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A Comparison of Zika Incidence and Access to Reproductive Healthcare in El Salvador and Cuba During the Latin American Zika Epidemic

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Abstract

This article investigates the connection between access to reproductive health care and transmission of Zika virus during the 2015–2016 epidemic in Latin America, by comparing rates of Zika incidence and congenital Zika syndrome (CZS) in El Salvador and Cuba. This was conducted through a narrative review of the existent literature to analyze the connection between Zika incidence rates, CZS rates, and access to reproductive health care. Data were also analyzed from the Pan American Health Organization and incidence was compared through percentiles. By looking at access to contraceptives and legal abortions, El Salvador is considered to have limited access to reproductive health care, whereas Cuba is considered to have increased access. Additionally, El Salvador's incidence of Zika infection and CZS is higher for the region, while Cuba has some of the lowest rates. Although there are many factors involved that explain the difference in rates, access to reproductive healthcare should be considered.

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Keywords

Zika virus; Latin America; congenital Zika syndrome; women's health care; abortion access; birth defects; global health; comparative analysis; El Salvador; Cuba

Introduction

The 2015–2016 Zika epidemic in Latin America made a powerful impact on the region and was tightly interconnected with women's health care (Alvarado and Schwartz 2017, 26–28). The virus is spread through mosquito transmission as well as sexual intercourse and can lead to severe birth defects in children who are born from infected women (Carabali et al. 2018, 1). This creates extensive implications for women's reproductive and sexual health. Across Latin America, women's health care is ranked low, with restricted access to birth control, abortion, and other family planning services (World Health Organization 2009, 18–20). When considering methods to reduce transmission of an infectious agent, it is important to not only include health-related action or vector control strategies but also gender, as differences in responsibilities expose women to additional risk (Forero-Martínez et al. 2020, 15). This is especially true when analyzing epidemics of agents that are infectious through sexual contact, like Zika virus (Forero-Martínez et al. 2020, 16). Forero-Martínez and colleagues further explain the additional implications that Zika has for women's sexual and reproductive health, including “increased risk of sexually transmitted infections; barriers to accessing quality primary healthcare; lack of adherence to programs and protocols; and stigma and discrimination experienced by the poorest and most vulnerable women” (16). In Zika outbreaks, women's access to reproductive health care is an important factor, out of many, that may influence rates of transmission and congenital Zika syndrome (CZS) in children born to those infected. This can be further explored in the differences in Zika incidence and CZS rates between El Salvador, which has more limited access to reproductive health care, and Cuba, where reproductive health care is less limited, during the 2015–2016 Zika epidemic. There are various explanations for these differences in incidence, including Cuba's primary health care-based system, but access to reproductive health care may be a contributing factor.

First, this study provides background on the Zika epidemic and congenital Zika syndrome (CZS) to illustrate why a correlation may exist between Zika virus infection and women's reproductive health. Next, statistical analysis provides data on transmission rates of Zika infection and CZS in El Salvador and Cuba. Finally, reproductive health care in the two countries is further explored and why a connection may exist is examined.

Zika Virus in Latin America

Zika's arrival in Latin America was first noted with a spike in fetal birth defects, primarily in Brazil in 2015 (Gorry 2016, 6; Fellner 2016, 242). Although the virus was detected in humans as early as 1952, it did not arrive in Latin America until 2014 (Gorry 2016, 6). This initial case was brought to Easter Island by travelers coming from French

Polynesia and caused a local outbreak of approximately 40 cases (Musso 2015, 1887). The virus then spread to Brazil and across Latin America (Musso 2015, 1887). Zika infection was not declared an emergency until 2015, when reports in Brazil found extremely high rates of severe fetal birth defects in children born to infected women (Gorry 2016, 6). This report also included new cases of Guillain–Barré syndrome, a neurological disease in adults, associated with Zika infection (Alvarado and Schwartz 2017, 26). The World Health Organization (WHO) declared Zika a public health emergency of international concern on February 1, 2016 (Fellner 2016, 242). This designation was held until November 18, 2016, when it was lifted, as Zika was determined to be a “significant enduring public health challenge” that no longer fit the definition of a public health emergency of international concern (World Health Organization 2016a). After the initial spike in cases in Brazil, cases of Zika continued to be detected in other Latin American countries, like Cuba and El Salvador, throughout 2016 (Fellner 2016, 242; Gorry 2016, 6; Zimmer 2019).

Congenital Zika Syndrome

Birth defects associated with Zika virus are a major concern with widespread infection and include microcephaly, intrauterine growth restriction, and ocular abnormalities (Carabali et al 2018, 1). The effects of Zika infection are widespread and include a wide variety of additional malformations, including neurologic, ocular, musculoskeletal, and genitourinary (Alvarado and Schwartz 2017, 28). Microcephaly and intrauterine growth restriction are both due to delayed growth in the womb, causing small brain size and small body size, respectively (Centers for Disease Control and Prevention 2019). Ocular abnormalities include issues with the development of the ocular nerve or macular scarring on the retina (Centers for Disease Control and Prevention 2019). These severe conditions are typically present at birth and can be detected by measuring the skull and with vision tests. Mild cases of infection may cause less severe effects that may not be detected until later in life (Centers for Disease Control and Prevention 2016; Rice et al. 2018, 858). These effects include epilepsy and developmental delays (Rice et al. 2018, 858). Each of these symptoms may occur together in various combinations and are typically associated with Zika virus, which then led to the classification of congenital Zika syndrome (CSZ).

Although congenital Zika syndrome is associated with a variety of conditions, microcephaly is one of the most severe birth defects seen and the primary indicator that the WHO uses to track cases (Pan American Health Organization 2017c, 4). This is the condition when a fetus’s head is significantly smaller than normal, leading to a smaller brain that may not have developed properly (Centers for Disease Control and Prevention 2016). Microcephaly can lead to a variety of other problems, including seizures, developmental delay, intellectual disability, and feeding problems (Centers for Disease Control and Prevention 2016). Although there are a variety of other symptoms from Zika infection, these fetal birth defects are the most severe and what led to the declaration of the epidemic as an emergency (Gorry 2016, 6). Research from El Salvador has shown that these effects have directly impacted women, due to the

responsibility of family planning and caring for children that women carry (Center for Reproductive Rights 2018, 23, 29). Reports published in 2018 found that fetuses have a 7% chance of being born with a birth defect if exposed to Zika virus, although some reports put that rate as high as 42% (Hoen et al. 2018, 986; Carabali et al. 2018, 1). Microcephaly is most easily diagnosed through an ultrasound late in the second trimester or early in the third trimester, but the condition may be detected as early as 18–20 weeks of gestation (Centers for Disease Control and Prevention 2018). Screening tests typically included with adequate prenatal care are crucial in effectively catching possible birth defects for early intervention in care of the child's well-being or termination of pregnancy in countries where it is legal, such as Cuba (Centers for Disease Control and Prevention 2020; Bélanger and Flynn 2009, 13). There are no treatments for microcephaly, but early intervention, like therapy and medication, can improve an affected child's quality of life and development (Mayo Clinic 2020). Birth control methods like condoms are important for reducing a woman's chance of being infected through sexual transmission (Forero-Martínez et al. 2020, 17). Abortion may also be an option for women who want to control the risk of birth defects during times of high Zika transmission or for women who are unable to care for a child with birth defects (Forero-Martínez et al. 2020, 17).

Methods

This article utilizes a narrative review of the existent literature to analyze the connection between Zika incidence rates, CZS rates, and access to reproductive health care. The literature analyzed consists of published research articles and official reports from government agencies and intergovernmental organizations, originally written in either English or Spanish. First, this article examines statistics on women's health care in Latin America, as well as scholarship on health care laws in El Salvador and Cuba. This was done to better understand both countries' histories of reproductive health care provisioning for women. To assess whether there is a correlation between access to reproductive health care and Zika infection rates, data were analyzed from a database created by the Pan American Health Organization (PAHO), which is the Americas division of the World Health Organization (WHO) (Pan American Health Organization n.d.). This database was chosen as the PAHO records counts of Zika cases "that all 52 countries and territories in the Americas reported directly or published in national bulletins" (Pan American Health Organization n.d.). Although the PAHO accumulates data from all countries in the Americas, its database and this subsequent analysis are dependent on official government reports. These reports may be over- or underreporting cases due to a variety of factors, such as the strength of a national surveillance program.

This article reviews the data on the accumulated incidence of Zika from the first reported case in El Salvador and Cuba until the epidemic was no longer considered a public health emergency of international concern in November 2016, which was epidemiological week 46. This date was chosen as it is considered the end of the epidemic and the time when the number of Zika cases had gone down to the new postepi-

demographic baseline (Pan American Health Organization 2017a; Siedner et al. 2018, e109). Additionally, this was done to standardize comparison between the two countries. With these raw data, all countries in the Americas that had data available were then ranked from lowest to highest accumulated incidence, and percentiles were found for each country to use as a standard for comparison. This was done for both Zika and CZS rates in El Salvador and Cuba.

Women's Health Care in Latin America

El Salvador and Cuba were chosen for comparison due to their differences in access to reproductive health care, particularly women's access to birth control, abortion, and pre- and postnatal care. The differences between these two countries can help explain potential differences in Zika infection and CZS rates. Cuba is above the regional average at 73.3% coverage, and El Salvador is below the regional average at 67.3% coverage (World Health Organization 2009, 18). This means that a significant amount of women are unable to access contraception like condoms or birth control that could help them control when they become pregnant. Access to abortion also varies significantly between the countries studied. El Salvador has very restrictive abortion laws, only allowing abortion in situations where it is necessary to save the life of the mother. Cuba allows abortion in any circumstance (Mishra et al. 2014, 6, 24; Amnesty International 2015, 3).

Contraceptive coverage is an important component of not only reproductive health care, but health care during pregnancy as well. As previously mentioned, microcephaly can be easily detected via ultrasound in the second trimester (Centers for Disease Control and Prevention 2018). Even if abortion is not available, early detection can help prepare a mother and family for likely long-term challenges and impacts of microcephaly. This detection can only be done if a woman has access to adequate prenatal care, which many women are currently lacking. Only an average of 85.9% of women in Latin America received adequate prenatal care in 2015, defined as four or more visits to a physician (Pan American Health Organization 2016a, 12). Countries like El Salvador fell way below this regional average at 74% of women receiving adequate care, whereas in Cuba an impressive 97.8% of women receive adequate care (Pan American Health Organization 2016 "Core Indicators 2016," 12). For comparison, the average in the United States is 93.6% (Pan American Health Organization 2016a, 12). The typical number of prenatal visits for women in the United States is 15, which is much higher than the international standard of four visits (Office on Women's Health 2019). These visits also include ultrasound imaging and maternal screening tests that are not commonly offered in countries that fall below the international standard of prenatal care. Other commonly used measurements for adequacy of prenatal care in literature are the Kessner Index and the Adequacy of Prenatal Care Utilization Index, which combine information about when during pregnancy the first prenatal care visit was, how many visits were made, and the length of gestation (Kotelchuk 1994, 1414, 1417). This could be a much more informative measure of adequacy, but unfortunately, there is a lack of research on these indexes being applied to El Salvador and Cuba.

For postnatal care coverage, only five countries in the region are at 100% coverage of new mothers having a single visit to a physician post birth (World Health Organization 2009, 20). Cuba is the leader in this metric, while El Salvador is near the bottom of the list at 86% (World Health Organization 2009, 20). The regional average for Latin America was 94% coverage and increasing at the time. In more recent WHO reports, data are largely missing for these metrics in Latin America. This is especially concerning due to the Zika virus's direct impact on women's reproductive health in the region.

Access to Abortion and Contraception in El Salvador

In El Salvador, restrictive abortion laws mean that a woman can be convicted for miscarriage even when she was not aware she was pregnant (Viterna 2012, 252; Amnesty International 2015, 3). The foundations for current-day policies were originally drafted in 1995 and were modeled largely on Spanish law (Viterna 2012, 250). This included a "moderate expansion" of abortion rights throughout the country, but once these expansions became public, pro-life leaders led a powerful outcry against the new laws (Viterna 2012, 250). This subsequent campaign helped significantly restrict abortion access in El Salvador and build the current laws that exist today.

In 1997, a constitutional amendment was passed in the Legislative Assembly to outright ban abortions in all situations that the country exists under today (Center for Reproductive Law and Policy 2001, 35). This proposal eliminated the previously existing exceptions to abortion law, such as to save a mother's life or in cases of fetal impairment. Once again, in 1999, the Legislative Assembly debated the reproductive rights of women, voting for further amendments to the law to protect life from the moment of conception (Center for Reproductive Law and Policy 2001, 37). This amendment was rejected during the first vote, but the second vote passed with 86% affirmative (Viterna 2012, 251).

Data collected on clandestine abortions performed in El Salvador estimate that there are 20,000 performed each year (Wenham et al. 2021, 2). Given the strict illegal nature of abortions, though, this number is just an estimation and could be higher in actuality. Additionally, El Salvador had 64% contraceptive prevalence and 18% unmet need for family planning in 2016 (Pan American Health Organization 2016a, 12). This is less than average for the rest of the Americas and demonstrates a possible unmet need in terms of reproductive health care (Pan American Health Organization 2016a, 12). A survey conducted in 2019 also revealed that more than half of women who do use contraceptives use permanent methods, such as female sterilization (Ponce de Leon et al. 2019, e231–e232). Rates are high due to "limitations in access or difficulties in use" seen with reversible contraceptives (Ponce de Leon et al. 2019, e234). Additionally, the insertion of long-acting reversible contraceptives, such as intrauterine devices, is not universally practiced in Latin America (Ponce de Leon et al. 2019, e228). These barriers provide women with fewer contraceptive choices.

In 2016, El Salvador went as far as to recommend that women not get pregnant until 2018 to prevent birth defects caused by CZS (Center for Reproductive Rights 2018, 11). This was suggested by the government, but the country has very little access to

family planning to support that outcome. Additionally, no policy guidelines surrounding Zika virus in El Salvador mention abortion (Wenham et al. 2021, 3). Low rankings on contraceptive and condom access, as previously discussed, demonstrate that Salvadoran women have limited options for preventing pregnancy. Moreover, women in El Salvador can be imprisoned due to miscarriages that they had no control over, creating a dangerous double bind. Putting together this information on abortion and contraception access creates a picture of more restrictive reproductive health care for women in El Salvador.

Zika and CZS Rates in El Salvador

Along with limited access to reproductive health care, El Salvador has comparatively high rates of Zika infection and CZS. Out of the 48 countries that had data on the incidence of Zika infection in the Americas, El Salvador was ranked on the higher end at 18th, with an incidence of 127.35 per 100,000 people. This placed El Salvador in the 36th percentile for the entire region. When comparing rates in Central America and Mexico, El Salvador fares better, with a ranking of fifth out of eight and in the 56th percentile. This is likely due to a multitude of factors. It is important to note, however, that although El Salvador has a middle ranking, Central American countries that showed higher incidence rates (like Honduras) also have restrictive reproductive laws (Mishra et al. 2014, 24; Brigida 2019).

When looking at cases of CZS, El Salvador had four confirmed cases, the third highest in the Central American isthmus and the 12th highest throughout the Americas (Pan American Health Organization 2017 “Zika- Epidemiological Report- El Salvador,” 2; Pan American Health Organization 2016 “Zika Cases and Congenital Syndrome,” 1). These cases of CZS were very specifically identified with both a confirmed case of microcephaly and infection of Zika virus (Pan American Health Organization 2017c, 2). Actual case numbers of CZS may be higher, as the United Nations Children Fund reported a rise in cases of microcephaly pre and post epidemic (Center for Reproductive Rights 2018, 11). CZS includes many symptoms beyond microcephaly, so it is difficult to document the full scope of the impact of maternal infection with Zika virus if the parameters of identification are so restrictive. Even with such limitations, having such a high ranking in Central America is notable.

Access to Abortion and Contraception in Cuba

Compared to El Salvador, Cuba has less restrictive abortion policies (Mishra et al. 2014, 24). Abortion is open to any woman in Cuba no matter the reason and it is provided cost-free due to the country’s socialized health care (Bélanger and Flynn 2009, 13). Cuba is a regional leader in abortion access, in 1965 under Fidel Castro being the first country to decriminalize abortion (Bélanger and Flynn 2009, 13). This was implemented as a way to curtail maternal morbidity and mortality resulting from unsafe abortions from untrained personnel (Bélanger and Flynn 2009, 13). Further liberalization took place in 1979, making legal abortion services more accessible to women and adolescent girls across the country, in addition to the implementation of regulatory prac-

tices that ensure safety (Bélanger and Flynn 2009, 13). This was done out of concern about adverse postabortion effects from self-induced abortions and procedures performed by unqualified individuals (Bélanger and Flynn 2009, 13). After the 1959 Revolution, the Cuban government considered the health concerns of women and enacted policies that would increase their options and ability to make choices for themselves.

It has been argued that Cuba today has higher rates of abortion as it plays an important role in family planning, second only to available contraceptives (Bélanger and Flynn 2009, 13). When compared to countries that offer legal abortions and have public data, rates in Cuba are some of the highest in Latin America, with estimates from 2008 reporting 29 abortions for every 1000 women (Sedgh et al. 2011, 192). Clandestine abortions are more difficult to track due to their covert nature, but research puts rates in Latin America at 16 to 33 per 1000 women (Rasch 2011, 694). Therefore, Cuba's rates compared to other countries in Latin America may not be as elevated as some scholars argue. This indicates that although Cuba's documented rate of abortions is higher for the region, that is because they are legal and can be easily recorded and researched.

Contraceptive access in Cuba is higher than average for the Americas, and even for the surrounding Latin Caribbean, at 72% (Pan American Health Organization 2016a, 12). The preferred method of contraception in Cuba is intrauterine devices (IUDs), a long-acting reversible method (Bélanger and Flynn 2009, 14; Ponce de Leon et al. 2019, e231). Rates of usage of long-acting reversible methods are higher than any other country in Latin America, as they are the preferred method for almost one in three women using contraceptives in Cuba (Ponce de Leon et al. 2019, e231). These long-acting contraceptives have many advantages, such as cost-effectiveness and independence of user compliance after insertion (Ponce de Leon et al. 2019, e228). Cuba's high rate of various methods of contraception coverage before and during the epidemic indicates that women in Cuba have high levels of access to contraception. This, coupled with less restrictive abortion policies and higher rates of safe and legal abortions, indicates an overall picture of less restrictive reproductive health care for women.

Zika and CZS Rates in Cuba

When comparing all countries in the Americas with data on Zika incidence rates in November 2016, Cuba ranked extremely low in third place, with an accumulated incidence of 0.01 infected people per 100,000. This places Cuba in the 5th percentile. When breaking down the Americas into regions, it becomes easier to compare rates. In the Caribbean, Cuba is ranked even lower than when compared with all the Americas and is in first place and the 2nd percentile.

Through the end of the period analyzed, Cuba did not have a single congenital case associated with Zika virus (Pan American Health Organization 2017b, 2). Although many countries throughout the Americas have a rate that low, Cuba is one of three countries with that low a rate in the Latin Caribbean (Pan American Health Organization 2016b, 1). As in El Salvador, the standards for determining a positive case are strict and include an ultrasound image to determine a small fetal head size con-

sistent with microcephaly and a positive Zika virus test (Pan American Health Organization 2017b, 2). Because of this, missed cases could be a possibility, but with the low accumulated incidence in Cuba, it is likely that zero CZS cases reported would be close to accurate.

Discussion and Conclusion

Although many factors may account for differences in Zika transmission and CZS rates between Cuba and El Salvador, reproductive health care may be one important factor when examining this difference. Zika virus, reproductive health care, and national policy are entangled in a complex story. Although at different levels, countries across Latin America have policies that restrict women's access to family planning services such as high-quality contraceptives and abortions. Access to abortions, national attitudes about reproductive health, and legislative responsiveness to the Zika epidemic have all impacted health outcomes for women and their children, even exacerbating Zika transmission. El Salvador appears to be the key example of this, with high rates of Zika and extremely restrictive reproductive laws. As discussed in the preceding, the country has high rates not only of viral transmission but also of adverse fetal impacts, such as stillbirths, birth defects, and several documented cases of CZS (World Health Organization 2016b). A lack of access to contraceptives and legal abortions limits women's ability to protect their own health and the health of their children, potentially leading to a higher incidence of CZS. Low rates of condom prevalence mean women can more easily be exposed to Zika virus through sexual contact, potentially increasing the incidence rate. Providing more access to reproductive health care allows women to make decisions to help prevent transmission to fetuses or sexual partners (Harris et al. 2016, 2).

El Salvador can then be compared to Cuba, which has one of the lowest rates of Zika virus infection in the region (Pan American Health Organization n.d.). There are various explanations for why this may have occurred. First, Cuba is an island, as compared to continental countries previously described, and is much more isolated from disease due to the decreased flow of people and mosquitoes. Initially, the confirmed Zika cases were almost entirely imported, but this gave rise to locally transmitted cases. Second, the state response was quick, with the Cuban government declaring an epidemiological response in 2015 and an 11-step National Zika Action Plan in early 2016 (Gorry 2016, 6). This response included establishing protocols to slow transmission and *Aedes* mosquito proliferation, as well as mobilizing 9000 armed forces for fumigation (Gorry 2016, 6). Nevertheless, better reproductive health care, as compared to the rest of Latin America, could be a component that contributed to Cuba's success in curbing transmission and should not be overlooked. Women in Cuba have more options for reproductive health care and have the ability to make safer choices that lower the risk of adverse health outcomes from Zika virus infection.

In countries without access to abortion, pregnant women who receive a positive Zika virus diagnosis may turn to unsafe abortions, potentially putting their lives in danger (Carabali et al. 2018, 6). In El Salvador, there was a significant increase in re-

quests for abortion through external online-based abortion providers during the Zika epidemic (Aiken et al. 2016, 396). This is especially significant considering that about half of pregnancies in the region are unplanned, and many women do not have access to adequate information about their Zika infection status or the possible risks associated with infection (Roa 2016, 843). Additionally, many countries in Latin America, including El Salvador, have encouraged women not to become pregnant for at least 8 weeks and even up to 3 years (Harris et al. 2016, 2; Center for Reproductive Rights 2018, 12). Advising women not to become pregnant while then also restricting reproductive health care and in the case of El Salvador criminalizing abortion puts women in especially dangerous situations, which can lead to imprisonment or potentially fatal self-abortion attempts. Additionally, not all women have the ability to avoid pregnancy, as they may not have access to birth control or the ability to say no to partners.

During the Zika epidemic, many scholars suspected that abortion laws would be amended in response, although this does not appear to be the case (Carabali et al. 2018, 2). Although it has only been 5 years since the height of the outbreak, the only country to make a significant change to promote reproductive health care or lessen restrictions on abortion was Argentina in 2020 (BBC News 2020). Even though the effect of such laws on Zika transmission specifically will have diminished over time, they would still make a positive impact on women's lives. There are hopes that a crisis would influence laws, similar to how increased rubella infections causing birth defects in the 1960s helped liberalize abortion legislation in the United States (Carabali et al. 2018, 2; Howard 2016).

Although the heart of the analysis is comparing countries with different sexual and reproductive health care policies, this is also a limitation as it makes it difficult to standardize for proper comparison. Epidemics are complex situations that are influenced by various factors, and that makes it challenging to pinpoint one specific contributing factor. The research presented here would suggest a connection between reproductive health care and the impact of Zika virus. Future research can focus on specific regions within countries and see whether spikes in Zika cases are more strongly connected to less access to reproductive health care.

To conclude, the 2015–2016 Zika epidemic highlights differences in reproductive health care throughout Latin America and how limited access may increase transmission rates. Future research could explore how these differences could then exacerbate the impact of Zika virus infection by potentially causing more cases of CZS in areas where reproductive health care coverage is limited. The liberalization of abortion policies and improved access to contraceptives in Latin America are crucial steps toward protecting the health of women and children in the context of infectious disease outbreaks and beyond.

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Biography

Georgia Artzberger is a recent graduate of Michigan State University, earning a B.A. in comparative cultures and politics from James Madison College and a B.S. in Biomedical laboratory science from the College of Natural Science. She is currently a Medical Laboratory Scientist in Clinical Microbiology at Cleveland Clinic. Her research is centered on infectious diseases, global health, and underserved populations. Address correspondence to Georgia Artzberger, 1221 Bowers #219 Birmingham, MI 48012, USA. E-mail: georgiaartzberger@gmail.com.

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