagues from across the South. By working together within the SLC and participating on its committees, Southern state legislative leaders are able to speak in a distinctive, unified voice while addressing issues that affect their states and the entire region.