

# ULTRA VIRES? THE THREAT OF ZIKA

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## INTRODUCTION

Researchers first isolated and identified the Zika Virus in 1947 in Uganda.<sup>1</sup> For the next fifty-seven years only fourteen naturally acquired cases were reported.<sup>2</sup> In 2007, the first major outbreak occurred in the State of Yap, a part of the Federated States of Micronesia, where the Zika virus infected 5,005 of the total 6,892 residents.<sup>3</sup> Scientists have hypothesized that the outbreak may have been the result of a population lacking immunity; in other words, regular exposure to infection in Asia may have prevented the large outbreaks that occurred in the Pacific Islands.<sup>4</sup> Underreporting is another possibility for outbreak prevention, considering the similarities between chikungunya, dengue fever, and Zika virus.<sup>5</sup>

The Zika virus will spread in the United States without proper interagency coordination.<sup>6</sup> The Zika virus has proven especially difficult to predict where it will appear over time.<sup>7</sup> Even releasing funds that could curtail the deadly effects of the virus has proven difficult as state and local counties must bid for funds, and federal agencies have to decide how to allocate these funds.<sup>8</sup> Faced with the prospect of extended congressional

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1. Robert M. Califf & Luciana Borio, *FDA Takes Action Against Zika Virus*, FDA: FDA VOICE (July 12, 2016), <http://blogs.fda.gov/fdavoices/index.php/2016/07/fda-takes-action-against-zika-virus/>.

2. Mark R. Duffy et al., *Zika Virus Outbreak on Yap Island, Federated States of Micronesia*, 360 N. ENG. J. MED. 2536, 2536–43 (2009); see also Mary Kay Kindhauser et al., *Zika: The Origin and Spread of the Mosquito-Borne Virus*, WORLD HEALTH ORG. (WHO), [http://www.who.int/bulletin/online\\_first/16-171082/en/](http://www.who.int/bulletin/online_first/16-171082/en/).

3. Duffy, *supra* note 2, at 2539.

4. Kindhauser, *supra* note 2, at 4.

5. See *id.*; see also *Emerging Infectious Diseases Preliminary Observations on the Zika Virus: Hearing Before the Subcomm. on Oversight & Investigations of the H. Comm. on Energy & Commerce*, 114th Cong. 10 (2016) (statement of Timothy M. Persons, Chief Scientist, Gov't Accountability Office). Underreporting may be because many of Zika's symptoms are asymptomatic, meaning the virus does not manifest clinical symptoms. Another possibility is that "a lack of validated diagnostic tests may mask the incidence of Zika." *Id.* at 12.

6. Press Release, The White House Office of the Press Secretary, FACT SHEET: Preparing for and Responding to the Zika Virus at Home and Abroad (Feb. 8, 2016), <https://www.whitehouse.gov/the-press-office/2016/02/08/fact-sheet-preparing-and-responding-zika-virus-home-and-abroad>.

7. Hui-Lain Chen & Ren-Bin Tang, *Why Zika Virus Infection has Become a Public Health Concern?*, 79 J. CHINESE MED. ASS'N 174, 174 (2016).

8. Maggie Fox, *Zika Funds Not Going Anywhere Fast Until Next Year, HHS Says*, NBC NEWS (Oct 18, 2016, 5:17 PM), <http://www.nbcnews.com/storyline/zika-virus-outbreak/zika-funds-not-going-anywhere-until-next-year-hhs-says-n668481>. In 2009, during the H1N1 pandemic, Congress allocated nearly \$7.65 billion for agencies to respond to the pandemic,

gridlock, administrative agencies at both the federal and state level have taken an active role in fighting the Zika outbreak.<sup>9</sup> A deputy director at Centers for Disease Control and Prevention (CDC) characterized the Zika virus as the agency's "most difficult health emergency response."<sup>10</sup> On September 26, 2016, the Senate and House passed H.R. 5325, which appropriated \$1.1 billion in Zika supplemental funding.<sup>11</sup> Only on December 22, 2016, did the CDC award \$184 million to "support efforts to protect Americans from Zika virus infection and associated adverse health outcomes . . . ."<sup>12</sup>

This Comment argues that states, territories, local jurisdictions, and the federal government require greater interagency coordination to curtail the deleterious effects of the Zika virus. This Comment argues that appropriating emergency health funds would allow federal and state agencies to swiftly respond to infectious disease outbreaks and allocate resources accordingly.

Part I of this Comment discusses the present outbreak, congressional reactions to other epidemics, sufficiency of local and federal agencies' responses, the first reported cases of the Zika virus in the United States, and vector control in the United States. Part II discusses public health at the

including funds for the development of a vaccination. Travis Daub, *How Much Will the H1N1 Flu Cost the U.S.?*, PBS NEWSHOUR (Oct. 8, 2009, 12:00 AM), [http://www.pbs.org/newshour/updates/health-july-dec09-flu-costs\\_10-08/](http://www.pbs.org/newshour/updates/health-july-dec09-flu-costs_10-08/).

9. Mark Lander, *Obama Asks Congress for \$1.8 Billion to Combat Zika Virus*, N.Y. TIMES (Feb. 8, 2016), <http://www.nytimes.com/2016/02/09/us/politics/obama-congress-funding-combat-zika-virus.html>; see also Janet L. Dolgin, *Zika Funding and Partisan Politics*, 29 A.B.A. HEALTH LAW SEC. 1, 6 (2016) (noting that disagreements between Republicans and Democrats have reflected a deep ideological divide).

10. Julie Beck, *Zika Is the 'Most Difficult' Health Emergency Response Ever*, ATLANTIC (June 24, 2016), [http://www.theatlantic.com/health/archive/2016/06/zika-is-the-most-difficult-emergency-health-response-ever-says-cdc-official/488579/?utm\\_campaign=KHN%3A+Daily+Health+Policy+Report&utm\\_source=hs\\_email&utm\\_medium=email&utm\\_content=31183950&hsenc=p2ANqtz-8kt1deko41cWB6mnzLtpBDe01ZQAOG5ZgniYs-bAEPdFGRh8hMev3N2RvKATM7SXT7R08JUnKQ8ZsKWuyk7MdGNIKMsA&\\_hsmi=31183950#articlecomments](http://www.theatlantic.com/health/archive/2016/06/zika-is-the-most-difficult-emergency-health-response-ever-says-cdc-official/488579/?utm_campaign=KHN%3A+Daily+Health+Policy+Report&utm_source=hs_email&utm_medium=email&utm_content=31183950&hsenc=p2ANqtz-8kt1deko41cWB6mnzLtpBDe01ZQAOG5ZgniYs-bAEPdFGRh8hMev3N2RvKATM7SXT7R08JUnKQ8ZsKWuyk7MdGNIKMsA&_hsmi=31183950#articlecomments).

11. Zika Response and Preparedness Act, Pub L. 114-223, 130 Stat. 857, 901-04 (2016). To see a breakdown of funding during the Zika crisis, see generally SUSAN EPSTEIN & SARAH A. LISTER, CONG. RESEARCH SERV., R44460, ZIKA RESPONSE FUNDING AND CONGRESSIONAL ACTION (2016). This is less than the \$1.9 billion the White House initially requested. *Id.*

12. Press Release CDC, CDC awards nearly \$194 million to continue the fight against Zika, <https://www.cdc.gov/media/releases/2016/p1222-zika-funding.html>.

state level and will analyze Puerto Rico and Florida, and lessons learned from those states. Part III analyzes the active role that federal agencies have taken to curtail the Zika outbreak. Part IV provides various recommendations including the appropriation of more federal funds to curtail future outbreaks.

### I. THE ZIKA OUTBREAK

A number of significant Zika outbreaks occurred in the Pacific Islands, and researchers in the Americas first identified the virus in March 2015, when an outbreak occurred in Bahia, Brazil.<sup>13</sup> Researchers have speculated that the outbreak in Brazil likely started from a single strain of the virus in mid-2013, when there was an upsurge in the number of people traveling to the country due to hosting the World Cup in 2014; however, researchers later discovered that it was likely a consequence of Rio hosting the Va'a World Sprint Championship canoe race in which four Pacific countries competed.<sup>14</sup> The Brazilian Ministry of Health recognized the occurrence of up to 1.3 million cases by December 2015.<sup>15</sup> Lee Riley, a professor of Epidemiology and Infectious Disease at the University of California Berkeley remarked that the "Zika virus has been around for many decades . . . but it wasn't until it entered massively urbanized Brazil that it spread like wildfire."<sup>16</sup>

As of July 2016, sixty-five countries reported evidence of mosquito-borne Zika transmission.<sup>17</sup> Between January 1995 and March 2016, 183 counties from twenty-six states and the District of Columbia documented occurrences of *Aedes Aegypti* mosquitoes (the most prevalent mosquito species found to be capable of spreading Zika virus).<sup>18</sup> According to the CDC, the Zika virus spreads primarily through the bite of an infected mosquito, but a

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13. For a precise and comprehensive summary of the origins of the Zika virus outbreak in Brazil, see Gubio S. Campos et al., *Zika Virus Outbreak, Bahia, Brazil*, 21 EMERGING INFECTIOUS DISEASES 1885, 1885–86 (2015).

14. Didier Musso, *Zika Virus Transmission from French Polynesia to Brazil*, 21 EMERGING INFECTIOUS DISEASES 1887, 1887 (2015).

15. WHO, *Zika Virus, Microcephaly and Guillain-Barré Syndrome*, Situation Report 2 (Feb. 26, 2016) [hereinafter WHO, *Zika Virus*].

16. Michael Eisenstein, *Disease: Poverty and Pathogens*, NATURE (Mar. 17, 2016), [http://www.nature.com/nature/journal/v531/n7594\\_suppl/pdf/531S61a.pdf](http://www.nature.com/nature/journal/v531/n7594_suppl/pdf/531S61a.pdf).

17. WHO, *Zika Virus*, *supra* note 15.

18. See generally Micah B. Hahn et al., *Reported Distribution of Aedes (Stegomyia) Aegypti and Aedes (Stegomyia) Albopictus in the United States, 1995–2016 (Diptera Culicidae)*, 53 J. MED. ENTOMOLOGY 1169, 1169 (2016).

person with the Zika virus can also pass it to his or her sexual partner.<sup>19</sup> “The number of people in the Western Hemisphere affected by the Zika virus is unknown, but as many as four million people may be at risk of infection,” and almost all countries in Latin America have recorded cases of the Zika virus.<sup>20</sup>

Scientists associated the virus to adverse health effects. In 2015, Brazilian scientists reported an increase in the number of cases of microcephaly.<sup>21</sup> There is now scientific consensus that the Zika virus is linked to Microcephaly, a condition in which a baby’s head grows much smaller than expected, leading to a number of other health problems, including seizures and developmental delays.<sup>22</sup> No vaccine currently exists for the disease.<sup>23</sup> Scientists also linked the Zika virus to Guillain-Barré syndrome, a condition in which the immune system attacks nerve cells causing muscle weakness and sometimes ascending paralysis.<sup>24</sup> A Zika infection also produces a mild febrile illness, and may include symptoms such as “fever, rash, joint pain, conjunctivitis, muscle pain, and headache.”<sup>25</sup>

19. CDC, *Questions About Zika*, <https://www.cdc.gov/zika/about/questions.html> (last visited Feb. 5, 2017).

20. CLARE RIBANDO SEELKE ET. AL., CONG. RESEARCH SERV., R.44545, ZIKA VIRUS IN LATIN AMERICAN AND THE CARIBBEAN: U.S. POLICY CONSIDERATIONS (2016).

21. See generally Wanderson Kleber de Oliveira et al., *Increase in Reported Prevalence of Microcephaly in Infants Born to Women Living in Areas with Confirmed Zika Virus Transmission During the First Trimester of Pregnancy—Brazil, 2015*, 65 MORBIDITY & MORTALITY WEEKLY REPORT 242–43 (2016); see also Lavinia Schuler-Faccini et al., *Possible Association Between Zika Virus Infection and Microcephaly—Brazil, 2015*, 65 MORBIDITY AND MORTALITY WEEKLY REPORT 59–62 (2016).

22. For a more extensive list of deleterious medical effects of microcephaly, see CDC, *Facts about Microcephaly*, <http://www.cdc.gov/ncbddd/birthdefects/microcephaly.html> (last visited Jan. 17, 2017).

23. Lena H. Sun, *Zika Vaccine Test Moves to Next Stage with More than 2,000 Volunteers in U.S., Abroad*, WASH. POST (March 31, 2017) [https://www.washingtonpost.com/news/to-your-health/wp/2017/03/31/zika-vaccine-test-moves-to-next-stage-with-more-than-2000-volunteers-in-u-s-abroad/?utm\\_term=.4e2708553d69](https://www.washingtonpost.com/news/to-your-health/wp/2017/03/31/zika-vaccine-test-moves-to-next-stage-with-more-than-2000-volunteers-in-u-s-abroad/?utm_term=.4e2708553d69). The National Institute of Allergy and Infectious Disease is in the process of testing an experimental vaccine and results could be available by the end of the year. *Id.*

24. CDC, *Zika and Guillain-Barré Syndrome*, <https://www.cdc.gov/zika/healtheffects/gbs-qa.html> (last updated Aug. 9, 2016).

25. See Sloane Ackerman, *The Spread of Zika: What U.S. Employers Should Know*, N.Y. L.J. (Aug. 29, 2016) <http://www.newyorklawjournal.com/id=1202766261128/The-Spread-of-Zika-Virus-What-US-Employers-Should-Know?slreturn=20160913143701>; see also CDC, *Symptoms*, <https://www.cdc.gov/zika/symptoms/symptoms.html> (last visited March 27,

Zika's spread also raises important issues in the area of reproductive health care: mainly contraception, prenatal testing, and abortion.<sup>26</sup> The CDC and the World Health Organization (WHO) recommends men refrain from unprotected sex for 6 months and women should wait for 8 weeks after symptoms appear before attempting to become pregnant.<sup>27</sup> While many could avoid pregnancy by choosing to refrain from sexual relations, other contraceptive or medical alternatives have a higher likelihood of success.<sup>28</sup>

Government officials in several countries severely affected by the Zika virus, including Brazil and Columbia, have advised women to halt pregnancy plans temporarily due to the risk of microcephaly.<sup>29</sup> Researchers found that the Zika virus makes microcephaly twenty times more likely in infants.<sup>30</sup> Another study showed "low levels of knowledge and concern of Zika virus in the United States."<sup>31</sup> The Zika virus is different from other recent pandemics such as H1N1 and Ebola, and thus requires a different response due to the following: (1) dangers for pregnant women; (2) relatively mild symptoms; (3) lack of airborne transmission; and (4) absence of a vaccine.<sup>32</sup>

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2017). The most common symptoms of Zika are fever, rash, joint pain and conjunctivitis. *Id.*

26. See Dolgin, *supra* note 9, at 9.

27. CDC, *CDC Issues Updated Zika Recommendations: Timing of Pregnancy After Zika Exposure, Prevention of Sexual Transmission, Considerations for Reducing Unintended Pregnancy in Areas with Zika Transmission*, <http://www.cdc.gov/media/releases/2016/s0325-zika-virus-recommendations.html> (last updated Mar. 25, 2016) [hereinafter CDC, *Zika Recommendations*].

28. See, e.g., Dolgin, *supra* note 9, at 9. Puerto Rico demonstrates the intricacies of this problem. The CDC reports that two-thirds of Puerto Rico's pregnancies are unintended. CDC, *Zika Recommendations*, *supra* note 27.

29. Uri Friedman, *A Country Without Babies*, ATLANTIC (Feb. 1, 2016), <https://www.theatlantic.com/international/archive/2016/02/zika-pregnancy-latin-america/433980/>.

30. Janet D. Cragen et al., *Baseline Prevalence of Birth Defects Associated with Congenital Zika Virus Infection—Massachusetts, North Carolina, and Atlanta, Georgia, 2013–2014*, 66 *Morbidity & Mortality Weekly Report* 220–21 (2017).

31. Sonja A. Rasmussen et al., *Zika Virus and Birth Defects—Reviewing the Evidence for Causality*, 374 *NEW ENG. J. MED.* 1981, 1982 (2016).

32. *Id.*; 2009 H1N1 Flu ("Swine Flu") and You, CDC (Feb. 10, 2010, 5:00 PM), <https://www.cdc.gov/h1n1flu/qa.htm> (stating that the H1N1 pandemic, which occurred between 2009 and 2010, has continued to circulate since that time period and has now become a human seasonal flu virus); Wendy E. Parmet, *Pandemics, Populism and the Role of Law in the H1N1 Vaccine Campaign*, 4 *ST. LOUIS U. J. HEALTH L. & POL'Y* 113, 113–14 (2010); Erica Check Hayden, *Spectre of Ebola Haunts Zika Response*, *NATURE* (Mar. 02, 2016), [http://www.nature.com/nature/journal/v531/n7594\\_suppl/pdf/531S61a.pdf](http://www.nature.com/nature/journal/v531/n7594_suppl/pdf/531S61a.pdf). Ebola

While the Ebola pandemic in 2014 managed to mobilize bipartisan efforts in Congress, the reaction to the Zika outbreak has been lackadaisical at best.<sup>33</sup> Some politicians have justified not allocating further funds to combat the Zika virus by stating that there are still “leftover” funds from Ebola.<sup>34</sup> The White House took the highly unusual step of moving \$500 million aimed at fighting Ebola to address a haphazard response to the Zika virus.<sup>35</sup> What is clear is the pressing need for more funding at the federal level that can combat not only the Zika virus, but also other infectious disease outbreaks.<sup>36</sup>

### B. Zika in the United States

The *Aedes Aegypti* mosquito that carries the Zika virus has been present in the United States since the seventeenth century and was most likely the vector for yellow fever and dengue outbreaks in the early twentieth century.<sup>37</sup> Vectors are organisms—such as mosquitos—which transmit infections to humans.<sup>38</sup> Climactic factors such as temperature, rainfall, humidity, and wind all play significant roles in the complex dynamics of

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currently only has four documented cases in the United States; Zika now has over 222 cases through presumed local mosquito-borne transmission; see CDC, *Cases of Ebola Diagnosed in the United States*, CDC, <http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/united-states-imported-case.html> (last updated Dec. 16, 2014); see also Kevin B. Laupland & Louis Valiquette, *Ebola Virus Disease*, 25 CAN. J. INFECTIOUS DISEASE & MED. MICROBIOLOGY 128, 128–29 (2014) (stating Ebola is a rare but often fatal disease caused by the infection of the Ebola virus. Ebola is transmitted through direct contact including: blood or bodily fluids, objects, and through sexual contact); CDC, *Case Counts in the US*, CDC, <https://www.cdc.gov/zika/geo/united-states.html> (last updated March 27, 2017).

33. See Maggie Fox, *Zika Virus Fight: White House Shifts Ebola Cash, Blames Congress*, NBC NEWS (Apr. 6, 2016, 9:00 AM), <http://www.nbcnews.com/storyline/zika-virus-outbreak/white-house-shift-ebola-funds-zika-fight-n551631> (finding that in 2014, Congress approved nearly \$5 billion on a stand-alone emergency spending bill to fight Ebola).

34. Press Release, House Majority Leader Kevin McCarthy, *Fighting Zika Responsibly* (Apr. 6, 2016), <http://www.majorityleader.gov/2016/04/06/fighting-zika-responsibly/> (“Currently, there are billions of dollars leftover that Congress appropriated to combat Ebola. Now that the World Health Organization has announced an end to the Ebola public health emergency, it is time to reprioritize and use these funds for today’s challenges.”)

35. See *id.*

36. See Dolgin, *supra* note 9, at 4–5, 7.

37. Hahn, *supra* note 18, at 1169.

38. See H.F. VAN EMDEN & M.W. SERVICE, *PEST AND VECTOR CONTROL* 1, 8 (1st ed. 2004); see also André Barretto, Bruno Wilke & Mauro Toledo Marrelli, *Paratransgenesis: A Promising New Strategy for Mosquito Vector Control*, *PARASITES & VECTORS*, Feb. 2015 at 1, 3–4.

disease transmission.<sup>39</sup> One study found that the *Aedes Aegypti* mosquito, populates twenty-six states and the District of Columbia.<sup>40</sup>

Scientists and health experts warned policymakers that the recent Zika outbreak could become a regular fixture in the United States unless the federal government makes a coordinated effort to curtail the outbreak.<sup>41</sup> On August 1, 2016, the CDC issued domestic travel warnings advising pregnant women not to travel to a neighborhood north of Miami due to potential health hazards.<sup>42</sup> The former Ebola czar, Ron Klain, stated, "Zika is not 'coming' to the United States: It is already here."<sup>43</sup> Areas most likely to be affected by the Zika outbreak, such as Puerto Rico, have taken preventive measures that address the short-term risks, but fail to consider the long-term threat.<sup>44</sup> The total lifetime costs associated with treatment for a child with microcephaly includes medical costs and the indirect costs of providing around-the-clock care, which could cost \$10 million or more according to the CDC.<sup>45</sup>

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39. See Paul Reiter, *Climate Change and Mosquito-Borne Disease*, 109 ENVTL. HEALTH PERSPECTIVES 141, 142 (2001) (finding that seasonality and temperature affect mosquito multiplication rates and the likelihood of successful transmission to another host.)

40. See Hahn, *supra* note 18, at 1171 (finding that "Ae. Aegypti has been documented along much of the southern tier of the United States, including southern California, Arizona, New Mexico, Texas, Louisiana, and Florida").

41. See Ronald A. Klain, *Zika Is Coming, but We're Far from Ready*, WASH. POST (May 22, 2016), [https://www.washingtonpost.com/opinions/zika-is-coming-but-were-far-from-ready/2016/05/21/380ec54e-1dc3-11e6-9c81-4b61c14fb8c8\\_story.html?utm\\_term=.894532af06a9](https://www.washingtonpost.com/opinions/zika-is-coming-but-were-far-from-ready/2016/05/21/380ec54e-1dc3-11e6-9c81-4b61c14fb8c8_story.html?utm_term=.894532af06a9).

42. Press Release, CDC, CDC Issues Travel Guidance Related to Miami Neighborhood with Active Zika Spread (Aug. 1, 2016) <http://www.cdc.gov/media/releases/2016/p0801-zika-travel-guidance.html>.

43. Klain, *supra* note 41; see also CDC, *Case Counts in the US* *supra* note 32 (noting that as of March 28, 2017, the CDC reports 5,158 Zika cases in the continental United States including 222 locally acquired mosquito-borne cases and 4,861 cases related to travel. This total figure escalates to 38,212 when one expands the number of cases to include U.S. territories such as Puerto Rico).

44. See Lena H. Sun, *CDC director: Puerto Rico Could See Hundreds of Zika-Infected Babies with Microcephaly*, WASH. POST (June 17, 2016), [https://www.washingtonpost.com/news/to-your-health/wp/2016/06/17/cdc-director-puerto-rico-could-see-hundreds-of-zika-infected-babies-with-microcephaly/?utm\\_term=/64e613718f8a](https://www.washingtonpost.com/news/to-your-health/wp/2016/06/17/cdc-director-puerto-rico-could-see-hundreds-of-zika-infected-babies-with-microcephaly/?utm_term=/64e613718f8a); see generally Eisenstein, *supra* note 16.

45. Tom Frieden, *CDC Transcript for CDC Telebriefing: Zika Summit Press Conference*, CDC (Apr. 1, 2016), <http://www.cdc.gov/media/releases/2016/t0404-zika-summit.html>.



*C. Vector Control and Disease Surveillance in the United States*

Vector control has long been a police power and the responsibility of the state and local governments.<sup>46</sup> Mosquitos normally breed in stagnant pools of water, and the mosquito also thrives in receptacles used by households that do not have access to municipal services.<sup>47</sup> While the private sector undertakes many mosquito control and research activities, the government is responsible for implementing public policies that can affect social and environmental change. Moreover, the government is in a better position to monitor the outbreak of diseases.

Some of the primary responsibilities of local health agencies include the following: (1) early prevention; (2) early identification; and (3) providing a timely and effective response to public health threats.<sup>48</sup> The United States uses tracking, spraying, and surveillance as the first line of defense against mosquitos, similar to much of the world.<sup>49</sup> The agencies responsible for carrying out such functions include a myriad of state districts, which in turn depend on cities and counties for funding and for employing the necessary personnel.<sup>50</sup> These functions fall within the jurisdiction of multiple agencies at the federal, state, and local level. This smattering of local agencies includes departments of agriculture, transportation, health, and many others. State governments funded such efforts—providing short-term solutions like transferring federal funds for cleanup efforts and checking clinic patients for Zika symptoms—and achieved mixed results, at best.<sup>51</sup> Vector control involves the use of interventions aimed at reducing the life expectancy of vectors so that they are unable to transmit the disease.<sup>52</sup> These traditional control methods demonstrated limited success due to the

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46. See Edward P. Richards, *Public Health Law as Administrative Law: Example Lessons*, 10 J. HEALTH CARE L. & POL'Y 61, 64 (2007) (finding that states often took draconian measures to curtail mosquito-borne illnesses such as yellow fever and malaria).

47. See Eisenstein, *supra* note 16, at 2. The expansion of the mosquito is driven by industrialization and climate in both Asia and Africa. *Id.* Poverty is another condition that can exacerbate the spread of the virus, especially: overcrowding, poor sanitation, and massive migrations from rural to urban areas. *Id.*

48. See WHO, *Global Strategy for Dengue Prevention and Control 2012–2020*, 1, 13, 15 (2012).

49. See *id.* at 15.

50. See Maryn McKenna, *Disorganized Mosquito Control Will Make US Vulnerable to Zika*, NAT'L GEOGRAPHIC: PHENOMENA A SCIENCE SALON (Oct. 29, 2016, 10:59 PM), <http://phenomena.nationalgeographic.com/2016/02/29/zika-mosquito-control/>.

51. *Zika Regional Task Force Meets to Announce Transfer of \$34M to Fight Virus*, CLICK 2 HOUSTON (Aug. 18, 2016, 1:07 PM), <http://www.click2houston.com/news/zika-regional-task-force-meets-to-announce-transfer-of-34-million-to-fight-virus>.

52. See generally Barretto, Wilke & Marrelli, *supra* note 38, at 1.

complexities of urban environments and the labor intensive and logistical quagmire of diseases.<sup>53</sup>

This broad assortment of local agencies is often left scrambling without interagency coordination.<sup>54</sup> According to a 2014 study by the Council of State and Territorial Epidemiologists, which compared state and city health departments budgets during the 2004 spread of the West Nile Virus to all fifty states with the same 2014 budgets, overall federal funding for mosquito control programs dropped from \$24 million to \$10 million.<sup>55</sup> Some of these programs still receive ample appropriations for mosquito control. For example, Fort Myers, a mosquito-abatement district in Lee County, Florida, has a budget of \$24 million, employing twenty-seven aircraft; however, other areas lack the funding to conduct surveillance.<sup>56</sup> Additionally, many states have already eliminated mosquito control programs from the state budget, including some that are especially at risk of a Zika outbreak.<sup>57</sup>

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53. See Rafael Maciel de Freitas et al., *Why Do We Need Alternative Tools to Control Mosquito-Borne Diseases in Latin America?*, 107 MEM'L INST. OSWALDO CRUZ 828, 828 (2012).

54. See Alan Yuhas, *US Beekeepers Fear for Livelihoods as Anti-Zika Toxin Kills 2.5m Bees*, GUARDIAN (Sept. 4, 2016, 6:55 AM), <https://www.theguardian.com/environment/2016/sep/04/zika-mosquito-neurotoxin-kills-bees-livelihoods-beekeepers>. In Dorchester County, S.C., city officials failed to alert beekeepers about the use of Naled, an insecticide that kills mosquitos, this resulted in the death of 46 hives or 2.5 million bees. *Id.* South Carolina's protocol is to alert local officials of a carrier's residence, which will then target the mosquitos in a 200-yard radius. *Id.* Others have expressed concerns over careless mixture and application of chemicals and mismanagement. *Id.*

55. See *Assessment of Capacity in 2012 for the Surveillance, Prevention and Control of West Nile Virus and Other Mosquito-Borne Virus Infections in State and Large City/County Health Departments and How it Compares to 2004*, COUNCIL OF STATE & TERRITORIAL EPIDEMIOLOGISTS 9 (2014). According to the report, only 80% of states currently have some capabilities to survey mosquitos, this is down from the 96% figure from 2004. *Id.* at 16. Additionally, the report recommended that state and local health departments maintain capacity for mosquito surveillance at the national level. *Id.* at 39.

56. McKenna, *supra* note 50.

57. See Mark Binker, *As Zika Virus Arrives in the US, NC Left Without Mosquito Monitoring*, WRAL (Feb. 11, 2016), <http://www.wral.com/as-zika-virus-arrives-in-us-nc-left-without-mosquito-monitoring-program-/15352129/> (stating that the government has struggled to maintain mosquito budgets due to budget shortfalls); see also Marco Caputo & Christine Sexton, *Scott Bashes Feds over Zika Funding, but Slashed Mosquito Control Money*, POLITICO (Aug. 5, 2016, 5:41 AM), <http://www.politico.com/states/florida/story/2016/08/scott-boasts-about-states-zika-fight-but-slashed-mosquito-control-funding-to-save-money-104539>

(explaining that state mosquito control programs have been significantly reduced in Florida from \$2.16 million to \$1.29 million in 2011).

### 1. Lessons Learned from Malaria

The spread of Zika is the result of the environmental, social, economic, geographic, and poverty conditions of a specific area.<sup>58</sup> While conditions have dramatically changed, the fight against Malaria remains a useful analogy to the current state of affairs.<sup>59</sup> Many states lack the infrastructure to combat outbreaks of communicable and vector diseases.<sup>60</sup> This pattern is also in other jurisdictions where public health laws remain antiquated and only address a limited number of diseases such as tuberculosis and syphilis.<sup>61</sup> In essence, a number of states remain with largely reactionary measures in place leaving local health agencies scrambling to pick up the pieces of failed policymaking.<sup>62</sup>

Malaria is a mosquito-borne disease caused by a parasite that often infects a certain type of mosquito that feeds on humans.<sup>63</sup> Symptoms typically include high fevers, shaking, chills, and flu-like illnesses.<sup>64</sup> While reported cases of Malaria have significantly declined in the United States, there are still approximately 1,500 cases of Malaria diagnosed every year.<sup>65</sup>

During the New Deal era, the federal government experimented with public health efforts via the administrative state in areas traditionally left to

58. See Nicole Froio, *Zika's Spread in Brazil Is a Crisis of Inequality as much as Health*, THE GUARDIAN (Feb. 3, 2016, 7:39 AM), <https://www.theguardian.com/commentisfree/2016/feb/03/zika-virus-brazil-inequality-microcephaly-access-water-contraception>.

59. See Lucie Robertson Bridgforth, *The Politics of Public Health Reform: Felix J Underwood and the Mississippi State Board of Health, 1924–1958*, 6 PUB. HISTORIAN SUMMER 5, 22–23 (1984) (explaining the environmental, economic, and social conditions in Mississippi during a malaria outbreak in the mid-twentieth century).

60. See Tatiana Almeida, *Poverty, Inequality at the Heart of the Zika Outbreak*, U.N. POPULATION FUND (July 21, 2016), <http://www.unfpa.org/news/poverty-inequality-heart-zika-outbreak>; see also A DICTIONARY OF EPIDEMIOLOGY 9 (Miquel Porta et al. eds., 6th ed. 2014) (defining arthropods as a major group of pathogen vectors that includes mosquitos, flies, sand flies, lice, fleas, and ticks). In epidemiology, a vector is any agent responsible for carrying an infectious pathogen or disease into another living organism. *Id.*

61. See Christa-Marie Singleton, *Avian/Pandemic Flu Issues for Consideration and Pandemic Planning: What a Local Government Faces*, 58 ADMIN. L. REV. 645, 646 (2006).

62. See LAWRENCE O. GOSTIN & LINDSEY F. WILEY, PUBLIC HEALTH LAW POWER, DUTY, RESTRAINT 153 (3d ed. 2016) (noting that because many public health measures face opposition at the political level, administrative agencies often must fill in the gaps).

63. See *The History of Malaria, an Ancient Disease*, CDC, <https://www.cdc.gov/malaria/about/history/index.html> (last updated Mar. 11, 2016).

64. *About Malaria*, CDC, <https://www.cdc.gov/malaria/about/index.html> (last updated Dec. 14, 2016).

65. *Id.*

state and local governments.<sup>66</sup> In 1946, with congressional approval, the CDC became a permanent federal agency.<sup>67</sup> There was still a deep suspicion of the increased involvement of the federal government, and the federal agencies in the New Deal era worked primarily through local agencies.<sup>68</sup>

After the Great Depression in 1929 and the ensuing economic downturn, public health conditions significantly deteriorated during the 1930s.<sup>69</sup> Such conditions allowed Malaria to proliferate between 1932 and 1936, especially in the South, where people had trouble finding work in urban settings.<sup>70</sup> Living under disparate conditions of poverty, many people had little choice but to move back to the countryside.<sup>71</sup>

While the New Deal did not live up to President Franklin D. Roosevelt's dreams of national health insurance, it did allow for an increased federal role to combat the South's prevalent Malaria problem.<sup>72</sup> State health departments (SHDs) in the South were incredibly resistant to the federal government's efforts to expand oversight in an area traditionally left to the states.<sup>73</sup> The New Deal saw the establishment of an effective administrative system that contained the requisite resources and expertise that also allowed for coordination with local state agencies.<sup>74</sup> Malaria, along with other vector diseases, affected large swaths of American territory in the eighteenth and nineteenth centuries, but by the turn of the century, it remained a problem largely restricted to southern states.<sup>75</sup> Malaria remained a problem in part due to the abysmal health record of the South

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66. Polly J. Price, *Federalization of the Mosquito: Structural Innovation in the New Deal Administrative State*, 60 EMORY L.J. 325, 327–28 (2011).

67. RICHARD E. GOODMAN ET AL., *LAW IN PUBLIC HEALTH PRACTICE*, 1, 55 (2d ed. 2007).

68. Price, *supra* note 66, at 334.

69. José A. Tapia Granados & Ana V. Diez Roux, *Life and Death during the Great Depression*, 106 PROCEEDINGS NAT'L ACAD. SCI. 17, 290–91 (2009).

70. Elizabeth Fee & Theodore M. Brown, *Depression-Era Malaria Control in the South*, 96 AM. J. PUBLIC HEALTH 1694, 1694 (2004).

71. *Id.*

72. See Price, *supra* note 66, at 326–27.

73. See Fee & Brown, *supra* note 70 (discussing how southern states viewed increased federal involvement with great skepticism given that vector control was an area traditionally left to the states and local municipalities. A surrender of control in one area could infringe on state sovereignty).

74. Price, *supra* note 66, at 326–27.

75. *Id.* at 331–35. Philanthropists were also attracted to the dire consequences of Malaria in the South, which led to private efforts well before the federal government intervened.

and in part because of the warmer southern climate that allowed mosquitos to breed for the entire year.<sup>76</sup>

The Office of Malaria Control in War Areas (MCWA) formally institutionalized the federal response to Malaria in the southern parts of the United States during the course of World War II.<sup>77</sup> The Tennessee Valley Authority (TVA) also provided help with sanitation efforts and significantly reduced mosquito breeding grounds.<sup>78</sup> Neither Public Health Service (now the Department of Health and Humans Services), nor MCWA had a statutory mandate from Congress to tackle Malaria in the United States.<sup>79</sup> While some historians have challenged the federal government's role, there appears to be a consensus that the problem would have remained for many more years without the active support of the federal government.<sup>80</sup> The MCWA later became a permanent federal agency in the CDC, but its expanded federal jurisdiction was severely restricted with the end of the war.<sup>81</sup>

## 2. Lesson Learned from West Nile Virus

Another useful analogy to the current Zika outbreak is found in the rapid spread of the West Nile Virus from 1999 to 2004.<sup>82</sup> Researchers first identified the virus in New York City in 1999 and it quickly spread to forty-four states by the end of 2002.<sup>83</sup> The arrival and subsequent spread of West Nile Virus demonstrates how quickly an infectious disease can establish itself in a new environment.<sup>84</sup> A study by the CDC estimated that more than three million people in the United States have been infected by the virus, although approximately 80% of the infections are asymptomatic, meaning that there is no manifestation of the disease or any noticeable

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76. TODD L. SAVITT & JAMES HARVEY YOUNG, DISEASE AND DISTINCTIVENESS IN THE AMERICAN SOUTH 8–10 (1st ed. 1988).

77. Farshad Najafipour, et al., *A Review of Malaria Prevention and Control in War Areas*, J. ARCHIVES MIL. MED. 1, 2 (2015).

78. See Price, *supra* note 66, at 347 (explaining that such efforts included drainage projects and building dams).

79. *Id.* at 358.

80. See generally *id.* (analyzing New Deal public health efforts).

81. *Id.* at 328.

82. Kelly E. Shamel, *West Nile—The New Aids Epidemic?* 10 MO. ENVTL. L. & POL'Y REV. 56 (2002). On August 29, 2002, Missouri had only twenty-five cases of West Nile Virus reported, but as of October 4, 2002, it had the second highest number of confirmed cases at 149. *Id.* at 56.

83. James J. Sejvar, *West Nile Virus: An Historical Overview*, OCHSNER J., July 2003, at 6.

84. See *id.* at 8.

symptoms.<sup>85</sup> As of 2014, there had been 17,463 cases of neuroinvasive disease and approximately 1,554 deaths attributed to the West Nile Virus.<sup>86</sup>

Prior to 1999, states appropriated little to no funding for surveillance; in fact, many states did not conduct any surveillance.<sup>87</sup> Congress later appropriated annual funds to local health agencies to establish epidemiology and laboratory capacity in the form of cooperative agreements with the CDC.<sup>88</sup> In 2000, the CDC also established the National Arboviral Surveillance System, or ArboNET, a national surveillance platform that monitors West Nile Virus patterns in the continental United States.<sup>89</sup>

In 2004, the CDC confirmed the highest number of recorded cases of West Nile Virus in the United States and distributed nearly \$24 million total to the states in order to assist local health agencies with developing the infrastructure to combat the spread of the virus.<sup>90</sup> According to one study, fifteen local health departments (LHDs) that did not receive federal funding were less likely to take an active role in the surveillance of human disease or avian deaths.<sup>91</sup>

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85. See J. Erin Staples et al., *Initial and Long-Term Costs of Patients Hospitalized with West Nile Virus Disease*, 90 AM. J. TROPICAL MED. HYGIENE 402, 402 (2014).

86. *West Nile Virus Disease Cases and Deaths Reported to CDC by Year and Clinical Presentation, 1999–2013*, CDC, [https://www.cdc.gov/westnile/resources/pdfs/cummulative/99\\_2013\\_CasesAndDeathsClinicalPresentationHumanCases.pdf](https://www.cdc.gov/westnile/resources/pdfs/cummulative/99_2013_CasesAndDeathsClinicalPresentationHumanCases.pdf) (last visited Feb. 18, 2017).

87. James L. Hadler et al., *Assessment of Arbovirus Surveillance 13 Years After Introduction of West Nile Virus, United States*, 21 EMERGING INFECTIOUS DISEASES 1159, 1159 (2015).

88. *Id.*

89. See *id.*; see also CDC, *West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control*, <http://www.cdc.gov/westnile/resourcepages/survresources.html> (last updated Feb. 12, 2015) (noting that ArboNET is a passive national surveillance that maintains data on arboviral infections, which also includes laboratory diagnosis and control and prevention methods).

90. See Hadler *supra* note 87, at 1159; see also *How Federal Funding Reaches Local Health Departments*, NACCHO, <http://www.naccho.org/uploads/downloadable-resources/Policy-and-Advocacy/Federal-Funding-final.pdf> (last visited Nov. 1, 2016). According to a 2010 profile, 23% of local health departments receive their revenue through federal investments, with an average of 26% via local funding. *Id.* at 2. Some examples of federal funding include but are not limited to infectious diseases, emergency preparedness and chronic diseases. *Id.*

91. See Hadler, *supra* note 87, at 1161–62; see also JEFFREY GRIFFITHS ET AL., PUBLIC HEALTH AND INFECTIOUS DISEASES 1, 365 (1st ed. 2010). An analysis of data gathered 2001–2002 shows that counties that reported West Nile Virus-infected birds are more likely to report subsequent West Nile Virus cases in humans than counties that do not report such birds. Stephen C. Guptill et al., *Early Season Avian Deaths from West Nile Virus as Warnings of*

Currently, the ability to detect early signs of arboviruses has largely been lost as most states have cut back on surveillance.<sup>92</sup> Many large metropolitan areas now lack the infrastructure necessary to anticipate an outbreak and therefore are unable to properly ascertain the risk and mount an effective response. Scientists have also documented the economic impact of the West Nile Virus in the United States.<sup>93</sup> One study suggests that the disease has cost the country approximately \$800 million since the first reported case of West Nile virus.<sup>94</sup>

Similar to Malaria, which plagued the United States during the early twentieth century, a greatly enhanced federal role could significantly curtail Zika.<sup>95</sup> The West Nile Virus outbreak in 2003 demonstrates the significant impact on several important economic areas including: travel, agriculture, tourism, tariffs, banking, mining and investments.<sup>96</sup> Some scientists have found that the cost of combatting a communicable disease emergency could reach as high as \$250 billion.<sup>97</sup> Therefore, communicable diseases, such as Zika, have a significant impact on the federal economy and there is a pressing need for greater federal involvement in the area of communicable diseases.

## II. PUBLIC HEALTH AT THE STATE LEVEL

In the United States, the governmental Public Health System is made up of “federal agencies, state health agencies (SHAs), tribal and territorial health departments, and more than 2,500 LHDs.”<sup>98</sup> LHDs will usually provide health services at a micro level, while SHAs will “establish the policies for those programs and services, . . . allocate funds to the LHDs,

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*Human Infection*, 9 EMERGING INFECTIOUS DISEASES 483, 483–84 (2003). This means that West Nile Virus-infected birds serve as the proverbial canary in the coalmine and provide an important warning sign of imminent harm. *Id.* at 484.

92. See Hadler, *supra* note 87, at 1164.

93. See Alan D.T. Barrett, *Economic Burden of the West Nile Virus in the United States*, 90 AM. J. TROPICAL MED. HYGIENE 389, 389 (2014).

94. See Staples et al., *supra* note 85, at 402.

95. See Price, *supra* note 66, at 331–35 (explaining the MWCA’s efforts significantly aided in the eradication of Malaria in the South, especially given the economic and financial conditions of southern states at the time).

96. See generally Barrett, *supra* note 93.

97. Martin I. Meltzer et al., *The Economic Impact of Pandemic Influenza In the United States: Priorities for Intervention*, 5 EMERGING INFECTIOUS DISEASES 659, 664 (1999).

98. Michael Meit et al., *Promising Practices in the Coordination of State and Local Public Health* 1, 2 (May 2012). On average, 60% of SHA funds that come from the federal government are allocated to local health departments (LHDs). *Id.* at 13.

and . . . coordinate activities within jurisdictions.”<sup>99</sup> Many researchers and governmental officials have recognized the need for a coordinated and effective response to an infectious disease outbreak.<sup>100</sup> Partnerships between public health agencies at various levels of government as well as a healthy relationship between the public and the private is important to “achieve the wide-ranging goals of public health.”<sup>101</sup> One of the unique characteristics of public health is the intersection of a number of disciplines, which range from epidemiology and biostatistics, to social and behavioral sciences.

The HHS appropriates federal funds for SHAs primarily through the CDC, which distributes grants aimed at addressing specific risks.<sup>102</sup> The CDC will also award grants to LHDs in some cases.<sup>103</sup> While SHAs generally define “the scope of public health authority,” there is flexibility for policymakers to determine where LHDs will be responsible.<sup>104</sup> As one study indicated “governmental public health agencies are increasingly being asked to broker broad societal change.”<sup>105</sup> On average, an SHA receives 50% of its funding “from federal grants, cooperative agreements, and contracts” and only “24% from state funds.”<sup>106</sup> SHAs require new funding to address appropriate responses and to control infectious diseases.<sup>107</sup>

State legislatures act under police powers to protect the health, safety, and welfare of their citizens, as well as to enact a variety of statutes aimed at disease control and prevention.<sup>108</sup> Such statutes create health agencies at

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99. *Id.* at 3; see also INSTITUTE OF MEDICINE OF THE NAT’L ACADEMIES, *THE FUTURE OF THE PUBLIC’S HEALTH IN THE 21ST CENTURY* (2003) (“An effective public health system that can assure the nation’s health requires the collaborative efforts of a complex network of people and organizations in the public and private sectors, as well as an alignment of policy and practice of governmental public health agencies at the national, state, and local levels.”)

100. Press Release, CDC, *Sebelius Announces \$42.5 Million for Public Health Improvement Programs Through the Affordable Care Act* (Sept. 20, 2010), <https://www.cdc.gov/media/pressrel/2010/r100920.htm>.

101. Eileen Salinsky, *Governmental Public Health: An Overview of State and Local Public Health Agencies*, National Health Policy Forum 1, 5 (2010).

102. *Id.* at 7.

103. *Id.*

104. *Id.* at 14–15.

105. *Id.* at 22.

106. *Id.* at 17 (citing ASTHO, *Profile of State Public Health*, 1 ASS’N STATE & TERRITORIAL HEALTH OFFICIALS 1, 26 (2008)). In some cases, “state health agencies will receive over 80 percent of their total funds from federal grants.” *Id.*

107. See generally INSTITUTE OF MEDICINE, *supra* note 99.

108. See GOSTIN & WILEY, *supra* note 62, at 156.



local and state levels and often delegate such powers to lower level agencies.<sup>109</sup> Another important source of law are the rules, regulations, orders, and procedures devised by administrative agencies to promote legislative goals.<sup>110</sup>

A state's plenary authority also allows for the creation of administrative agencies.<sup>111</sup> Administrative agencies at the local level provide expertise and flexibility, important components of a public health system.<sup>112</sup> Enabling statutes give the authority for administrative agencies to pass rules or regulations.<sup>113</sup> According to the National Association of County and City Health Officials (NACCHO), SHDs today are responsible for a variety of functions at the local level.<sup>114</sup> Government leaders also have the power to issue executive orders to address public health threats.<sup>115</sup> In the past, many jurisdictions have issued executive orders to address other mosquito-borne illnesses such as the West Nile virus.<sup>116</sup>

#### A. States Affected by Zika

The CDC has identified a number of states particularly susceptible to the transmission of the virus; including many Southern states.<sup>117</sup> Cities on the Gulf Coast provide the ideal environment for the *Aedes Aegypti* mosquito to thrive.<sup>118</sup> States especially at risk of a Zika outbreak often lack the

109. See *id.* at 155–56 (clarifying the delegation of powers at the state level). In some states, local health departments are the responsibility of the state health agency, while in others, state and local authorities govern all health departments. Finally, in several states, governance is mixed, meaning that health departments can either be under “state or shared governance.” *Id.*

110. See Price, *supra* note 66, at 366.

111. See GOSTIN & WILEY, *supra* note 62, at 156.

112. *Id.* at 157.

113. See *Enabling Statutes and Rulemaking Provisions*, CDC, <https://www.cdc.gov/tb/programs/laws/menu/statutes.htm> (last visited Mar. 2, 2017).

114. GOSTIN & WILEY, *supra* note 62, at 154.

115. See Lainie Ruklow et al., *The Public Health Workforce and Willingness to Respond to Emergencies: A 50-State Analysis of Potentially Influential Laws*, 42 J.L. MED. & ETHICS 64, 64 (2014).

116. CDC, *Executive Orders and Emergency Declarations for the West Nile Virus: Applying Lessons from Past Outbreaks to Zika* 1, 6–7 (2016), <https://www.cdc.gov/php/docs/zika-brief/pdf>. [hereinafter CDC, *Executive Orders and Emergency Declarations*]. Governors issued twenty-one executive orders at the state level for the West Nile virus. *Id.*

117. See Dolgin, *supra* note 9, at 4.

118. See generally Andrew J. Monaghan et al., *On The Seasonal Occurrence and Abundance of the Zika Virus Vector Mosquito Aedes Aegypti in the Contiguous United States*, PUB. LIBRARY OF SCI. CURRENT OUTBREAKS (2016).

necessary tax base to fund mosquito control programs and often wait for federal funding.<sup>119</sup> Regulatory agencies are often responsible for mosquito control programs, but in some cases, cities, counties, special districts, and jurisdictions have historically performed mosquito control.<sup>120</sup> This Part analyzes the active role that Puerto Rico and Florida have taken in fighting the Zika virus and how they have fallen short due to a lack of federal funding. These jurisdictions have been selected because they are arguably the most at risk of suffering from the effects of Zika.

### 1. Puerto Rico

Puerto Rico's Department of Health (PRDH) is responsible for ensuring the health of the citizens of Puerto Rico. PRDH is a Cabinet-level agency whose authority comes from Puerto Rico's Constitution.<sup>121</sup> The Secretary of Health serves as the head of the agency and is responsible for all matters relating to disease, sanitation, and public health.<sup>122</sup>

The Zika virus has hit Puerto Rico harder than any other U.S. state or territory.<sup>123</sup> As of August 12, 2016, there have been 10,690 laboratory confirmed cases of Zika in Puerto Rico, including 1,035 pregnant women.<sup>124</sup> On February 2, 2016, Puerto Rico issued an emergency declaration regarding the threat of the Zika virus.<sup>125</sup> On August 12, 2016, HHS declared a public health emergency in Puerto Rico.<sup>126</sup> While some of

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119. See *id.*; see also Craig Lemout, *Mosquito Research Feels Bite of Budget Cuts*, NPR (Aug. 25, 2011), <http://www.npr.org/2011/08/25/139928697/mosquito-research-feels-bite-of-budget-cuts> (explaining how some states have struggled to maintain core capacity for mosquito surveillance following federal budget cuts).

120. See *id.*; see also Lemout, *supra* note 119.

121. 3 L.P.R.A. § 171. The Secretary of Health is also responsible for publishing information regarding epidemics.

122. 3 L.P.R.A. § 176.

123. See Donald G. McNeil Jr., *Puerto Rico Braces for Its Own Zika Epidemic*, N.Y. TIMES (Mar. 19, 2016), [http://www.nytimes.com/2016/03/20/health/zika-virus-puerto-rico.html?smid=nytcore-ipad-share&smprod=nytcore-ipad&\\_r=0](http://www.nytimes.com/2016/03/20/health/zika-virus-puerto-rico.html?smid=nytcore-ipad-share&smprod=nytcore-ipad&_r=0).

124. See Julie Steenhuyse, *Up to 270 Microcephaly Cases Expected in Puerto Rico Due to Zika*, REUTERS, (Aug. 19, 2016) <http://www.reuters.com/article/us-health-zika-puertorico-microcephaly-idUSKCN10U1HU>; see also Jason Beaubien, *Zika Cases Surge in Puerto Rico as Mosquitos Flourish*, NPR (Aug. 5, 2016) <http://www.npr.org/sections/health-shots/2016/08/05/488864340/zika-cases-surge-in-puerto-rico-as-mosquitoes-flourish>. Tyler Sharp, the lead epidemiologist for the CDC's operation, has called the month of August in Puerto Rico the 'Goldilocks zone' for Zika virus replication. *Id.*

125. See CDC, *Executive Orders and Emergency Declarations*, *supra* note 116.

126. Press Release, Department of Health and Human Services, *HHS Declares a Public Health Emergency in Puerto Rico in Response to Zika Outbreak* (Aug. 12, 2016),

Puerto Rico's troubles were also the result of serious fiscal challenges, additional questions remain as to Puerto Rico's preparedness.<sup>127</sup>

Puerto Rico lacks a mosquito control district, which is a key component in the fight against mosquito control.<sup>128</sup> This sort of district is fundamental at the state level because it allows agencies to coordinate mosquito control. Puerto Rico also has peculiar layers of regulation that stifle the use of pesticides.<sup>129</sup> A plan in early 2016 by the current governor to spread Naled, an insecticide, caused a furor and led San Juan's mayor to label its use as "environmental terror."<sup>130</sup> Thus, Puerto Rico has relied on Auto Dissemination (AD) Traps, which "destroy distal breeding sites as the mosquitoes visiting the AD trap pick up a larvicide and transport the agent to hidden breeding sites."<sup>131</sup>

## 2. Florida

In Florida, regulation of mosquito-borne diseases falls to the Florida Department of Public Health, which is responsible for coordinating the general health and welfare of the public.<sup>132</sup> The State Surgeon General position is responsible for spearheading efforts of the Department of Health.<sup>133</sup> The Department is an executive branch agency, and includes sixty-seven county health departments.<sup>134</sup> On February 3, 2016, the State Surgeon General of Florida declared a Public Health Emergency in four Florida counties due to Zika virus concerns.<sup>135</sup>

Chapter 388 of the Mosquito Control Act provides guidance and

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<https://www.hhs.gov/about/news/2016/08/12/hhs-declares-public-health-emergency-in-puerto-rico-in-response-to-zika-outbreak.html> [<http://wayback.archive-it.org/3926/20170129045711/https://www.hhs.gov/about/news/2016/08/12/hhs-declares-public-health-emergency-in-puerto-rico-in-response-to-zika-outbreak.html>].

127. D. ANDREW AUSTIN, CONG. RESEARCH SERV., R.44095, PUERTO RICO'S FISCAL CHALLENGES (2016).

128. See Jose F. Cordero et. al., *Findings from the Technical Workshop to Create a Safe, Effective and Integrated Strategy for the Control and Elimination of Aedes Aegypti from Puerto Rico*, PUERTO RICO TRUST FOR SCIENCE, TECHNOLOGY AND RESEARCH 1, 2 (2016).

129. See *id.* at 4.

130. See Beaubien, *supra* note 124.

131. See Cordero, *supra* note 128, at 4–5.

132. See FLA. STAT. § 20.43(1)(g) (2016).

133. See *id.* § 381.00315. The State Health Officer has the authority to declare a public health emergency. *Id.* "Before declaring a public health emergency, the State Health Officer shall, to the extent possible, work with the governor." *Id.*

134. See *id.* § 381.001.

135. See State of Florida Office of the Governor, *Florida Executive Order 16-29* (Feb. 3, 2016).

technical assistance for matters relating to mosquito control.<sup>136</sup> The Mosquito Control Act states that any city, town, or county may create a special taxing district for the control of arthropods.<sup>137</sup> Each county or district in the state may apply for funds, services, or equipment in an amount no more than \$50,000 per year up to three years for any new program for mosquito control.<sup>138</sup> Part of this statute also provides for cooperation between counties and districts stating that, "any county or district carrying on an arthropod control program may cooperate with another county, district, or municipality" when approved by the Florida Department of Health.<sup>139</sup>

Florida has also created a special account aimed at curtailing the spread of mosquitos, the Solid Waste Management Trust Fund, which is partially funded with a \$1 tax on every new tire that is purchased in the state.<sup>140</sup> The Florida Mosquito Control Association has been instrumental in the construction of the Florida Medical Entomology Laboratory.<sup>141</sup>

Florida also created the Florida Coordinating Council on Mosquito Control under Chapter 388.<sup>142</sup> The council shall "develop and implement guidelines to assist the department in resolving disputes in the control of arthropods," and to "identify potential funding for research and implementation projects" and "prepare and present reports . . . in the state to other government organizations."<sup>143</sup> Such innovations permit effective coordination of mosquito control between different agencies.

### III. THE FEDERAL GOVERNMENT

Although most public health law operates at a local level, the role of the federal government has increased substantially over the last couple of decades.<sup>144</sup> HHS serves as the first line of defense for all health concerns at

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136. See generally FLA. STAT. § 388.

137. *Id.* § 388.021(1).

138. See *id.* § 388.261.

139. *Id.* § 388.381.

140. See Florida Department of Environmental Protection, *Background of the Solid Waste Management Trust Fund Review Commission*, [http://www.dep.state.fl.us/waste/quick\\_topics/publications/documents/trustfund/history.pdf](http://www.dep.state.fl.us/waste/quick_topics/publications/documents/trustfund/history.pdf). Such ingenious solutions are necessary to combat further mosquito outbreaks. *Id.*

141. The lab was later closed due to budget cuts in 2011. Caputo & Sexton, *supra* note 57.

142. See FLA. STAT. § 388.46(2)(a). The council includes representatives from a variety of executive agencies and allows interagency concerns to be addressed in a swift manner.

143. *Id.* § 388.46(2)(c).

144. See generally GOSTIN & WILEY, *supra* note 62, at 158–64.

the federal level.<sup>145</sup> Eight operating agencies, the regional health administrators for the ten federal regions of the country, and the Officer of Public Health and Science constitute the U.S. PHS.<sup>146</sup> Sources for PHS agency funding are allocated via the annual appropriations process.<sup>147</sup> The HHS Secretary may transfer funds from one budget to another within the department; however, this amount may not be increased by more than 3%.<sup>148</sup> Other than the FDA, most agencies within HHS have limited regulatory responsibilities.<sup>149</sup>

The Surgeon General, with the HHS Secretary's approval, oversees the prevention, introduction, transmission, and spread of communicable disease in the United States.<sup>150</sup> The Secretary of HHS, under § 319 of the Public Health Service Act (PHSA), may declare a public health emergency when "(a) a disease or disorder presents a public health emergency; or (b) a public health emergency, including significant outbreaks of infectious diseases or bioterrorist attacks otherwise exists."<sup>151</sup> The Secretary may also access the Public Health Emergency Fund; however, this fund has remained empty since 2000.<sup>152</sup> When the Secretary declares a public health emergency, he or she can take appropriate action to respond to the emergency, including issuing grants; entering contracts; and investigating the cause, treatment, and prevention of the disease.<sup>153</sup>

Faced with the prospect of congressional gridlock, it is important to understand the distinct roles that each agency plays at the federal level.<sup>154</sup>

145. *See id.* at 164.

146. *Id.*

147. C. STEPHEN REDHEAD ET AL., CONG. RESEARCH SERV., R44505, PUBLIC HEALTH SERVICES AGENCIES: OVERVIEW AND FUNDING (FY 2015–FY 2017) 1, 2 (2016).

148. *See id.*

149. *See id.* at 1. To see a breakdown of funding during the Zika crisis, see generally SUSAN EPSTEIN & SARAH A. LISTER, CONG. RESEARCH SERV., R44460, ZIKA RESPONSE FUNDING AND CONGRESSIONAL ACTION (2016).

150. *See* 42 U.S.C. § 264 (2012).

151. *Id.* § 247d; *see also* Thomas D. Kimball, *The Contagion of Governmental Leadership: A Renewed Call for Increased Presence in Communicable Disease Emergencies* 62 LOY. L. REV. 113, 115 (2016).

152. *Public Health Emergency Declaration Q&As*, PUBLIC HEALTH EMERGENCY, <https://www.phe.gov/Preparedness/legal/Pages/phe-qa.aspx>.

153. *See id.*; *see also* 42 U.S.C. § 1320b-5 (2012) (stating that the Secretary may also waive or modify certain requirements of Medicare, Medicaid, and State Children's Health Insurance, as necessary, to ensure that sufficient items and services are available to meet the needs of individuals enrolled in SSA programs).

154. BERNARD J. TURNOCK, PUBLIC HEALTH: WHAT IT IS AND HOW IT WORKS 1, 138 (3rd ed. 2004); *see also* DEP'T OF HEALTH AND HUMAN SERVS., UNITED STATES

There are a variety of federal agencies that can operate to curtail the deleterious effects of Zika; however, the lack of a concerted effort at the federal level remains a significant problem.<sup>155</sup> The National Security Council governs threats such as natural disasters, pandemic influenza, and weapons of mass destruction.<sup>156</sup> Federal agencies manage outbreaks, leading to an uncoordinated response and an inefficient expenditure of resources.<sup>157</sup>

#### *A. Centers for Disease Control and Prevention*

The CDC is “a public health agency that develops and supports community-based and population-wide programs and systems to promote quality of life and prevent the leading causes of disease, injury, disability, and death.”<sup>158</sup> The CDC is organized into a number of centers aimed at targeting specific public health challenges and general public health capabilities, including surveillance.<sup>159</sup> Many CDC activities are not explicitly authorized and are based on “permanent authorities in the PHSA.”<sup>160</sup> Congress conferred explicit public health authority to the CDC via the PHSA.<sup>161</sup> Title III of the PHSA grants the CDC a broad range of mechanisms including scientific research relating to causes, treatment, control, and prevention as well as federal and state cooperation in disease prevention and control.<sup>162</sup>

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GOVERNMENT ZIKA VIRUS DISEASE CONTINGENCY RESPONSE PLAN 8–9 (2016). The HHS serves as the technical lead for coordinating international public health and medical assistance. *Id.*

155. See Ronald A. Klain, *Confronting the Pandemic Threat*, DEMOCRACY: A JOURNAL OF IDEAS (2016) <http://democracyjournal.org/magazine/40/confronting-the-pandemic-threat/>.

156. See Alan G. Whitaker et al., *The National Security Process: The National Security Council and the Interagency System* 19 (Aug. 15, 2011).

157. See Joe Eyerma & Kevin J. Strom, *A Cross-National Comparison of Interagency Coordination Between Law Enforcement and Public Health*, NATIONAL INSTITUTE OF JUSTICE, OFFICE OF JUSTICE PROGRAMS, DOJ (2005).

158. See Redhead et al., *supra* note 147, at 1.

159. *Id.* at 13. In 2016, CDC had a budget of \$11.78 billion, about \$5 billion per year are given to state, local, municipal, and foreign governments in the form of grants. *Id.* at 13–14.

160. See *id.* at 13; see also 42 U.S.C. § 241 (authorizing the Secretary of HHS to conduct research and investigations as necessary to control disease).

161. 42 U.S.C. § 264. Although the CDC is not directly mentioned in the cited section, under Section 361 of the PHSA, “the authority for carrying out these functions on a daily basis has been delegated to the Centers for Disease Control and Prevention (CDC).” *Id.*

162. *Id.* §§ 241 & 311.

The CDC is responsible for surveying state and local health departments.<sup>163</sup> The CDC surveys major outbreaks including mosquito borne diseases in addition to providing advice and consultation on preventing and controlling infectious disease outbreaks.<sup>164</sup> The CDC also created limited partnerships with other federal and state agencies and at times conducted joint studies to determine exposure levels to humans of mosquito adulticides.<sup>165</sup> The CDC provides limited funding to states for improving surveillance and tracking capacity via the Prevention and Public Health Fund.<sup>166</sup>

### *C. Environmental Protection Agency*

The EPA is a federal government agency responsible for protecting the environment and human health.<sup>167</sup> The EPA ensures that state and local mosquito control departments have access to relevant technical information regarding mosquitos.<sup>168</sup> More importantly, the EPA has the authority to review the health and environmental effects associated with the use of pesticides. Section 6(b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) regulates the registration, distribution, sale and use of pesticides in the United States.<sup>169</sup> The EPA also has the authority to issue permits to applicants for conducting tests to collect necessary information to register a pesticide.<sup>170</sup> Under FIFRA, states have the authority to adopt and implement adequate pesticide laws and regulations, as well as reporting requirements.<sup>171</sup> However, it is unlawful for states to impose requirements in addition to or different from FIFRA.<sup>172</sup>

The EPA plays a prominent role in this area because pesticides often

163. CDC, *Zika CDC Interim Response Plan* 1, 3 (Oct. 2016).

164. *Id.*

165. See *Human Exposure to Mosquito-Control Pesticides—Mississippi, North Carolina, and Virginia, 2002 and 2003*, 54 MORBIDITY AND MORTALITY WEEKLY REPORT 529 (June 3, 2005) <https://www.cdc.gov/MMWR/preview/mmwrhtml/mm5421a1.htm>.

166. *Prevention and Public Health Fund*, CTRS. FOR DISEASE CONTROL (Jan. 5, 2017) <https://www.cdc.gov/funding/pphf/>.

167. See EPA Order 1110.2 (Dec. 4, 1970).

168. See *Joint statement on Mosquito Control in the United States*, EPA, <https://www.epa.gov/mosquitocontrol/joint-statement-mosquito-control-united-states> (Sept. 2012).

169. See 7 U.S.C. § 136(a) (2012).

170. *Id.* § 136(c); see also *id.* § 136a(d)(1)(C)(i) (allowing for restricted uses of pesticides under the supervision of a certified pesticide applicator).

171. See *id.* § 136(v)(a).

172. *Id.* § 136(v)(b).

form the first line of defense against mosquitos in the United States and much of the rest of the world.<sup>173</sup> According to Janet McAlister, a research entomologist at the CDC, only two classes of insecticides have been used against mosquitos in the past 60 years.<sup>174</sup>

### C. Other Federal Agencies

There are many federal agencies that play prominent roles during epidemics. The U.S. Department of Homeland Security (DHS) is charged with “acting as a focal point regarding natural and manmade crises and emergency planning.”<sup>175</sup> The Pandemic and All-Hazards Preparedness Reauthorization Act of 2013 allows the Secretary of the HHS to authorize the temporary reassignment of state and local public health department or agency personnel.<sup>176</sup> This Act also allows authorities to develop countermeasures to strengthen security by investing in capacity and infrastructure.<sup>177</sup>

The Food, Drug and Cosmetics Act “authorizes the FDA to regulate the safety of food and cosmetics, and the safety and effectiveness of pharmaceuticals, biologics, and medical devices.”<sup>178</sup> The FDA ensures that medicines, cosmetics, medical devices, and other products are safe.<sup>179</sup> The regulation of vaccines and the introduction of genetically engineered mosquitos are of critical importance to combating the Zika virus.<sup>180</sup> The Center for Biologics Evaluation and Research (CBER) is one organization within the FDA responsible for reviewing new biological products and evaluating scientific and clinical data submitted by manufacturers to

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173. See Jacob Bunge & Betsy McKay, *In the Fight Against Zika, Insecticides Hit a Dead End*, WALL ST. J. (Jan. 5, 2017), <https://www.wsj.com/articles/fight-against-zika-nears-dead-end-1483621245>.

174. *Id.*

175. See 6 U.S.C. § 111(b)(1)(D) (2012).

176. Pandemic and All-Hazards Preparedness Reauthorization Act, Pub. L. No. 113-5 § 201, 127 Stat. 161 (2013).

177. See *id.* § 101(a)(7).

178. See Sarah A. Lister, *An Overview of the U.S. Public Health System in the Context of Emergency Preparedness*, CONG. RESEARCH SERVICE (March 17, 2005); see also Food, Drug and Cosmetics Act 21 U.S.C. § 360bbb (authorizing the HHS Secretary to enable the use of unapproved products or approved products for unapproved uses).

179. See Lister, *supra* note 178.

180. See *FDA Releases Final Environmental Assessment for Genetically Engineered Mosquito*, FDA (Aug. 5, 2016), <http://www.fda.gov/AnimalVeterinary/NewsEvents/CVMUpdates/ucm490246.htm>.



determine whether the vaccine is safe for the general public.<sup>181</sup> Because other attempts at fighting the *Aedes Aegypti* mosquito—including therapeutics, insecticides, and bed nets—are inadequate to eradicate vector-borne illnesses, the search for a vaccine is an fundamental step that must be prioritized.<sup>182</sup> The FDA is also responsible for providing guidance for commercial diagnostic developers and researchers for developing laboratory screening tests for the Zika virus.<sup>183</sup> Finally, the FDA regulates medicines and devices for birth control.<sup>184</sup>

#### IV. PROPOSED CHANGES

##### *A. Agency Appropriation of Federal Funds to Counter Future Outbreaks*

The current state of affairs regarding the Zika virus demonstrates that while states provided the first line of defense for infectious disease outbreaks, the expansive reach of global trade and the rapidity of travel illustrate the states' inability to address the gargantuan task of curbing the expansion of communicable diseases.<sup>185</sup> Public health officials must be prepared for future infectious disease outbreaks and plan to provide basic services to areas in the United States affected by the Zika virus. Spurred in part by the Cold War, the federal government has become significantly more involved in disaster management.<sup>186</sup> FEMA was created as an independent agency following general dissatisfaction during the Carter administration over the handling of mitigation, preparedness, and natural disaster responses.<sup>187</sup>

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181. See FDA, *About CBER*, <http://www.fda.gov/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CBER/ucm123340.htm>.

182. Laura Beil, *Vaccines May Offer Defense Against Dengue, Zika and Chikungunya*, SCIENCE NEWS (June 15, 2016) at 22-25.

183. *Id.*

184. See FDA, *FDA Birth Control Guide*, <http://www.fda.gov/downloads/ForConsumers/ByAudience/ForWomen/FreePublications/UCM517406.pdf>.

185. Kimball, *supra* note 151, at 117-20.

186. See Tanya Adamski et al., *FEMA Reorganization and the Response to Hurricane Disaster Relief*, 3 PERSPECTIVES IN PUBLIC AFFAIRS 3, 5-6 (2006). The updated mission of FEMA is "to reduce the loss of life and property and protect the Nation from all hazards including natural disasters, acts of terrorism and other man made disasters, by leading and supporting the Nation in a risk-based, comprehensive management system of preparedness, protection response, recovery and mitigation." 6 U.S.C. § 313 (b)(1) (2012).

187. Adamski, *supra* note 186, at 6-7.

Before President Jimmy Carter created FEMA by Executive Order on March 31, 1979, there was no permanent federal program administering disaster assistance to states and municipalities.<sup>188</sup> States could appeal for special disaster assistance, and from 1803 to 1950 Congress passed over 100 special assistance acts.<sup>189</sup> This state of affairs was largely reactionary and often led to frequent delays before federal assistance could finally reach impacted areas and much needed aid was delivered.<sup>190</sup> FEMA offers many services including rehabilitation loan grants for communities, public facilities for temporary housing, unemployment assistance, food coupons, and grants.<sup>191</sup>

FEMA is responsible for managing the Disaster Relief Fund (DRF).<sup>192</sup> The DRF is the principal account used to fund disaster assistance programs and to provide assistance and grants to tribal, state, and municipal governments.<sup>193</sup> Generally, such funds are released after the government has issued an emergency or major disaster declaration pursuant to the Robert T. Stafford Relief and Federal Emergency Act.<sup>194</sup> Two federal declarations were issued for the West Nile Virus, although this step appears to be unusual.<sup>195</sup> Prior to DRF, recovery projects relied primarily on volunteers and non-profit organizations.<sup>196</sup>

A president may either declare an emergency declaration, which is intended to supplement and aid the coordination of state and local efforts, or issue a major disaster declaration allowing for a more hands-on response and is aimed at helping states and local communities.<sup>197</sup> This distinction is important because FEMA has also implemented what is known as immediate needs funding guidance, which allows FEMA to divert funds

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188. Exec. Order No. 12148 (1979).

189. *See id.* at 4–5.

190. *See id.*

191. *See* Gary A. Kreps, *The Federal Emergency Management System in the United States: Past and Present* 8 INTERNATIONAL JOURNAL OF MASS EMERGENCIES AND DISASTERS, 275, 280–81 (1990).

192. *See* BRUCE R. LINDSAY, CONG. RESEARCH SERV., R.43537, FEMA'S DISASTER RELIEF FUND: OVERVIEW AND SELECTED ISSUES (2014).

193. *Id.*

194. 42 U.S.C. §§ 5121–5207 (2012). The Stafford Act authorizes the president to issue a major disaster declaration to an event that overwhelms state and local agencies. *Id.* § 5162. The governor in the affected area must first execute the state emergency plan before requesting that the president issue a major disaster declaration. *Id.* § 5170.

195. *See* CDC, *Executive Orders and Emergency Declarations supra* note 116, at 7.

196. *See* LINDSAY, *supra* note 192, at 1.

197. *Id.* at 1–2.

from long-term projects to immediate recoveries.<sup>198</sup> Congress currently funds the DRF through yearly appropriations, the key difference being that the DRF is a “no year” account, meaning that any remaining funds at the end of the fiscal year are carried over.<sup>199</sup> FEMA must also submit a monthly report providing details on allocations and expenditures of funds from the DRF.<sup>200</sup>

The federal government’s current response to infectious disease outbreaks remains highly reactionary—similar to the manner in which the federal government responded to natural disasters prior to the establishment of FEMA in 1950.<sup>201</sup> The reality today is that infectious disease outbreaks remain a significant threat.<sup>202</sup> Yet while the federal government has made great efforts to increase assistance to states and local municipalities during natural disasters, the same cannot be said about infectious disease outbreaks.<sup>203</sup> Currently, a highly divided Congress is entrusted with ensuring yearly appropriation of funds for a federal response, which could take months and thus allow for a significant deterioration of conditions on the ground.<sup>204</sup> Allocating a limited amount of funds would allow the federal government to rapidly respond to any infectious disease outbreaks.

Similar to the manner in which FEMA is funded, Congress should set

198. *Id.* at 10.

199. See LINDSAY, *supra* note 192, at 4. This provides the important benefit of allowing the balance of the account to pay for future disasters. See also American Health Line, *CDC Unveils Emergency Zika Response Plan* (June 15, 2016), <http://www.americanhealthline.com/Members/Request-Access?item=%2ftodays-news%2f2016%2f06%2f15%2fobama-admin&user=ahl%5cAnonymous&site=ahl> (noting that the American Medical Association (AMA) suggested that a public health fund be established so that the HHS could promptly respond to public health emergencies in the future).

200. LINDSAY, *supra* note 192, at 9–10. Some have argued that FEMA has received greater attention because it was inextricably tied to national security during the height of the Cold War. *Id.* While a similar argument could be made for infectious disease outbreaks, they have not received the same amount of attention. *Id.*

201. See Kreps, *supra* note 191, at 281.

202. See Michael C. Osterholm & Mark Olshaker, *The Real Threat to National Security: Deadly Disease*, NY TIMES (Mar. 24, 2017), [https://www.nytimes.com/2017/03/24/opinion/the-real-threat-to-national-security-deadly-disease.html?\\_r=0](https://www.nytimes.com/2017/03/24/opinion/the-real-threat-to-national-security-deadly-disease.html?_r=0)

203. Compare Kreps, *supra* note 191, at 275–80, with Press Release, Gov. Rick Scott to Congress on Zika Action: Your Time Is Up (Sept. 13, 2016), <http://www.flgov.com/2016/09/13/gov-rick-scott-to-congress-on-zika-action-your-time-is-up/> (“I have allocated more than \$26 million from the state to combat Zika, but we need federal action now . . . mosquitos don’t care about party affiliation. Zika is non-partisan.”).

204. See, e.g., Press Release, *supra* note 203.

aside emergency funds on a yearly basis for infectious disease outbreaks. The CDC should be given broad discretionary authority over these funds and the ability to allocate grants to state and local authorities, given its expertise in this area. The federal government should also offer incentives for local health departments to maintain minimum levels of surveillance, as well as reimbursements for the purchase of supplies critical to countering the Zika virus.<sup>205</sup>

It is no secret that SHDs have struggled in the past to curb the deleterious effects of infectious disease outbreaks.<sup>206</sup> The only thing that has remained certain is that financial support will increase dramatically after major events and will dramatically decrease when there no longer appears to be a threat.<sup>207</sup> The establishment of a public health emergency fund could operate on yearly appropriations. The establishment of a common federal fund would also allow local and state agencies to purchase materials to combat mosquito viruses and offer an incentive to provide fundamental materials such as repellants to all individuals regardless of whether they carry health insurance.<sup>208</sup>

Appropriating more funds at the federal level would allow the federal government to monitor and offer incentives for states to maintain a minimum level of infrastructure. The deterioration of infrastructure following the spread of the West Nile virus demonstrates the need to maintain a minimum level, that allows local health departments to effectively monitor such diseases. Maintaining this minimum level could be achieved through subsidies and federal grants. Having an appropriate amount of infrastructure in place would allow for a calculated response that is based on previous planning. State and local municipalities would still

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205. S. REP. NO. 114-274, at 63 (2016).

206. See American Public Health Association, *The National Preparedness Report: Assessing State of Preparedness*, House Committee on Homeland Security Subcommittee on Emergency Preparedness, Response and Communications, 1, 44 (2012).

207. See *id.* at 41. Dr. Georges Benjamin, executive director of the American Public Health Association has described this phenomenon as “yo-yo funding”, pointing out the need for a more consistent approach. *Id.*

208. See Jessica Glenza et al., *Texas Moves Slowly to Combat Growing Threat of Zika Virus*, GUARDIAN (Aug. 26, 2016), <https://www.theguardian.com/world/2016/aug/26/texas-gulf-coast-zika-virus-medicaid-mosquito-repellent>. In Texas, the state has issued a standing order in an attempt to make it unnecessary for women to get a prescription for mosquito repellants. *Id.* Two weeks after it was announced that mosquito repellants would be given to women and girls on Medicaid, less than 1% of the women eligible for the product have received it. *Id.* Those ineligible for Medicaid are the group most susceptible to the disease. *Id.*; see also David Dana, *Incentivizing Municipalities to Adapt to Climate Change: Taking Liability and FEMA Reform as Possible Solutions*, 43 B.C. ENVTL. AFF. L. REV. 281, 282–84 (2016).

have an important and fundamental role to play with regards to educational outreach and vector control on the ground.<sup>209</sup>

### *C. Interagency Coordination*

When one considers the different number of agencies involved, there is a need for agencies to speak the same language. Most SHDs and LHDs have established partnerships with other agencies of government and private-sector organizations.<sup>210</sup> Although information exchanges between these varying agencies is prevalent, “formal agreements and resource sharing are much less prevalent.”<sup>211</sup> This requires developing a common vocabulary, which enables the jurisdictions affected by outbreaks to effectively communicate what is needed and ensure that it arrives quickly.<sup>212</sup> Effectively delegating responsibilities allows for essential services to arrive where they are needed. This includes, but is not limited to, the arrival of experts, volunteers, local agencies, the federal government, the private sector, and the non-profit sector. The special challenge of outbreaks is delegating federal and state personnel where the emergency conditions are experienced in many locations.<sup>213</sup>

The federal government should also identify all individuals ahead of time with a stake in outbreak decisions. The Emergency Management Assistance Compact (EMAC) is a natural interstate mutual aid agreement which enables states to share resources during disasters.<sup>214</sup> A similar agreement could focus on responses to infectious disease outbreaks. The idea behind EMAC is to mitigate the incredible variety found in disaster management policies in federal, state, and municipal entities.<sup>215</sup> This partnership offers implementation guidelines and ratification procedures between states that, in turn, create expectations and certain

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209. See Salinsky, *supra* note 101, at 16.

210. *Id.* at 22; see also INSTITUTE OF MEDICINE, *Who Will Keep the Public Healthy? Educating Public Health Professionals for the 21st Century* (2002).

211. See Salinsky, *supra* note 101, at 22; see also INSTITUTE OF MEDICINE, *supra* note 210.

212. See Ernest B. Abbott, *Law, Federalism, the Constitution, and Control of the Pandemic Flu*, 9 ASIAN-PACIFIC LAW & POLICY JOURNAL 186, 193–94 (2008).

213. See Association of State and Territorial Health Officials, *Before the Swarm Guidelines for the Emergency Management of Vector-Borne Disease Outbreaks* (2015) <http://www.astho.org/programs/environmental-health/natural-environment/before-the-swarm/>.

214. *Id.*

215. See Naim Kapucu et al., *Interstate Partnership in Emergency Management: Emergency Management Assistance Compact in Response to Catastrophic Disasters*, 69 PUB. ADMIN. REV. 297, 297–300 (2009).

responsibilities.<sup>216</sup> EMAC was passed as the result of Florida Governor Lawton Chiles's general dissatisfaction with emergency mitigation options available to his state following the aftermath of Hurricane Andrew.<sup>217</sup> States are required to individually pass EMAC legislation in order to become members of the compact.<sup>218</sup>

Health education can also be a useful disease-prevention tool, "results of regional and global surveillance programs are often available for selected arboviruses . . . such that citizens can be informed about particular arboviruses."<sup>219</sup> Diminishing mosquito proliferation also involves sanitation measures to reduce mosquito breeding grounds like flood waters.<sup>220</sup> Mosquito control also presents important environmental considerations, and without proper guidance, such decisions could have dire consequences on the environment. Only EPA-approved insecticides should be applied in a manner that reduces their environmental impact.

One example of the lack of interagency coordination revolves around the distribution of mosquito repellants to Medicaid eligible pregnant women.<sup>221</sup> The HHS issued a letter intended to clarify how low-income individuals covered by Medicaid can protect themselves so that they do not contract the virus.<sup>222</sup> In the absence of vaccines, repellents are one of the best available ways to avoid mosquito bites.<sup>223</sup> States, however, did not start the Medicaid program until August, well after Florida had its first documented case of Zika transmission.<sup>224</sup>

Another important way to develop formal processes for memorializing interagency coordination involves using assessments to identify shortcomings at the local level.<sup>225</sup> Public health agencies have used

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216. *Id.* at 297.

217. *Id.*

218. *Id.* All 50 states, D.C., and Puerto Rico have enacted EMAC legislation.

219. Griffiths, *supra* note 91, at 364.

220. *Id.*

221. *See* Glenza, *supra* note 208.

222. Jayne O'Donnell, *Feds Say Medicaid Can Pay for Mosquito Repellent to Prevent Zika*, USA TODAY (June 1, 2016), <http://www.usatoday.com/story/news/politics/2016/06/01/feds-say-medicaid-has-pay-zika-prevention-diagnosis-and-treatment/85240846/>.

223. *See* Sue Byrne, *Mosquito Repellents That Best Protect Against Zika*, CONSUMER REPORTS (Apr. 16, 2016), <http://www.consumerreports.org/insect-repellents/mosquito-repellents-that-best-protect-against-zika/>. According to the CDC, "using insect repellent is the best way to prevent diseases like Zika, dengue, and chikungya that are spread by mosquitos." CDC, *Avoid Mosquito Bites* (Dec. 17, 2016), <https://www.cdc.gov/features/stopmosquitoes/>.

224. *See* Glenza, *supra* note 208 (noting that Louisiana was the only state on the Gulf Coast that distributed the repellant in the month of June).

225. *See* Salinsky, *supra* note 101, at 23–34.

empirical-based assessments such as “state health plan development[s], performance standards, and quality improvement (QI) techniques.”<sup>226</sup> While seventy-six SHAs have adopted performance assessments, only 16% of states have implemented such programs.<sup>227</sup> Similarly, LHDs have engaged in formal performance assessments, primarily in the form of customer satisfaction surveys.<sup>228</sup> An analysis of public health systems should be based on “health status, service utilization, and community satisfaction data to assess program effectiveness.”<sup>229</sup> The CDC should work with SHDs and LHDs to ensure that assessments are made occur annually to improve health planning.

## V. THE NEED FOR AN INTERNATIONAL RESPONSE

Although this Comment focuses on governmental public health agencies at the state and federal level, this emphasis is in no way intended to minimize the importance of world health organizations. A comprehensive analysis of public health at the international level is outside the scope of this article; however, given the scope of the problem, there is a need to briefly address the importance of a coordinated international response.<sup>230</sup> The Zika virus extends beyond North and South America and has currently been documented in over sixty-five countries. The World Health Organization (WHO) has outlined a response plan that includes four main components: detection, prevention, care and support, and research.<sup>231</sup> Zika responses on an international scale have been led by Brazil, Colombia, and organizations such as the WHO, the Pan American Health Organization, and the U.S. government.<sup>232</sup> Generally speaking, the costs of investing in prevention such as vector control are less than the attributed costs of control after an outbreak.<sup>233</sup> Presently, worldwide funds remain poorly

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226. *Id.* at 23.

227. *See id.*

228. *See id.*

229. CDC, LOCAL PUBLIC HEALTH SYSTEM PERFORMANCE ASSESSMENT INSTRUMENT 1, 57 (2013).

230. *See generally* Seelke, *supra* note 20; United Nations, *Zika: UN Health Agency Launches Global Response Strategy; Member States Briefed on Outbreak*, UN NEWS CENTER (Feb. 16, 2016), <http://www.un.org/apps/news/story.asp?NewsID=53249#>.

231. WHO, *Zika Virus Outbreak Global Response*, (July 15, 2016), <http://www.who.int/emergencies/zika-virus/response/en/>.

232. *See* Seelke *supra* note 20, at 8–14.

233. Association of State & Territorial Health Officials, *Public Health Confront the Mosquito: Developing Sustainable State and Local Mosquito Control Programs*, MOSQUITO CONTROL COLLABORATIVE 1, 7 (2004).

allocated to counter the emergence of the disease and should focus on maintaining and bolstering the community-level response.

The United States cannot combat epidemic threats with only a domestic response; infectious diseases must also be fought overseas to lessen the risk of transmission in the United States. One way to expand U.S. involvement would be to increase our investment in the Global Health Security Agenda to bolster the capabilities of other countries to fight the Zika virus.<sup>234</sup> Federal agencies such as the U.S. Agency for International Development must increase their spending in the Western Hemisphere to support government responses to the Zika outbreak.

While slums and cities in the periphery of industrialization provide fertile breeding grounds for the *Aedes Aegypti* mosquito species, trade routes have also been linked to the spread of the mosquito.<sup>235</sup> Furthermore, even countries that have invested heavily in anti-*Aedes Aegypti* mosquito programs aimed at eliminating the virus, have been left helpless against the introduction of the virus by visitors.<sup>236</sup> Global health organizations and the public health community must work together to ensure that populations at the epicenter of emerging outbreaks are protected.<sup>237</sup> An important step is to improve general living standards, including improving sewage systems and offering better housing. Currently, the only methods available to combat Zika remain health education, surveillance, removal of standing water, and vector control using insecticides and larvicides.

### CONCLUSION

The Zika virus is likely to become a permanent fixture—a constant low-level threat. Until a vaccination becomes available, local health agencies, states, and the federal government must work together to effectively combat the Zika virus. While the federal government has played a significant role through FEMA in assisting states and local municipalities when natural disasters strike, the same cannot be said about infectious disease outbreaks which have not been given the same amount of attention.

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234. Press Release, The White House Office of the Press Secretary, *The Global Health Security Agenda* (July 28, 2015), <https://www.whitehouse.gov/the-press-office/2015/07/28/fact-sheet-global-health-security-agenda>. The United States announced its intent to invest more than \$1 billion primarily to prevent, detect, and respond to future infectious disease outbreaks in seventeen countries. *Id.*

235. See Eisenstein, *supra* note 16, at 3. One recent example includes China's increased investment in urban development in Africa, which may be connected to the arrival of the Asian tiger mosquito to the continent.

236. *Id.*

237. See *id.*



Congress should work on allocating federal funds that can counter the erratic expenditures of outbreaks by pooling together a common fund that allows for a rapid response to infectious disease outbreaks. Like FEMA, this fund could provide critical resources to states and municipalities including the following: instruction on pesticide use, surveillance and reporting of arboreal activity, and funding critical services and goods such as repellants. States would also retain a fundamental role through educational awareness campaigns and through the implementation of vector control programs. Additionally, there must be renewed interagency coordination both domestically and abroad, to ensure that appropriate remedial measures are taken to combat the Zika virus disease.

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