



International Cooperation to Combat Zika Virus Transmission

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Introduction

Zika virus epidemic of 2015-2016 demonstrated the critical need for greatly improved global cooperation on pandemic health issues. In a short period of time, the Zika virus spread to dozens of states world-wide and infected hundreds of thousands. Tragically this resulted in over 2,000 reported cases of microcephaly in newborns in Brazil alone.¹

The Zika epidemic is not over. It continues to infect people around the world. Should the virus evolve slightly, new vulnerabilities could emerge overnight. Preparedness remains as important as ever.

Because of the global impact of this virus, it is crucial for the UN to play a leading role in coordinating a truly global response. As globalization deepens and the ease of travel continues to increase, there is a high likelihood of the recurrence of a new Zika virus epidemic in the future and the world must be prepared.

The Zika problem also stand out as a symbol of international preparation for rapidly moving epidemic disease. The problems confronted when dealing with Zika are typical of innumerable infectious diseases. If the international community cannot deal effectively with Zika, it is vulnerable many other health threats. Correspondingly, buy better preparing

for the return of Zika, the world prepares for worse challenges.

The difficulties of coping with the Zika epidemic point to larger issues facing the World Health Organization. While the WHO leads interactional action on epidemics, it is hindered by the internal politics of Member States and the procedures they have worked out, procedures often designed to serve political goals and power-balancing between the 194 Member States (more members than the United Nations) than to control disease.

World health policy is largely a question of priorities; priorities for publicly and attention, spending and effort. It is impossible to stress everything. Public health resources are limited everywhere. Many public health problems are readily solved with more resources—more money, more personnel and more drugs—but there is never enough to do everything.

Despite the horror of epidemics like Ebola (which usually is fatal) and Zika (which is not fatal but can causes extreme birth defects), every year other infectious diseases kill far more, especially malaria and dysentery, the two greatest infectious killers. Both are readily treated, but still kill huge numbers. The Ebola virus outbreak of 2014-15 left more than 11,000 people dead, mostly in Guinea, Liberia and Sierra Leone. It also left uncertainty about the ability of the WHO to respond rapidly and flexibly.²

¹ Statista. "Zika virus – Statistics & Facts." December 2017, <https://www.statista.com/topics/3002/zika-virus-disease/>.

² Lena Sun, Brady Dennis, Lenny Bernstein, Joel Achenbach, 'Out of control: How the world's health organizations failed to stop the Ebola disaster', *Washington Post*, 4 October 2014, <https://www.washingtonpost.com/sf/national/2014/10>

[/04/how-ebola-sped-out-of-control/?utm_term=.b5c9d412b30f](https://www.washingtonpost.com/sf/national/2014/10/04/how-ebola-sped-out-of-control/?utm_term=.b5c9d412b30f) ; and Kathleen Caulderwood, 'World Health Organization Response to Ebola Outbreak 'Behind The Curve,' Report Says', *International Business Times*, 12 May 2015, <https://www.ibtimes.com/world-health-organization-response-ebola-outbreak-behind-curve-report-says-1918677>



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But epidemics are not uncommon. More recently, a cholera outbreak in Zimbabwe has killed at least 20 people and sickened 2,000 others, leading the country's health minister said on Tuesday, as he declared a state of emergency in the capital, Harare. Cholera is a bacterial disease spread by fecal matter coming into contact with drinking water or food; in places with inadequate sewer systems, the bacteria can easily spread to wells. It causes extreme diarrhea that can lead to fatal dehydration, but when treated with fluids and antibiotics, the death rate is very low. The cholera outbreak, coming so unexpectedly, as a symptomatic of larger unresolved issues in the global system of epidemic suppression and control.³

Zika will not be the last or worst infectious outbreak, but it remains a serious threat. The ability to minimize and eliminate its threat is a test of the effectiveness of the WHO's entire approach to global epidemic disease suppression and eradication.

Background

The Zika virus is spread by daytime-active *Aedes* species mosquitoes. The disease has been known since the 1950s, originally in a narrow equatorial belt in Africa and Asia. In 2007, the virus began to spread eastward, across the Pacific Ocean to the Americas. It was in the Americas that it reached epidemic proportions, culminating in the 2015-16 Zika epidemic which garnered global attention.



The WHO's Executive Boardroom, Geneva. The 34-member Board meets yearly in May. It appoints the Director-General every five years

During the epidemic, an outbreak of the Zika virus spread from Brazil to other parts of North and South America and eventually affected several islands in the Pacific and Southeast Asia. This rapid spread caused the World Health Organization (WHO) to predict the spread of the virus through most of the Americas by the end of 2016.⁴

The fever which often accompanies infection by the Zika virus is characterized by mild symptoms such as a fever or rash or there may be no symptoms at all. Carriers often are unaware they have or can spread disease.

Zika's greatest danger is to pregnant woman and their unborn children. This transmission from mother to fetus can result in microcephaly, severe brain malformations, and other serious birth defects.^{5 6} Furthermore, it is also possible for the Zika virus to be transmitted from an infected male to his sexual partners which means

³ Jeffrey Moyo and Richard Pérez-Peñ, 'Zimbabwe Declares Cholera Emergency as Disease Spreads in Capital', *New York Times*, 11 September 2018, <https://www.nytimes.com/2018/09/11/world/africa/zimbabwe-cholera.html>

⁴ Tom Miles and Ben Hirschler. "WHO sees Zika outbreak spreading through the Americas". *Reuters*. 25 January 2016, <https://www.reuters.com/article/us-health-zika-idUSKCN0V30U6>.

⁵ CDC. "CDC Concludes Zika Causes Microcephaly and Other Birth Defects". *CDC Newsroom*. 13 April 2016, <https://www.cdc.gov/media/releases/2016/s0413-zika-microcephaly.html>.

⁶ WHO. "Zika Virus Microcephaly And Guillain-Barré Syndrome Situation Report". *World Health Organization*. 7 April 2016, http://apps.who.int/iris/bitstream/10665/204961/1/zik-asisitrep_7Apr2016_eng.pdf?ua=1.



those impacted may not have even traveled to at risk regions.⁷

In February 2016, the WHO declared a Public Health Emergency of International Concern as it became clear that the Zika virus was related to birth defects and neurological problems.⁸ This is the same designation that was given to the 2014 Ebola outbreak and it spawned a public awareness campaign aimed at warning travelers about affected regions.

The WHO declaration was echoed by a joint statement issued by more than 30 global health bodies calling for increased information sharing and free access to data and results regarding the Zika outbreak.⁹

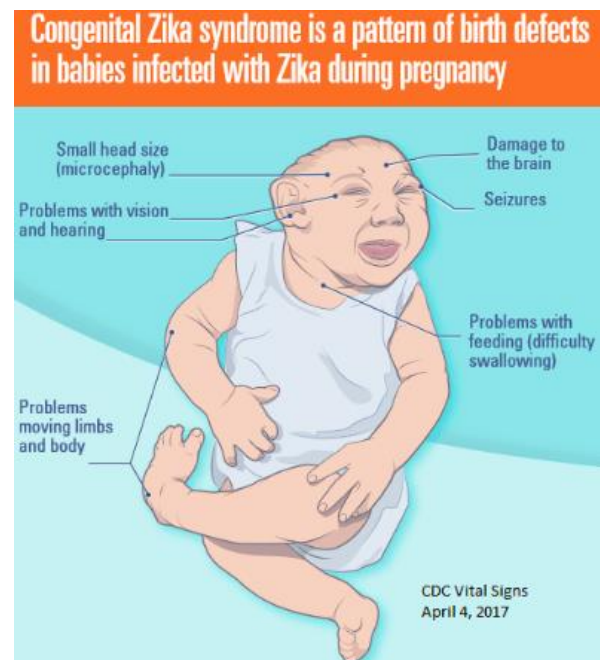
Possibly due to the public awareness campaign and influenced by the somewhat seasonal aspect of the virus (mosquitoes proliferate during only select months in many regions of the world), by the fall of 2016 the epidemic was significantly reduced.

In November 2016, following a meeting of its Emergency Committee on Zika, the WHO said that the infectious disease and its associated consequences no longer presented a public health emergency of international concern.¹⁰

The last reported case in the continental parts of the United States was in Texas in September of

2017, although cases continue to be reported elsewhere, mostly in Latin America.¹¹ As of 2018, Zika remains endemic in Puerto Rico, for example, but the number of reported cases has dropped from around 8,000 per month in August 2016 to around 10 per month as recently as April 2017.¹²

Zika Syndrome



Larger numbers of cases continue to be reported in other parts of the Caribbean, Central America

⁷ CDC. "CDC encourages following guidance to prevent sexual transmission of Zika virus". CDC Newsroom. 23 February 2016, <https://www.cdc.gov/media/releases/2016/s0223-zika-guidance.html>.

⁸ WHO. "WHO Director-General summarizes the outcome of the Emergency Committee regarding clusters of microcephaly and Guillain-Barré syndrome". World Health Organization. 1 February 2016, <http://www.who.int/en/news-room/detail/01-02-2016-who-director-general-summarizes-the-outcome-of-the-emergency-committee-regarding-clusters-of-microcephaly-and-guillain-barr%C3%A9-syndrome>.

⁹ Hannah Isom. "Data sharing in public health emergencies," Wellcome Trust Blog. 10 February 2016, <https://wellcome.ac.uk/news/sharing-data-during-zika-and-other-global-health-emergencies>.

¹⁰ WHO. "No longer an international public health emergency, Zika is 'here to stay.'" UN News. 19 November 2016,

<https://news.un.org/en/story/2016/11/545872-no-longer-international-public-health-emergency-zika-here-stay-un-health-agency>.

¹¹ Jerome Groopman. "Is Zika Gone for Good?" The New Yorker. 2 September 2017, <https://www.newyorker.com/tech/elements/is-zika-gone-for-good>.

¹² Julie Steenhuysen. "Puerto Rico Declares Zika Outbreak Over, CDC Maintains Travel Warning" Reuters. 2017, <https://www.usnews.com/news/us/articles/2017-06-05/puerto-rico-declares-zika-outbreak-over-cdc-maintains-travel-warning>.



and equatorial regions of South America. Incidences of Zika have dropped significantly in many countries, but it is still considered a significant problem in a tremendous number of primarily equatorial states.¹³

Current Situation

Although the emergency status of the Zika epidemic has been downgraded, there is still no vaccine or cure for the disease and the impacts on babies born with it are serious.

According to the WHO, although the associated consequences of Zika no longer present a public health emergency, there remains a need for sustained effort to address the disease. The early 2016 declaration of a Public Health Emergency of International Concern (PHEIC) was instrumental in leading the world to an urgent and coordinated response. The WHO played a leading role in providing the understanding that Zika virus infection and its associated consequences constitute a significant long-term problem. The WHO recognizes that this problem must be managed in the future by joint efforts of the WHO, individual states and other international health partners.¹⁴

Beyond the WHO, virtually every Member State's health agencies are involved, as are regional health organizations such as the Pan-American Health Organization (PAHO). Many

WHO Member States prefer to work through their own domestic agencies rather than invest heavily in international or regional organizations.

One Member State agency involved in the response to Zika has been the United States Centers for Disease Control (CDC). On 8 February 2016, the CDC elevated its response to Level 1, the highest response level at the agency.¹⁵ The United States Congress awarded \$350 million in funding to the CDC under the Zika Response and Preparedness Appropriations Act of 2016.¹⁶

Role of the UN and WHO

The WHO, has played a leading role in the global response to the 2015-2016 Zika outbreak. In February 2016, it declared a Public Health Emergency of International Concern. In the period since this call to action, the global research community has responded with the introduction of 45 vaccine candidates to the R&D pipeline, some of which have moved into human clinical trials.¹⁷

In May 2016, then-UN Secretary-General Ban Ki-moon established a *UN Zika Response Multi-Partner Trust Fund* to generate and ensure the effective use of the required funding to develop a response to Zika.¹⁸ The most important guidance which has been put forth by the UN's

¹³ U.S. Department of State. "Zika Virus Information for Travelers." U.S. Department of State. 16 August 2018,

<https://travel.state.gov/content/travel/en/international-travel/before-you-go/your-health-abroad/zika-virus-information-for-travelers.html> .

¹⁴ WHO. "No longer an international public health emergency, Zika is 'here to stay.'" UN News. 19 November 2016,

<https://news.un.org/en/story/2016/11/545872-no-longer-international-public-health-emergency-zika-here-stay-un-health-agency>.

¹⁵ CDC. "CDC encourages following guidance to prevent sexual transmission of Zika virus". CDC Newsroom. 23 February 2016,

<https://www.cdc.gov/media/releases/2016/s0223-zika-guidance.html>.

¹⁶ Alex Murtha. "Clawson to introduce Zika prevention legislation when House reconvenes." *Homeland Preparedness News*". 29 August 2016, <https://homelandprepnews.com/countermeasures/195-95-clawson-introduce-zika-prevention-legislation-house-reconvenes/>.

¹⁷ WHO. "Progress toward discovery of Zika virus vaccines and therapeutics." WHO Emergencies. 23 July 2018, <http://www.who.int/emergencies/diseases/zika/discove-ry-of-vaccines/en/>.

¹⁸ WHO. "WHO/PAHO and partners set out Zika strategic response plan for the next 18 months." WHO News. 2 June 2018, <http://www.who.int/news->



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WHO is the revised *Zika Strategic Response Plan* which was put forth in June of 2016.



WHO headquarters in Geneva

In June of 2016, the UN issued a revised strategic response plan to combat the transmission of the Zika virus. The Zika Strategic Response Plan emphasized prevention and management of medical complications caused by Zika virus infection. The plan highlights several specific characteristics of the Zika outbreak that require a collaborative, global response and support. These include:

- The potential for further international spread of Zika virus due to wide distribution of the *Aedes* mosquitoes which transmit the Zika virus;
- The lack of population immunity in areas where Zika virus is circulating for the first time;
- The absence of vaccines, specific treatments and rapid diagnostic tests; and,
- Inequalities in access to sanitation, information and health services in affected areas.¹⁹

November 2016, the WHO downgraded the crisis by declaring the Zika virus no longer

[room/headlines/16-06-2016--who-paho-and-partners-set-out-zika-strategic-response-plan-for-the-next-18-months](https://news.un.org/en/story/2016/06/532432-new-room/headlines/16-06-2016--who-paho-and-partners-set-out-zika-strategic-response-plan-for-the-next-18-months).

¹⁹ UN Health Agency. "New Zika response strategy to focus on preventing, managing medical complications." UN News. 17 June 2016, [https://news.un.org/en/story/2016/06/532432-new-](https://news.un.org/en/story/2016/06/532432-new-room/headlines/16-06-2016--who-paho-and-partners-set-out-zika-strategic-response-plan-for-the-next-18-months)

represented a public health emergency. Despite this, the UN has continued to play a leading role in developing solutions to combat future outbreaks of Zika.

Part of this continued effort is shown in the WHO's 2018 Blueprint Priority Disease list. In February, the WHO released a list that determines which diseases and pathogens to prioritize for research and development in public health emergency contexts. Diseases make this list due to their epidemic potential and for which there are no, or insufficient, countermeasures. Given its potential to generate a future public health emergency and the absence of treatment or vaccines, there is an urgent need for accelerated research and development for Zika. Other diseases on the list include Ebola, Lassa fever and SARS.²⁰

Most recently, in April 2018, a UN coordinated partnership between the UN International Atomic Energy Agency (IAEA), the UN Food and Agriculture Organization (FAO) and the non-profit group WeRobotics released a drone able to implement Zika prevention efforts at the local level through the delivery of Sterile Insect Technique (SIT) to control mosquito populations.

SIT is a form of insect birth control which uses radiation to sterilize male mosquitos that are then released to mate with wild females. As these do not produce any offspring, the insect population declines over time. The use of drones represents a significant breakthrough for large-scale, cost-efficient releases over densely populated or densely forested areas. Brazil plans to start using the drone-based system in select urban and rural areas starting in January 2019, at the peak of the mosquito season.²¹

[zika-response-strategy-focus-preventing-managing-medical-complications-un](https://news.un.org/en/story/2016/06/532432-new-room/headlines/16-06-2016--who-paho-and-partners-set-out-zika-strategic-response-plan-for-the-next-18-months).

²⁰ WHO. "List of Blueprint priority diseases." WHO R&D Blueprint. February 2018, <http://www.who.int/blueprint/priority-diseases/en/>.

²¹ UN Health. "Mosquito-packed drones ready to join fight against Zika and other deadly diseases." UN



Six WHO regional offices

Region	Headquarters
Africa	Brazzaville, Republic of Congo
Europe	Copenhagen, Denmark.
South-East Asia	New Delhi, India
Eastern Mediterranean	Cairo, Egypt
Western Pacific	Manila, Philippines.
The Americas	Washington D.C., USA.

Country and Bloc Positions

African Union – Following the 2015 Ebola crisis, in April 2015 the African Union formalized a collaboration with the US CDC which created the African Centres for Disease Control and Prevention (African CDC). The African CDC quickly established travel advisories and made recommendations regarding importation prevention once the Zika epidemic began.²² This may have set the stage for a response to Zika in Africa, and during the 2015-2016 epidemic there was no major outbreak reported. Despite this, the Zika virus is known to occur in Africa and as such its prevention is

certainly of interest to the African Union. Some African countries have resources to invest in the threat, such as Algeria, Angola, Nigeria and South Africa. Others are dependent on funding from donor governments.

China – China has managed to avoid an outbreak of Zika on its mainland thus far. During the height of the 2015-2016 outbreak, China rapidly implemented disinfection protocols (the killing of live mosquitos, their larva and their eggs) on all cargo shipments originating from countries with reported Zika infections. These protocols may have been instrumental in preventing the spread of the virus to the Chinese mainland.²³ China is increasingly willing to offer personnel and financial support to help countries affected by international calamities of all sorts. Its funding for global public health is growing as well.

European Union – The European Union has been especially proactive in its response to the threat of Zika. Early in the epidemic, it initiated consultations with the Global Research Collaboration for Infectious Disease Preparedness (GloPID-R).²⁴ The European Centre for Disease Prevention and Control (ECDC) is a special branch of the European Union which is dedicated to the prevention of infectious disease. In 2016 the ECDC released a policy briefing titled “Preparing for Zika in the EU” which focused on preparedness measures should the virus have spread to member states. The ECDC has developed risk assessments based on WHO guidelines and implemented travel advisories for areas impacted by Zika. These risk assessments are updated annually for current analysis of the threats posed by the Zika

News. 18 April 2018,

<https://news.un.org/en/story/2018/04/1007672>.

²² Africa CDC. “Africa Centers for Disease Control and Prevention (Africa CDC) Report Calls Strict Preventive Measures Before, During and After Travel to Rio-De Janeiro-2016 Olympic to Reduce the Risk of Zika Virus (ZIKV) Importation.” 5 August 2016, <https://au.int/en/pressreleases/20160805-0>.

²³ Britannia P&I. “Zika Virus: Chinese Regulations.” Britannia P&I, <https://britanniapandi.com/zika-virus-chinese-regulations/>.

²⁴ European Commission. “Zika: Commission activities in the area of Zika.” European Commission Research Areas, <https://ec.europa.eu/research/health/index.cfm?pg=area&areaname=zika>.



virus.²⁵ Thus far, the Zika virus has not been locally contracted in any EU member states. Furthermore, the EU has invested EUR 45 (USD 53) million to research prevention of infectious outbreaks such as Zika and three projects targeting the research gaps on Zika were selected for funding under EU Horizon 2020.

Latin America – Latin American governments work largely through the Organization of American States (OAS). The OAS has a significant interest in the prevention of a recurrence of the Zika virus as Brazil was one of the hardest hit states. Despite this vested interest, the OAS has permitted the WHO and the PAHO to take the leading role in addressing concerns over the spread of the virus. As recently as September 2018, the PAHO briefed the OAS at the 56th Directing Council regarding the development of a plan to strengthen member state capacities to stem the spread of vector-transmitted diseases such as Zika.²⁶

Russia – Russia faces little threat from Zika as the natural climate is not conducive to the spread of the disease. It supports WHO activity, but is unwilling to donate more funding. It has offered technical personnel and resources, if funding can be found.

Southeast Asia – Zika spread into Southeast Asia in June of 2016. In response, the Association of Southeast Asian Nations (ASEAN) increased member state information sharing and joint research on the virus.²⁷ Southeast Asia does face a significant risk as the Aedes mosquito (the carrier of the virus) is endemic in the region. Thus far, however, Southeast Asia has been fortunate to avoid a large-scale outbreak. In September 2016 at the ASEAN Summit, Zika was discussed as a subject of preventative

concern. The ASEAN Health Ministers further spoke about the need of the Southeast Asian community to promote the prevention of public health threats.

The United States – In 2016, the United States Center for Disease Control (CDC) issued travel guidance for affected countries and elevated its response to Level 1, the highest response level at the CDC. Congress has been active in funding Zika response and research with the February 2016 bill titled the Zika Authorization Plan Act of 2016 (H.R. 4562). Under the leadership of President Donald Trump, the United States is trying to reduce its reliance and support for international organizations.

Proposals for Action

The WHO's response to the Zika outbreak of 2015-2016 was far more adequate than what many in the international community saw with the 2014 Ebola response. Although the status of the virus has been downgraded, the WHO and other UN bodies continue to remain active in collaborating on the issue. Despite the relatively low incidence of Zika infections currently, prior infections have generated long-term health consequences for states such as Brazil with high rates of infant malformations due to the virus. Furthermore, there remains a looming threat of a resurgence due to the prevalence of the Aedes mosquito around the world. Some proposals to be considered include:

Permanent Zika observatories? The Member States of the WHO traditional have sought to centralize its resources in the name of efficiency. With a relatively small budget and huge expectations, this was a logical response. It also

²⁵ ECDC. "Preparedness information for Zika virus disease." European Centre for Disease Prevention and Control, <https://ecdc.europa.eu/en/zika-virus-infection/preparedness>.

²⁶ PAHO. "PAHO Director Briefs OAS Ambassadors on Topics to be Addressed in the 56th Directing Council." Pan-American Health Organization. 13 September 2018, https://www.paho.org/hq/index.php?option=com_con

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²⁷ ASEAN. "ASEAN Health Ministers respond to Zika virus". 20 September 2016. <http://asean.org/asean-health-ministers-respond-to-zika-virus/>.



served the internal organizational needs to share rewards among the Member States. But the sudden and unexpected appearance of epidemics. There widespread recognition of a need for a more dispersed approach. The WHO has six regional offices. How to create more without diluting resources counterproductively?

Regional disease observatories, if locating the countries where epidemics are most commonly found, would better accelerate reporting and responses. But regional observatories are costly to establish and maintain. And there is little possibility of additional funding. More regional observatories would have to small and efficient, even then requiring resources to be taken from existing programs. As always in public health, it's largely about priorities.

Specialized emergency dispatch teams?

Currently the WHO has scant resources of its own to respond to epidemics. It relies on contributions by Member States, which usually must be requested and organized on a case-by-case basis. The WHO has its famous Emergency Response Framework (ERF), but this largely serves to alert and coordinate Member State responses.

Revise and update the Zika Strategic

Response Plan: Rather than pursue general reforms aimed at epidemics generally, the 194 WHO Member States may find it easier to focus exclusively on Zika per se. The Zika Strategic Response Plan from July 2016 to December 2017 provided a comprehensive strategy of

infection identification and spread prevention which focused on collaboration with international health bodies, regional health organization and local states. This plan, however, has exceeded its end date of December 2017 and has failed to be updated. A revised Zika Strategic Response Plan should include new findings of research to ensure the world is ready if and when a future Zika outbreak recurs.

Analyze the impact of climate change on the

Zika virus: As the climate shifts and global temperatures are on the rise, the season with heightened risk of Zika transmission is extended. As such, the prevention of vector-borne diseases must be included in analysis of the impacts of climate change.

Investigate the link between Zika and long-term health impacts:

Infants born with microcephaly and other malformations due to the contraction of the Zika virus while in the womb face long-term health challenges that will place a significant strain on the states such as Brazil with particularly high rates. The international community should determine these impacts to ensure states have the expertise and resources to adequately handle them. Furthermore, serious questions have been raised regarding the need for legalization of abortion in places such as Brazil where Zika is prevalent and abortion is currently illegal.²⁸ While this is traditionally an issue left to member states, the question remains regarding basic rights when a pregnancy bears serious or life-threatening health impacts.

²⁸ Krithika Varagur. "Zika Virus Prompts Activists to Push For Legal Abortions in Brazil." The Huffington Post. 2 February 2018,

https://www.huffingtonpost.com/entry/zika-brazil-abortion-petition_us_56afc0aae4b0b8d7c2303283.

Bibliography

Africa CDC. "Africa Centers for Disease Control and Prevention (Africa CDC) Report Calls Strict Preventive Measures Before, During and After Travel to Rio-De Janeiro-2016 Olympic to Reduce the Risk of Zika Virus (ZIKV) Importation." 5 August 2016. <https://au.int/en/pressreleases/20160805-0>.

ASEAN. "ASEAN Health Ministers respond to Zika virus". 20 September 2016. <http://asean.org/asean-health-ministers-respond-to-zika-virus/>.

Britannia P&I. "Zika Virus: Chinese Regulations." Britannia P&I. <https://britanniapandi.com/zika-virus-chinese-regulations/>.

CDC. "CDC Concludes Zika Causes Microcephaly and Other Birth Defects". CDC Newsroom. 13 April 2016. <https://www.cdc.gov/media/releases/2016/s0413-zika-microcephaly.html>.

CDC. "CDC encourages following guidance to prevent sexual transmission of Zika virus". CDC Newsroom. 23 February 2016. <https://www.cdc.gov/media/releases/2016/s0223-zika-guidance.html>.

CDC. "World Map of Areas with Risk of Zika." Travelers' Health. 5 September 2018. <https://wwwnc.cdc.gov/travel/page/world-map-areas-with-zika>.

European Commission. "Zika: Commission activities in the area of Zika." European Commission Research Areas. <https://ec.europa.eu/research/health/index.cfm?pg=area&areaname=zika>.

ECDC. "Preparedness information for Zika virus disease." European Centre for Disease Prevention and Control. <https://ecdc.europa.eu/en/zika-virus-infection/preparedness>.

Frank Gluck. "Clawson introduces legislation to stem spread of zika". *The Tennessean*. 11 February 2016. <https://www.tennessean.com/story/news/local/2016/02/11/third-zika-case-reported-lee-health-department/80242696/>.

Jerome Groopman. "Is Zika Gone for Good?" *The New Yorker*. 2 September 2017. <https://www.newyorker.com/tech/elements/is-zika-gone-for-good>.

Hannah Isom. "Data sharing in public health emergencies". *Wellcome Trust Blog*. 10 February 2016. <https://wellcome.ac.uk/news/sharing-data-during-zika-and-other-global-health-emergencies>.

Tom Miles and Ben Hirschler. "WHO sees Zika outbreak spreading through the Americas". *Reuters*. 25 January 2016. <https://www.reuters.com/article/us-health-zika-idUSKCN0V30U6>.

Alex Murtha. "Clawson to introduce Zika prevention legislation when House reconvenes." *Homeland Preparedness News*. 29 August 2016. <https://homelandprepnews.com/countermeasures/19595-clawson-introduce-zika-prevention-legislation-house-reconvenes/>.

PAHO. "PAHO Director Briefs OAS Ambassadors on Topics to be Addressed in the 56th Directing Council." Pan-American Health Organization. 13 September 2018. https://www.paho.org/hq/index.php?option=com_content&view=article&id=14620:directora-de-la-ops-brindo-informe-a-los-embajadores-de-la-oea-sobre-los-temas-que-se-trataran-en-el-56-consejo-directivo&Itemid=135&lang=en.

Statista. “Zika virus – Statistics & Facts.” December 2017. <https://www.statista.com/topics/3002/zika-virus-disease/>.

Julie Steenhuysen. “Puerto Rico Declares Zika Outbreak Over, CDC Maintains Travel Warning” Reuters. 2017. <https://www.usnews.com/news/us/articles/2017-06-05/puerto-rico-declares-zika-outbreak-over-cdc-maintains-travel-warning>.

UN Health. “Mosquito-packed drones ready to join fight against Zika and other deadly diseases.” UN News. 18 April 2018. <https://news.un.org/en/story/2018/04/1007672>.

UN Health Agency. “New Zika response strategy to focus on preventing, managing medical complications.” UN News. 17 June 2016. <https://news.un.org/en/story/2016/06/532432-new-zika-response-strategy-focus-preventing-managing-medical-complications-un>.

U.S. Department of State. “Zika Virus Information for Travelers.” U.S. Department of State. 16 August 2018.. <https://travel.state.gov/content/travel/en/international-travel/before-you-go/your-health-abroad/zika-virus-information-for-travelers.html> .

Krithika Varagur. “Zika Virus Prompts Activists to Push For Legal Abortions in Brazil.” The Huffington Post. 2 February 2018. Accessed 18 September 2018. https://www.huffingtonpost.com/entry/zika-brazil-abortion-petition_us_56afc0aae4b0b8d7c2303283.

WHO. “List of Blueprint priority diseases.” WHO R&D Blueprint. February 2018. <http://www.who.int/blueprint/priority-diseases/en/>.

WHO. “No longer an international public health emergency, Zika is ‘here to stay.’” UN News. 19 November 2016. <https://news.un.org/en/story/2016/11/545872-no-longer-international-public-health-emergency-zika-here-stay-un-health-agency>

WHO. “Progress toward discovery of Zika virus vaccines and therapeutics.” WHO Emergencies. 23 July 2018. <http://www.who.int/emergencies/diseases/zika/discovery-of-vaccines/en/>.

WHO. *“WHO Director-General summarizes the outcome of the Emergency Committee regarding clusters of microcephaly and Guillain–Barré syndrome”*. World Health Organization. 1 February 2016. <http://www.who.int/en/news-room/detail/01-02-2016-who-director-general-summarizes-the-outcome-of-the-emergency-committee-regarding-clusters-of-microcephaly-and-guillain-barr%c3%a9-syndrome>.

WHO. “WHO/PAHO and partners set out Zika strategic response plan for the next 18 months.” WHO News. 2 June 2018. <http://www.who.int/news-room/headlines/16-06-2016--who-paho-and-partners-set-out-zika-strategic-response-plan-for-the-next-18-months>.

WHO. *“Zika Virus Microcephaly And Guillain–Barré Syndrome Situation Report”*. World Health Organization. 7 April 2016. Accessed 18 September 2018. http://apps.who.int/iris/bitstream/10665/204961/1/zikasitrep_7Apr2016_eng.pdf?ua=1