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Conspiracy Theories and the Zika Epidemic

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Abstract

After a Zika outbreak began in Brazil in April 2015, narratives blamed the virus on a variety of international actors, including chemical companies and the Gates Foundation. Many of these narratives drew upon older conspiracy theories that had circulated in Latin America during the 2009 H1N1 influenza pandemic. Whether these narratives denounced transgenic mosquitoes or pesticides, they reflected not only the fear created by a mysterious wave of birth defects but also a profound mistrust of health authorities and transnational corporations. This paper will examine the narratives that circulated on YouTube, blogs, podcasts, and other alternative media sources, which typically blamed outside forces (and their dangerous use of science) for the emergence of the virus. These popular narratives provide insight into how Latin Americans in general—and Brazilians in particular—have interpreted this epidemic in the context of globalization.

Keywords: Zika, epidemic, conspiracy theories, health communication, social media

Every pandemic proves to be fertile ground for conspiracy theories, from the outbreak of the Black Death in 1348 to the H1N1 influenza outbreak in 2009 (Smallman, 2015). By December 2015, health authorities in Brazil were aware that Zika was circulating in Brazil and that it appeared to be associated with microcephaly in infants born to Zika-infected mothers. In May 2016, researchers at John Hopkins published a study in the journal *Vaccine*, which examined Twitter messages concerning Zika in the first four months of that year (Dredze, Broniatowski, & Hilyard, 2016). The study found that many of the narratives blamed vaccines for the emergence of the birth defects and drew upon pseudo-science. A similar study noted a disturbing trend: “It is interesting that the misguided . . . posts about Zika virus were far more popular than the posts dispersing accurate public health information about the disease” (Sharma et al., 2016, p. 2).

This paper will expand upon this work to examine conspiracy theories that circulated within Latin America, including in Brazil, the epicenter of the epidemic. To do so, it will draw on material in Portuguese, Spanish, and English published on blogs, websites, newspapers, YouTube, and social media, as well as videos that can be identified through a Google search.¹ These are sources that lack a selection process or gateway but may still be influential. People’s opinions, attitudes, and beliefs are shaped by material that they receive through Whatsapp, Reddit, YouTube, and social media.

The personal/public narratives put forth through social media typically blame the virus’s outbreak and the ensuing appearance of birth defects upon a diverse array of actors: Bill Gates, Oxitec, the Rockefeller Foundation, Genetically Modified Organisms (GMOs), Monsanto, the Eugenics Movement, pharmaceutical companies, the World Health Organization, transnational companies, and the DTaP vaccine (Zúñiga, 2016; February 1, 2016). This list reflects a shared regional belief that foreign agents manipulated the global scientific establishment to impose a malevolent agenda upon a population terrorized by Zika.

Zika was first discovered in 1947 by researchers at the Yellow Fever Research Institute who were investigating primate diseases in the Zika Forest in Uganda. Although the virus existed in Africa and South East Asia in the decades following its initial identification, it had a low level of morbidity, and the number of identified cases was minimal. In 2007, the disease appeared in Yap, Micronesia (as well as Gabon), before spreading to other regions of Oceania, particularly French Polynesia in 2013 and 2014. Doctors first realized that there was an epidemic of Zika in Brazil in April of 2015, although it had begun circulating in northeastern Brazil as early as August of 2014 (Kindhauser, Allen, Frank, Santhana, & Dye, 2016; see also Diniz, 2017, p. 15).

At the time, Brazil was suffering from a multiplicity of mosquito-borne illnesses, such as Dengue and Chikungunya, which made it difficult to detect a new arbovirus (Diniz, 2017, p. 25). Based on its symptoms, Zika did not at first appear to be menacing. Many of the people who were first infected believed that there was a strange outbreak of allergies in their communities (Diniz, 2017, pp. 20, 27). In late 2015, however, doctors in northeastern Brazil began to realize that an increasing number of mothers were giving birth to children with microcephaly (reduced head size) and that these children were being born to mothers infected with Zika during pregnancy. This realization led to widespread fear, which was exacerbated by a lack of clinical knowledge. Medical experts in Brazil’s heartland at first responded to the reports with some skepticism (Diniz, 2017, p. 77); health systems were already overwhelmed by dengue (Diniz, p. 82). The Brazilian government also was slow in its initial response, perhaps because the outbreak took place far from the nation’s metropole and scientific establishment, as Debora Diniz (2017, p. 82) has suggested.

In January 2016, the Center for Disease Control (CDC) issued a travel advisory for Brazil. At the time, Brazil was in the midst of trying to prepare for the Olympics while simultaneously grappling with a massive political scandal, which culminated in the impeachment of the country's president. Although the outbreak received widespread global attention, there was a lack of confidence within Brazil regarding whether the political system could address the crisis. Throughout Latin America, other nations wondered if they would experience the same health disaster.

Perhaps the greatest factor that encouraged the prevalence of conspiracy theories was the lack of information about Zika virus. If this was a virus that scientists had discovered in 1947, why hadn't it created an epidemic earlier or elsewhere? Why hadn't microcephaly previously been associated with the virus? Perhaps most of all, families wondered why the disease had ravaged Brazil's northeast but not other regions of South America (Diniz, 2017, pp. 97-98). A host of narratives began to circulate in blogs, YouTube videos, and social media that blamed the emergence of the virus on science. These sources argued that a diverse array of groups—such as pesticide companies, the Eugenics Movement, Monsanto, and Bill Gates—were using science to impose a malevolent agenda upon Latin American peoples. For example, VM Granmisterio posted a video to YouTube on a channel dedicated to conspiracy theories (VM Granmisterio, 2016). The host stated that the virus was spread by a particular mosquito (*aedes aegypti*), which was accurate. He then, however, argued that in 2012, the company Oxitec had created a GMO mosquito with funding from Bill Gates, whom he then accused of being part of a Eugenics Movement trying to eliminate undesirable races. In the video, the host hypothesized that the GMO mosquito created by Oxitec had evolved extreme pesticide resistance, which enabled it to spread the disease. The host also suggested the Rockefeller Foundation was involved in events because it had the patent on the Zika virus; he suggested that a New World Order conspiracy was using Zika to spread fear so that non-white women would not have children.

The level of scientific knowledge displayed in the video was poor, but it nonetheless received 169,906 views by December 2016. This content was typical of many such accounts (Atraviesa lo desconocido, 2016), which blamed an unlikely array of actors for the viral outbreak. Of course, it appears implausible to suggest that Bill Gates, Oxitec, the Rockefeller Foundation, and the Eugenics Movement conspired together to unleash the Zika epidemic while maintaining complete secrecy. Yet improbable allies—and their exceptional skill at maintaining secrecy—are nearly universal themes in many conspiracy theories. These narratives also point to shared fear of science and international organizations. At the time of the outbreak, much of the media coverage in Latin America included doctors' warnings that women should delay pregnancy (Panorama, January 31, 2016). Many people in Latin America were receptive to the arguments suggesting that malevolent actors were using the Zika virus to control population growth in developing countries.

These arguments also found an audience because they built upon earlier conspiracy theories and fears. While the Rockefeller Foundation might appear to be an unlikely target for conspiracy theorizing, many conspiracy theories about Big Oil, the fossil fuel industry, and major corporations draw on powerful narratives from the early twentieth century about the Rockefellers and their influence through Standard Oil. In the 1970s and 1980s, the Rockefellers were a central element in some conspiracy theories regarding the creation of a "New World Order" or the actions of economic elites (Allen & Abraham, 1973). Even now, such narratives remain a trope in conspiracy theories regarding global affairs, including 9/11 (Knight, 2008, p. 187). Many of the same recesses of the internet where people suggest Big Oil companies are

conspiring to raise oil prices—or invade Middle Eastern countries—also contain portrayals of Bill Gates as a genocidal, global master-mind. The Gates Foundation’s promotion of vaccines, to which there is deep opposition amongst conspiracy theorists, has probably fueled these attacks. With regard to Zika, these narratives introduced suspicions that it was the DTaP vaccine, not Zika, that had caused the spike in microcephaly and also suggested that any vaccines manufactured to protect against Zika might in fact poison or sterilize entire populations. While these accounts have deep roots both in time and the United States, in developing countries they have been adapted to reflect contemporary fears regarding how corporations use new biotechnologies.

Oxitec was a frequent culprit mentioned in social media coverage of the virus because of the company’s genetically modified mosquitoes (Kadri & Trapp-Petty, 2016, p. 2). Among these mosquitos, when the male mates with the female, the offspring soon die. This represents a valuable technique to control the Zika transmitting mosquitoes. Some conspiracy theory commentators, however, suggested that not all genetically modified (GMO) mosquitoes died and that the survivors might be uniquely adapted to transmit Zika. These narratives not only circulated in Latin America but also within the United States and other developed countries. Commentators on the news aggregation and discussion platform *Reddit* had a vigorous debate—on the conspiracy subreddit—as to whether the sudden appearance of Zika was linked to Oxitec’s GMO mosquitoes (redditsucksatbanning, January 25, 2016). An Annenberg Science Knowledge Survey found that “a quarter of the public (26 percent) continues to think that scientists subscribe to the theory (which has been debunked) that genetically modified mosquitoes have caused the spread of the Zika virus. About the same number (27 percent) correctly say scientists have established that GMO mosquitoes could minimize the spread of Zika” (Annenberg Public Policy Center, 2016). A group of doctors in Latin America (Physicians in the Crop-Sprayed Villages, 2016) argued that Oxitec’s mosquitoes made the epidemic worse.

The irony was that these accounts blamed GMO mosquitos for the virus even though such mosquitos were useful tools to fight the disease. In fact, the World Health Organization (WHO) quickly published a study that disproved the alleged association: “Public perceptions—especially with the advent of fast and global communications via the Internet—are often inaccurate and the general public is often misled by conspiracy theories and catastrophism” (De Andrade et al., March 10, 2016, p. 766). Even more striking was that doctors in Argentina and Brazil had suggested that a pesticide called Pyriproxyfen might be responsible for the increase in microcephaly. This particular pesticide has been widely used in a variety of applications since the mid-1990s and has proved effective at preventing mosquito larvae from reaching adulthood. Doctors noted that during other Zika epidemics, the virus had not been associated with microcephaly (Physicians, 2016) and that the birth defects appeared only after the larvicide began to be used in their communities. In social media, authors suggested that in some parts of Brazil, Pyriproxyfen had been added to water supplies beginning in 2014. This argument was not confined to Latin America and attracted media coverage even in Asia (Navarro, 2016). This argument was also promoted by organizations that opposed genetically modified organisms by pointing out that the company that produced Pyriproxyfen had ties to Monsanto, a major pesticide producer also involved with GMOs (Robinson, February 10, 2016; Physicians, 2016). The Physicians in the Crop-Sprayed Villages report also said that the spraying was a “commercial maneuver from the chemical poisons industry, deeply integrated into Latin American ministries of health as well as WHO and PAHO” (Physicians in Crop-Sprayed Villages, 2016). It is important to note that Monsanto has been condemned for its practices

throughout the developing world, where it was the frequent subject of conspiracy theories long before Zika appeared. This negative image is certainly prevalent in Brazil, which is plagued by worries about agribusinesses.

Online forums were filled with posts which suggested that the very technologies and organizations intended to protect people were in fact responsible for the crisis. The WHO and other health authorities were failing to respond to the outbreak because they had allegedly been infiltrated by special interests, particularly by the pesticide industry. Such arguments were supported by anti-GMO websites in the developed world, which argued that Monsanto's pesticides were a more likely factor in microcephaly than Zika itself (Meyer, 2016). As Debora Diniz (2017, p. 27) has documented, arguments that pesticides (or chemical plants) might be responsible for the birth defects had first begun to circulate on social media in Brazil in December 2015 (Diniz, 33, p. 59). Ironically, key doctors at the heart of the epidemic in Brazil's northeast had quickly discounted this possibility, but by the following year, this belief had spread widely in agricultural areas throughout South America.

The rapid expansion of soy production in some rural areas has been accompanied by growing agrochemical use, particularly in Argentina, Brazil, and the eastern parts of Bolivia and Paraguay. Since the 1990s, the expansion of soybean cultivation has been so rapid that people speak of a "soy frontier" to describe how vast areas are being converted to monocrop production. Many people in these areas perceive that their health has been impacted by agrochemicals and that some health authorities and politicians have looked the other way for economic reasons. Other people in rural communities have been concerned by the cultivation of GMOs (such as Roundup®-Ready cultivars of soybean, and second-generation GM soybeans) and changes to traditional agriculture. Those citizens and doctors with negative experiences related to agrochemicals, multinational corporations, and GMOs may have been more likely to adopt narratives regarding Zika that portrayed these actors negatively.

Overall, the conspiracy theories regarding both Oxitec and Pyriproxyfen suggested that the science designed to protect people's health was itself the cause of the outbreak. Similarly, philanthropic organizations that are engaged in tropical health were frequently blamed for the outbreak. Two major private foundations that target health in the developing world are the Bill and Melinda Gates Foundation and the Rockefeller Foundation. In many videos, Bill Gates was associated with Oxitec. The Rockefeller Foundation, which has been conducting vital health work globally since its creation in 1913, was similarly blamed for the Zika epidemic. In both cases, conspiracy theorists argued that these organizations were in fact driven by the Eugenics Movement, which wished to control populations in Latin America.²

Some of these arguments draw on sources that date back to 18th century Europe, particularly referring to the Illuminati (an alleged secret society created during the Enlightenment), which became an umbrella term for organizations that brought together major corporations and scientific foundations to achieve global domination. In Colombia, one man who had been infected by the Zika virus created a YouTube video that blamed the Rockefeller Foundation for Zika and the Illuminati, which he argued wished to persuade women not to have children (Guardo, February 6, 2016). Another Spanish language YouTube video argued that this disease had been created in a lab by the Rockefeller Foundation for the purpose of eugenics, at the instigation of the Illuminati (Contraperiodismo, February 4, 2016). The video had 59,553 views in December 2016.

The Rockefeller Foundation has funded a wide array of projects through to fight epidemic disease throughout the region, which makes it an unlikely villain. Nevertheless, the

criticism of the Rockefeller Foundation became so intense that the foundation felt compelled to place a statement regarding Zika on its website:

Zika was first discovered at the Foundation-supported Virus Research Institute in Entebbe, Uganda in 1947, and a sample of the virus was given to ATCC (a nonprofit organization that authenticates and preserves microorganisms for research) by J. Casals of The Rockefeller Foundation in 1953. This appears to be the source of the rumor that The Rockefeller Foundation “patented” the virus. In fact, there is no indication that the Rockefeller Foundation holds or has filed for any patent on the Zika virus or has received any royalties or payments. (Rockefeller Foundation, 2016)

Conspiracy theorists have also pointed their finger at multiple other actors, almost all multinational corporations, foundations dedicated to public health, or global health organizations. An article by Tami Canal (2016) on the “March Against Monsanto” website blamed the DTaP vaccine, Oxitec, the Bill and Melinda Gates Foundation, the CDC (for spreading lies), and the Eugenics movement, all in one brief piece. These narratives argue that Zika has been created by a network of powerful global actors that misused science for financial gain.

The Context That Has Encouraged Conspiracy Theories

A number of factors combined to make the Zika outbreak amenable to conspiracy theories: (1) The virus was new to all of Latin America, so people had little solid data; (2) the virus seemed to be behaving very differently in Latin America than it had earlier in Africa, and there was no obvious reason for this; (3) microcephaly was a frightening condition, which discouraged women from having children; (4) government officials advised people to practice abstinence, which people perceived to be impractical; (5) Brazil was experiencing a national political crisis caused by a corruption investigation, which undermined popular trust in government; and (6) Latin America received little support from the international community during the outbreak so that its citizens felt abandoned (McNeil Jr., 2017; Diniz, 2017, p.106).

A historical context also shaped these conspiracy theories. Pandemics always raise issues related to the question of trust (Smallman, 2015). Will health authorities make the correct choices for people’s health, or will they be influenced by special interests with a profit motive? Because these issues involve the most personal of spaces—the body—they are particularly emotional. People dislike the idea of randomness. The idea that a disease is spreading because of its introduction to an immunologically naive population may be more frightening than the idea that it was deliberately introduced as a part of some malevolent plan. If people can understand the conspiracy, they may perceive that they can control their fates. Similar theories have circulated about many other epidemics (Smallman, 2013, 2015) in nations as diverse as Indonesia and Switzerland. Still, many of the narratives that circulated in Latin America concerning Zika reflected regional concerns.

Developing countries—even ones with large economies and populations—do not control global health infrastructure, although they can be important actors in health affairs on the global stage. Brazil, for example, played a key role in lowering the price of HIV medications in the late 1990s, which helped to make this treatment available to millions globally (Smallman, 2007, pp. 67-112). In addition, in the late 1990s and early 2000s, Brazil, India, and other developing nations allied with nongovernmental organizations (NGOs) in a battle against major pharmaceutical companies to make medications for HIV available at a reasonable price. Although they won, the history of this battle has shaped how people in Latin America perceive

the United States and its relationship with pharmaceutical corporations. People believe that foreign actors shape the region's health and that the United States dominates global health architecture. The reality is that health decisions often are made outside of Latin America, which contributes to the formation and appeal of conspiracy theories in the area.

Historically, the United States has a long history of interventions in the region, such as the Mexican-American War (1846-48), William Walker's invasion of Nicaragua (1856-57), the Spanish American War (1898), President Teddy Roosevelt's intervention in Colombia to create Panama (1903), multiple invasions of Caribbean countries (early twentieth century), the Bay of Pigs in Cuba (1961), the Contra War against Nicaragua (1979 to roughly 1990), Plan Colombia (1998 to present), the drug war in the Andean States (1990s to present), and the 2008 Mérida Initiative to fight the drug war in Mexico. Such interventions have not been confined to the distant past. For example, in 2015, Wikileaks revealed that the U.S. National Security Agency had tapped the phones of both Brazil's President Dilma Rousseff and her top aides. This so angered Brazilian leaders that they planned to create a new undersea communications cable to Europe so that telecommunications would no longer be routed through the United States. This fear has led to a mistrust of not only the United States but also of major multinational corporations that tend to be identified with it. For example, in 1954, an American corporation named United Fruit Company successfully lobbied the U.S. government to overthrow Guatemalan President Jacobo Árbenz. Because of such historical examples, major pharmaceutical and agricultural companies are often viewed as a tool of U.S. government interests. This political and historical reality creates an atmosphere of mistrust conducive to conspiracy theories.

In addition to the history of U.S. imperialism, economic globalization is often perceived to be intimately associated with the U.S. In part, this reflects how the United States has historically dominated the Bretton Woods institutions (The World Bank, International Monetary Fund, and World Trade Organization), which define the global architecture for financial globalization. During the 1990s, the U.S. government worked to advance the Washington Consensus through its influence within these organizations. The United States had economic power because it was the main trading partner for most Latin American countries. This has led to a mistrust of globalization in the region and has perhaps fed the rise of the left in Latin America from the 1990s onwards, although this tide is now receding. This fear of globalization is matched by a legitimate concern that the global science and research infrastructure is dominated by profit-making corporations in the United States and Europe, which disregard the needs of developing countries. Bill Gates himself has said that capitalism is flawed, given that more money is currently being invested in cures for baldness than for a cure for malaria (Chu, 2013).

While there are historical and political reasons for these concerns, these beliefs have led Latin Americans to distrust the very actors that may help to combat the Zika epidemic. There is a deep fear of GMOs (including GMO mosquitoes) despite the fact that Oxitec's technology will be much needed until a vaccine can be developed. The conspiracy theories also create a narrative of victimhood that not only distracts from real factors spreading the epidemic but also undermines the activities of local health officials. Mosquitoes multiply in part because of poorly planned urbanization; lack of health services in favelas³—Brazil's large, working class urban developments; lack of potable water (which leads people to use storage devices that create spaces for mosquito larvae); and lack of money for mosquito control, screens, etc. In this sense, conspiracy theories are dangerous because they can dissuade people from focusing on the real factors that may minimize their risks of being infected by Zika.

Conspiracy Theories in Brazil

Brazil has been influenced by many of the conspiracy theories that have circulated regarding Zika in other regions, particularly in North America. Andrew Jacobs (2016, p. A6, L) emphasized this point in a *New York Times* article: “Though Brazil is at the center of an epidemic now affecting more than two dozen countries, many of the dubious claims about Zika are born abroad, their purveyors a well-known coterie of critics of genetically modified crops and creatures.” Because many Brazilians are aware of the ethical debates surrounding soy production, particularly concerning the use of agrochemicals and GMOs, these theories proved persuasive. As Jacobs discussed, the Brazilian government became so concerned by these narratives that it has used social media, particularly Twitter, to counter these rumors. This work has proved necessary because conspiracy theories have hampered health authorities from spraying against mosquitoes in some affected areas. As James Hider (2016) noted in the *Times*: “Social media has been awash with speculation that a larvicide put in the water by many health authorities was behind the outbreak of microcephaly. The federal health minister vouched for the safety of the product, but one state in southern Brazil has banned it.” As conspiracy theories spread through social media, they seriously hampered the work of health professionals on the ground.

Brazil was not only the Latin American country most impacted by the Zika epidemic, but it also had the largest number of babies born with microcephaly. For this reason, one might have expected to find that its conspiracy theories differed sharply from those elsewhere in the region. Instead, the narratives were very similar. For example, one Brazilian YouTube video (E Se For VERDADE, 2016) connected the outbreak to the Illuminati, Bill Gates, and big pharmaceutical companies. Although poorly organized, it incorporated the same topics as in Spanish-language coverage of the Zika epidemic. Similarly, in a popular science magazine, the journalist Bruno Rizzato (n.d.) described theories that accused Oxitec, the Rockefeller Foundation, and Bill Gates and critiqued each of them in turn. The Brazilian edition of GQ magazine (GQ Globo, 2016) described how these same theories were circulating in Brazil, often in emails or the messaging app Whatsapp; this app does not require a data plan and has therefore grown dramatically in developing countries. From the very first cases of Zika, both doctors and patients in Brazil’s northeast turned to Whatsapp to communicate with their peers as they dealt with their professional and personal isolation (Diniz, 2017, pp. 64, 102). In sum, the conspiracy theories in Brazil resemble those elsewhere in Latin America, perhaps because people can easily communicate across borders digitally. Indeed, what is impressive about the Brazilian narratives is that they draw on social media, blogs, and videos from other continents.

Conspiracy Theories and Other Outbreaks

Academics are typically disdainful of conspiracy theories, which are omitted entirely from both courses and textbooks on theory in the social sciences (Smallman, 2016, p. 22; Clarke, 2002, p. 131; Kellman, 2012, p. 3). In part, academics distrust conspiracy theories because they are folk constructs, which are spread outside the journals and university publications that are the typical venue for academic theories in the social sciences. Nonetheless, conspiracy theories merit study because they can have immense power, as the antivax movement in the aftermath of the Andrew Wakefield case demonstrated. As Dredze, Broniatowski, & Hilyard (2016, p. 3441)

have argued, these beliefs may undermine efforts to have people adopt a vaccine for Zika when one becomes available.

Conspiracy theories always appear with every major outbreak, such as the Ebola epidemic that began in 2013 in West Africa, particularly Guinea, Liberia, and Sierra Leone. By September 2014, many health workers had been infected, but some people denied the existence of the virus, even as case counts rose. Conspiracy theories circulated that the disease was a myth created by the government to extract funds from international donors. This belief sometimes had fatal implications. For example, in August 2014, a crowd of men attacked an Ebola clinic in Monrovia, Liberia, with the intent of removing 17 patients from the facility. All these patients had tested positive for the Ebola virus. A journalist reported that the attackers were yelling “There is no Ebola” as they entered the clinic (Zoker & Chen, 2014). The men also carried away a bloody mattress (Zoker & Chen, 2014). What this case emphasized was the depth to which people mistrusted official explanations of the disease.

Conclusion

Conspiracy theories matter because they impact peoples’ behavior at both the individual and policy level. Conspiracy theory beliefs may dissuade people from taking steps to protect their health even in their own homes. In December of 2015, the Brazilian government sent 220,000 soldiers door to door with health inspectors in affected parts of the country, such as the major city of Recife. The task of the health officials was to look for locations that might house mosquito larvae, to spray pesticide, and to educate the populace (Diario de Pernambuco, 2015). Despite the painful history of military rule, in some areas, these health inspectors were welcomed. In other cases, people denied the inspectors access to their homes, a decision that doubtless reflected countless personal and political factors. Although there is no public data on why people turned away these figures, it seems probable that in some cases, people did not want to give the health officials and soldiers access to their homes because people mistrusted the authorities or because they doubted that preventing Zika transmission would effectively curb the rash of birth defects being seen in the area.

There are no good studies of how conspiracy theories shaped peoples’ behavior during the epidemic. What we do know is that YouTube videos, Whatsapp postings, and other social media posts discussing conspiracy theories and Zika were viewed millions of times during the epidemic. This number is far higher than the number of views of articles, videos, or links sharing reliable sources of information regarding how people could protect themselves from infection, and likely impacted some peoples’ behavior. On a personal level, why would a young woman of reproductive age use mosquito repellent—or ask her partner to use a condom for months after Zika infection—if she believed that the birth defects being associated with Zika were actually caused by pesticides or vaccines?

Conspiracy theories influence not only personal choices but also public policy. Some Brazilian state leaders created serious fears about pesticides at the same moment when vector control was a key tool to control the spread of Zika. Oxitec’s GMO mosquitoes presented a non-chemical option to the control of mosquito populations. During the Zika outbreak, however, the company was so demonized that it was difficult for any politician or health official to suggest the Oxitec mosquito as an alternative to protect the populace.

Conspiracy theories pertaining to the Zika outbreak were spread in a virtual world, but they had an impact in the real one and quickly spread from the favelas of Brazil to the cities of

southeast Asia. These conspiracy theories not only limited the health authorities' ability to mobilize the populations in both regions but also took valuable time to address, time that could have been better spent on many key tasks. Just as fear of vaccines can create a favorable environment for a measles outbreak, so too can conspiracy theories pose a health communication problem for those fighting an epidemic, which requires a sustained public education campaign to address (Feller, 2016). Some excellent work has already been done by the *New England Complex Systems Institute*, which produced a detailed response to conspiracy theories (Parens & Bar-Yam, 2016). In order to overcome emerging infectious diseases, policy makers need to fight not only viral transmission but also the conspiracy theories that circulate widely on social media. Instead of being ignored by academics, these theories should be included in every social science theory course and textbook, particularly in the fields of communications, global studies, psychology and public health. While a crisis may suddenly bring these theories into the public eye, most of these narratives recycle long-standing beliefs regarding key actors, such as the Illuminati, the Rockefeller Foundation, Bill Gates, and Monsanto. These narratives gain power by evoking feelings of anger, mistrust, and fear. By carefully investigating these theories before a crisis, health communications plans can be created for policy makers, national leaders, and medical professionals to use during outbreaks.

Notes

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² Some commentators have suggested that the Bill and Melinda Gates Foundation, the Rockefeller Foundation and the Eugenics Movement have a shared and dangerous agenda, which also promotes GMOs and vaccines. These same conspiracy theorists also link the Gates Foundation with the Illuminati. See the Alex Jones Channel, March 7, 2013; Alex Jones Channel, August 23, 2014; Alex Jones Channel, August 29, 2014.

³ Brazil's favelas emerged in the late-nineteenth century. With the end of slavery, poor and rural people -who were often of African ancestry- moved to cities in search of opportunities. These new communities were largely ignored by municipal governments, so they existed in the informal sector, and typically lacked services. After World War Two, these communities grew rapidly, until many became large urban areas largely outside the control of the state.

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