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## VIEWPOINT

# Is the United States Prepared for a Major Zika Virus Outbreak?

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JAMA Patient Page

**From its initial discovery** in Ugandan forests nearly 70 years ago, Zika virus has emerged as a worldwide public health crisis, with active transmission in more than 40 countries in the Americas and Caribbean. On February 1, 2016, the World Health Organization (WHO) declared a Public Health Emergency of International Concern (PHEIC), concerned about clusters of microcephaly and Guillain-Barré syndrome (GBS). A week later, the Centers for Disease Control and Prevention (CDC) triggered the highest "level 1" activation of its emergency operations center, and President Obama requested \$1.86 billion in emergency funding.<sup>1</sup> On April 7, the WHO reported there is scientific consensus that Zika is a cause of microcephaly and GBS.

Although none of the continental states has reported local mosquito-borne transmission, Health Secretary Sylvia Burwell warned that Zika has a "significant potential to affect national security or the health of Americans."<sup>2</sup> The virus severely threatens Puerto Rico, with one-quarter of its 3.5 million inhabitants projected to be infected.<sup>3</sup> The Olympics in Brazil will have an amplifying affect because the competition will be during the Northern summer. Travelers visiting or returning to the United States could likely escalate the spread of Zika. Epidemiologists estimate that Zika could affect a majority of US states including large cities where *Aedes* species mosquitos are active.

## Epidemiologists estimate that Zika could affect a majority of US states including large cities where *Aedes* species mosquitos are active.

Is the United States prepared for major clusters of Zika? Certainly, a highly functioning health system will help protect the domestic population. Yet there are signs of unpreparedness with insufficient resources and variable legal authorities.

### Zika Funding

WHO Director-General Margaret Chan characterized Zika as a "severe public health crisis."<sup>4</sup> Despite the exigencies, Dr Chan sought only \$56 million for 2016, and governments have thus far pledged about \$27 million. As with Ebola, global financing has not been commensurate with critical health needs.

President Obama's supplemental \$1.86 billion request is more robust, aimed at surveillance, mosquito control, research, and health services especially for low-income pregnant women. Importantly, funding would support Zika control in the region, including Puerto Rico. Yet Congress has not acted, in part due to concerns about

whether federal resources would be used to fund contraception or abortions abroad.<sup>5</sup> Legislators urged reallocating preapproved Ebola resources for Zika, even as new cases of Ebola emerge in West Africa. Concerned that Congress will not appropriate new funding, President Obama recently authorized reallocation of \$589 million of Ebola and other public health funds toward Zika preparedness, research, and the creation of response teams.

Failure to fund Zika preparedness would be a serious public health and political mistake. Health agencies will have insufficient capacity for surveillance, vector abatement, and health care services. Vaccine development could be delayed. Congress's inaction is also likely cost-inefficient. Each preventable case of Zika-related morbidity, especially among newborns, saves health care resources. Beyond cost, Zika has deep moral dimensions, with impoverished women and their newborns at greatest risk. Reluctance to act will have political repercussions if clusters of Zika this summer are followed by avoidable cases of microcephaly 9 months later.

### Knowledge Gaps

Funding for Zika is essential to fill major gaps in knowledge and medical technologies. Despite the US Food and Drug Administration's (FDA's) issuance of emergency use authorizations, diagnostic tests are slow, expensive, and of variable accuracy. With 80% of Zika infections asymptomatic, individuals may not take precautions to avoid transmission through sex or the blood supply. It is also unknown how long the body harbors the virus, the duration that patients remain immune, or when it becomes safe for women to become pregnant (the CDC currently recommends waiting at least 8 weeks after initial infection).<sup>6</sup> Importantly, the risk factors, frequency, and severity of neurological deficits in patients (GBS, myelitis, meningoencephalitis) and infants (microcephaly) are unknown.

### Mosquito Abatement

*Aedes aegypti*, the "cockroach of mosquitos," lives in close proximity to humans, is an aggressive daytime biter, and hides inside households. These and other Zika-carrying mosquitos breed in minute water sources (flowerpots, bottle caps, tires), and their desiccated eggs can survive for months. Abatement is arduous and legally complex. Sterilizing male mosquitos with radiation or through genetic engineering is controversial due to novelty and unforeseen ecological harms. Removing trash and water sources from family homes and gardens is intrusive. Spraying of habitats in homes or neighborhoods may be injurious to health or the environment.

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The exigencies of mosquito control, however, have driven action. The WHO is considering recommendations concerning transgenic mosquitos<sup>7</sup> and mosquito-killing bacteria.<sup>8</sup> The FDA invited public comment on the release of genetically engineered mosquitos in the Florida Keys. The Environmental Protection Agency has given several states experimental permits to introduce *Wolbachia* bacteria to inhibit mosquito reproduction.

States and localities are repurposing regulations crafted during West Nile virus outbreaks for Zika, including public education, environmental clean-ups, and relaxing legal requirements for pesticide applications (waivers for permits or notice and comment). Hawaii's "Fight the Bite" campaign educates the public about *Aedes* breeding grounds in homes, schools, and businesses. Puerto Rico is mobilizing the community to collect a million discarded tires and trash.<sup>3</sup> South Carolina coastal officials are going door-to-door to share abatement information and conduct consensual property inspections. Local governments can classify private property as a public nuisance, requiring owners to eliminate breeding habitats.

Nevertheless, legal doctrine protecting personal property and privacy can impede abatement—for example, restrictions on entering homes and lots while owners are absent thwarted Puerto Rico's policy to treat the premises of every pregnant woman.<sup>3</sup>

### Reproductive Services

Brazil, Columbia, Ecuador, and Puerto Rico, among others, have advised women to temporarily postpone pregnancy; El Salvador urged delays until 2018. These recommendations stand in tension with existing policies impeding access to contraceptives, safe abortions, or maternal-child health services. Latin America is among the world's most restrictive regions in terms of reproductive services. Similar problems arise in the United States, especially for poor women who lack affordable access to reproductive services. Some states have restrictive abortion laws, have withdrawn funding for Planned Parenthood, or have refused to expand Medicaid under the Affordable Care Act. Moral and health concerns arise if a poor woman chooses to avoid pregnancy, but government impedes her access to affordable reproductive services.

### Legal Authorities

Legal authority for mosquito or nuisance abatement rests principally with states and localities, with considerable variability in resources, expertise, and powers. There exists a patchwork quilt of more than 700 mosquito control districts—some within local health agencies and others within departments of agriculture, transportation, or parks. Most US localities do not even fall within existing mosquito control districts, leading to highly divergent practices. Large cities such as Houston, Los Angeles, and New Orleans are planning major mosquito abatement campaigns, but Miami-Dade County reports significant underfunding for its abatement efforts. Other smaller jurisdictions can do little more than advise inhabitants to use over-the-counter insect repellents.

Federal agencies often have few direct legal powers to implement control measures, but can exert influence through scientific guidelines and funding. Florida, Hawaii, and Puerto Rico have declared states of emergency, authorizing rapid response and infusing new resources. Puerto Rico plans to fix the price of condoms, repellents, and screens to discourage retailer gouging of consumers.<sup>3</sup>

Recalling unwarranted quarantines and travel impediments during Ebola, it is essential not to overreact to Zika. New Jersey Governor Chris Christie, for example, said he would quarantine Zika-infected individuals despite no public health justification.<sup>9</sup> Although the CDC advised pregnant women to postpone travel to Zika-affected countries, more restrictive policies would likely waste limited resources and lack public health justification. The Department of Homeland Security resisted political requests to screen travelers, noting its futility.

### The Nation's State of Preparedness

Ebola demonstrated that even advanced health systems can fail to eliminate the risks of novel infections. As the CDC noted at its national summit on April 1, local Zika virus transmission will likely occur in the continental United States this summer; the question is whether we are ready. The nation's state of preparedness is compromised by Congress's inaction on supplemental funding, epidemiologic uncertainties, and the weak capacities and powers of states and localities. If preventable cases of Zika-related infant abnormalities emerge, there will be a high political price for the failure to act decisively.

#### ARTICLE INFORMATION

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