

**REPRODUCTION REDUX: NATURE, WOMEN, AND SOVEREIGNTY IN THE ZIKA  
PUBLIC HEALTH CRISIS IN PUERTO RICO**

by

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## **Abstract**

In 2015 a new strand of the Zika virus emerged with a single genetic mutation. Suddenly, a virus that had once had an innocuous impact on human life could interrupt a fetus's physiological development, producing a condition known as "microcephaly." With dual transmission mechanisms of mosquitoes and sex, Zika ignited fears about the permeability of nation-state borders to infectious disease, as well as rising healthcare costs. Health economists and other experts "priced" a single case of microcephaly at USD \$10 million or more across a lifetime, such that "Zika babies" were seen to compromise the futures of other children. In the United States, these fears were mapped onto the "unincorporated territory" of Puerto Rico, where one-fifth of the population was predicted to contract the virus. In this dissertation I explore how Zika was culturally, aesthetically, and scientifically constructed as an emergency in the United States and detail U.S. government Zika intervention in Puerto Rico. I argue that public health expertise and practice positioned Puerto Rican women as the threshold between Zika and the economic future of the U.S. nation, "responsibilizing" them for that future. This hinged on the contradictory mapping of Puerto Rico as inside the United States in terms of disease risk and outside the United States in terms of political rights, which allowed chemical fumigation to be undertaken without consent and the insertion of contraceptive implants into bodies without providing infrastructures for safe removal. Altogether, I take the diffusion and management of Zika in Puerto Rico as a point of departure for a wider discussion about health and reproduction—note that the contemplation of these two concepts is not exhausted by "reproductive health"—amidst global ecological tumult. It is my contention that poor women and teenage girls in particular places are being positioned as a massified bodily threshold between an unruly nonhuman world, on one hand, and economic and biological human futures,

on the other. I posit that this emergent logic is much broader than the making and management of Zika, is destructive for women, and is continually subverted by them.

## **Lay Summary**

This dissertation is a feminist geography of Zika, a virus transmitted by sex and mosquitoes that has the capacity to damage human fetuses. It focuses on Puerto Rico, an “unincorporated territory” of the United States where Zika was predicted to infect one-fifth of the population. I examine two U.S. government public health interventions in Puerto Rico—chemical vector control and birth control provision—as well as popular culture and science on reproduction related to Zika. I find, first, that women and girls in tropical locations were blamed for Zika’s potential problems. Second, I find that Zika intervention was deceptive and coercive, with the potential for destructive consequences in environmental and reproductive health. Altogether, the dissertation contributes to theorizing human reproduction amidst growing global ecological uncertainty.

## **Preface**

This dissertation is the original and independent work of the author. The research program was approved by the University of British Columbia (UBC) Behavioural Research Ethics Board under Certificate Number H16-01162.

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## List of Abbreviations

CDC	Centers for Disease Control and Prevention
CDCF	Centers for Disease Control and Prevention Foundation
DALY	Disability Adjusted Life Years
DHS	Department of Homeland Security
DFLE	Disability-Free Life Expectancy
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
HLY	Healthy Life Years
ICER	Incremental cost-effectiveness ratio
IPCC	Intergovernmental Panel on Climate Change
IUD	Intrauterine Device
LARC	Long-Acting Reversible Contraceptive
NEPA	National Environmental Policy Act
PRDH	Puerto Rican Department of Health
PPD	Popular Democratic Party (Partido Popular Democrático)
PREPA	Puerto Rico Electric Power Authority
PROMESA	Puerto Rico Oversight, Management, and Economic Stability Act
QALY	Quality Adjusted Life Years
TSCA	Toxic Substances Control Act
WHO	World Health Organization

WIC            Women, Infants, and Children  
Z-CAN        Zika Contraceptive Access Network

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## Chapter 1: Public feelings of risk

In 2015, a new form of the Zika virus emerged with a single genetic mutation. Suddenly, a virus that had once had an innocuous impact on human life was capable of interrupting fetal physiological development (Yuan et al. 2017). The implications of this single mutation reached far beyond the structure of the virus: the intimate geographies of human procreation, the regional geographies of *Aedes aegypti* mosquitoes, the national geographies of healthcare funding and biosecurity, and the global geographies of biospheric change were all looped into the storying of Zika. All of these geographies, and not just those associated with sex, pregnancy, and childhood, are geographies of reproduction.

The public image of Zika is microcephaly, a term denoting a smaller-than-normal head size and problems in brain development (Oster et al. 2016; Rasmussen et al. 2016). In the early months of 2016, public health officials and other experts suspected a causal link between the presence of the Zika virus in a pregnant woman's body and microcephaly in children and delimited a suite of transmission mechanisms that included the chance bite of *Aedes aegypti* mosquitoes and the exchange of bodily fluids during sex. Furthermore, they noted that because Zika does not produce symptoms in most adults, its movement between humans and across nation-states would be difficult to monitor and even more difficult to control. Zika's varied movements in the circulatory systems of mosquitoes and human bodies, as well as its imperceptibility on the surface of the adult human body, suggested an increasingly unruly nonhuman world with the power to mark and mold the human.

As knowledge of this new strand of Zika expanded, feelings of vulnerability circulated between scientific communities and ordinary people, and the story of the virus was plotted socially and ecologically. In only the fourth such declaration in its history, the World Health Organization (WHO) named Zika a Public Health Emergency of International Concern in February 2016, predicting in excess of 4 million cases (Worland 2016). Not long after Zika was storied as an emergency, that emergency was framed as one of public cost. The U.S. Centers for Disease Control and Prevention (CDC) director Tom Frieden "priced" a single case of microcephaly at USD \$10 million or more across a lifetime (Centers for Disease Control and Prevention 2016a),

a figure which included direct medical costs and societal productivity losses. This is a striking example of the reduction of the not-yet-born but could-be-born to speculative economic futures that Michelle Murphy (2017a) has called the “economization of life.” All of these fears—corporeal, national, financial—converge in microcephaly. And all of them position “women of childbearing age” as a bodily threshold between the roiling agency of the virus on the one hand, and its dystopic realization on the other.

The positioning of *women as threshold* is the subject of this dissertation, and I explore it through a specific historical geography of empire. Fears about Zika may have first taken shape around northeastern Brazil, the epicenter of the public health emergency, but in the United States they were soon mapped onto Puerto Rico. This is because of Puerto Rico’s geography as at once a Caribbean island with active Zika transmission *and* an “unincorporated territory” of the United States. In the eyes of the CDC, the former meant predictions that one-fifth of the population would contract Zika by the end of 2016 (McNeil Jr. 2016a); the latter meant abundant circulations of people between island and mainland, unfettered by border control. The former meant heat and rains and *Aedes aegypti*; the latter meant U.S. citizenship rights, including varied means of accessing government support and healthcare. These geographies overlapped in denominations of the reproductive conduct of Puerto Rican women and girls as “risky” in public health expertise, and the focalization of their bodies as the principal point of intervention in public health practice.

I went to Puerto Rico in the late summer of 2016. En route to the island, I was hailed as a Zika subject, my body a potential vessel through which Zika’s dystopic horizons could be actualized. The security line at Minneapolis-Saint Paul airport greeted me with a warning about the virus and asked if I was pregnant. I wasn’t, but if I had been, the sign would have urged me to take caution in traveling to the Caribbean, Central America, or South America, the provenance of Zika. It blended seamlessly into the rest of the signage warning of possible threats (“If you see something, say something” and the like), becoming part of the airport security apparatus writ large. At Atlanta-Hartwick, one of those airport convenience stores that sells magazines, bottled water, and fancy mixed nuts was flanked by Zika warning signs taller than me. These signs stood

out amongst the ceaseless streams of people. “DON’T LET THIS BAD BUG BITE YOU,” it ordered, a monstrous *Aedes aegypti* specimen bearing down from above. Below, a map divided the Western Hemisphere into two discrete zones: the Zika-stricken zone and the zone that had, as yet, presumably been spared (Figure 1.1, left). The sign implored me to coat myself in DEET insect repellent—conveniently available in that very shop! At Luis Muñoz Airport in San Juan, I was drawn into the Zika public health emergency once again when, at the foot of the staircase all must descend to leave the securitized zone of the airport, a CDC Health Advisory notice asked if I was pregnant and informed me that “Zika is linked to birth defects.” And again, while I was waiting for my baggage to arrive, another Health Advisory declared “Protect yourself and your family from Zika,” explaining the virus’s transmission mechanisms. I called my mother to inform her of my arrival; she said to lay the “bug juice on thick” and “think about your future self.”

I left Puerto Rico at the close of 2016, and a few days later I found myself accompanying someone to a Planned Parenthood clinic in Saint Paul, MN. The clear, bone-cold air—punctuated only by the hot-breathed shouts of bundled-up anti-abortion protestors—made me feel far from my object of analysis, a tropical disease, but in the warmth of the waiting room, I looked up from the pages of an instructional magazine on female beauty to see warnings about Zika, travel, and sex in both English and Spanish on the wall. Zika warnings were everywhere, and I felt they were directed at me. This and subsequent journeys impressed upon me the growing acceptance in public health expertise of a causal relationship between Zika and microcephaly, and the growing anxiety over the possibility of a Zika epidemic in the United States.

In San Juan, it was impossible to move through the city without being confronted with the public health emergency. I arrived just a week after the epidemic “peaked” in epidemiological terms, just as the CDC increased its forecast *contagiados* in Puerto Rico to 850,000, due to the expected humidity and rainfall of late summer and early fall. An “unprecedented newspaper and billboard advertising campaign” on behalf of the CDC Foundation (CDCF) communicated the urgency of the virus (Rigau-Pérez 2018b: 20). Signs over highways and pathways, on bridges and beaches, proclaimed things like “Let’s take preventative actions and help avoid congenital deformations in

our babies,” linking present individual conduct (preventative actions) to future collective health (“our babies”). Smaller notices soliciting participation in clinical studies and vaccine trials peppered public space. Calls for employment opportunities in chemical fumigation were rife. In grocery stores, repellent advertisements proclaiming the dangers of Zika encouraged the people of San Juan to toss a can or two of repellent along with the rice, milk, eggs, and bananas in their shopping carts. Zika was something I was impelled to know simply as a result of traveling from mainland to island and back again, and while in the city, a repertoire of signs and symbols inquired of my reproductive habits and alluded to their potential consequences.



Figure 1.1: Don't let this bad bug bite you: Airport signage (Left – Atlanta; Right – San Juan; Photo by the author).

Yet the omnipresence of public health messages about Zika seemed far from efficacious in San Juan. Chitchat with cabdrivers and baristas and people at bus stops diverged starkly with the certainty and singleness of purpose of the public health warnings that dotted public space. Repeatedly I was made aware of a major epistemological conflict between island and mainland perceptions of risk. Several doctors I interviewed spoke of disputes over the task of counting both cases of Zika and cases of microcephaly between Puerto Rican health officials and the CDC, so much so that at one point the former refused to meet with the latter. And I was struck by the extent to which people in Puerto Rico questioned whether the Zika virus was even real, let alone a legitimate reason for U.S. government intervention. There were charged declarations of U.S. government experimentation and less pointed forms of speculation, all of which brought Lauren Derby's (2008: 306) description of a "robust [Puerto Rican] rumor culture about what goes on behind...closed doors" to life for me, which predated, subverted, but also intersected with "post-truth" American political culture. In my first ride from the airport, the cabdriver told me he thought Zika was a means through which the local government was trying to access more federal funds, nothing more than a ruse. "Wait, what?" I exclaimed, my gaze turning quickly from the J.Lo for Loreal billboard that stands sentry over San Juan to his raised left eyebrow. After exchanging pleasantries at a coffeeshop, I asked an older woman about "all the Zika stuff they are talking about." She stiffened, paused, and then said she thought it was propaganda wrapped up in a broader plan of U.S. government "genocide, related to *la operación*," noting the complicated history of coerced sterilization on the island. Outside a ceviche truck, a man recounted controversies over chemical fumigation, and speculated about nefarious closed-door business deals between U.S. chemical companies and the local government, overseen by the CDC. He also wondered whether the CDC had secretly doused the island with toxic chemicals from planes overhead. As I scrolled through Instagram one night before bed, a public service announcement with mosquitoes entered the frame. Based on my geographical location, an algorithm rendered me a target for an advertisement that read: "The fact that you don't know anyone infected with Zika doesn't mean nobody has it. Zika is REAL. This too, we have to fight as a country. #PRagainstZika" (Figure 1.2). Public health agencies were well aware of Zika skepticism and entered into active dialogue with it.



**Figure 1.2: Instagram post by Detén el Zika (Screenshot by author)**

The point is that while skepticism was rife, it was also varied in tone and in the conspiring objects it hailed. Whispers of U.S. government experimentation were countered with worried statements like those of CDC public health officials on the mainland: Zika, the real problem (not,

say, the safety or ethics of chemical or birth control-based methods of control), was being ignored by the people who would be most affected by it. Furthermore, one could hold both of these positions at the same time. I know I did. I was critical of the many approaches to disease control about which I was learning, and yet always in the back of my mind was the possibility that the virus could change everything. That I might have it already, unknowingly carrying its latent consequences, played upon my mind as well. Such is the nature of emergent disease epidemics. With the distance of history, it is easy for the critic to pass judgement on the doomsday horizons ballooning in public culture, to scoff at their sensationalism, but such a position is hard to inhabit when the story of the disease is unfolding around you, and might even be part of you. Many Puerto Ricans were skeptical of the Zika virus and the interventions that were aimed at them, but they were also skeptical of Zika skepticism. The skepticism which locked my analysis firmly onto the problem of Zika was not cut from the cloth of conspiracy theories. It was a constant, low-grade buzz that infused everyday life, a skeptical orientation to both certainty that Zika was real and certainty that it was fake.

This is not an ethnographic study of Zika skepticism. What skepticism made me realize is that, from the inside of the Zika problem, it is difficult to say whether interventions in the name of public health were warranted or not. Furthermore, it is near impossible to prove intent. Zika skepticism invited me to slow down and consider the logics of interventions in public health, to examine how they actually worked and whose lives they actually impacted. It invited me think about the construction of scientific expertise on Zika, reproduction, and health, to explore its social and political constitution. It invited me to examine the uneven political geography that enfolded the diffusion of Zika. It invited me to consider the “stratification” of reproduction (Colen 1995) across time and space. Skepticism, in other words, sharpened the question that guides this dissertation: How did Zika intervention, realized under the banner of future children and focalized on the bodies of living women and girls, work? *For whom did it work?*

What follows, therefore, is a feminist geography of the virus, approached from three angles. First, I examine Zika’s *emergence in a range of domains of public life in Puerto Rico*, including the reconfiguration of public space through public health intervention, legal action, everyday

street cultures, and social media. Across a four-month period in San Juan, I went to public health information sessions; examined CDC documentation, plans, and public health announcements as they were reported in local media and materialized in public space; attended a chemical fumigation work fair; and immersed myself in local media and social media. Informal interviews with sixteen healthcare professionals and employees of pharmaceutical firms and participation in Puerto Rican Department of Health (PRDH) webinars for doctors helped me get my bearings as the virus rearranged social life around me, introducing me to the institutions involved in the public health effort. While quotations from these interviews appear in brief in the chapters to capture the difficulty of accessing contraception and the discord between federal and local healthcare agencies, I do not lean on them heavily in terms of analysis. My focus is on the technologies, protocols, and practices of Zika management in Puerto Rico that flowed into and out of the constitution of the virus as a public health emergency in the United States, which appeared officially in plans and announcements and lawsuits, and unofficially in the cross-outs and amendments of public health notices by passersby, in speculations about covert chemical fumigation uttered over the radio, in women's nods on Facebook to having been refused the removal of contraceptives that had been implanted in their bodies as part of the anti-Zika effort, and of the persistent injunction for girls to wear DEET-based insect repellent "like perfume."

Between the official and unofficial, I identify and analyze two principal technologies for Zika intervention: synthetic chemicals designed to obliterate sites of mosquito reproduction and contraceptive devices to be implanted in the arms and uteri of women. Both of these were "modern" public health interventions, insofar as they were rooted in Western legal and political thought on the relationship between personhood and nature—namely, that organisms are distinct from both other organisms and from their environment—such that "living entails a ceaseless problem of boundary maintenance" (Cohen 2009: 8). And both were conditioned by the changing legal relationship between the United States and Puerto Rico. I reconstruct the rich network of political, economic, and cultural linkages that constituted chemical intervention and birth control provision in Puerto Rico, and I do this with a genealogical sensibility: like James Holston (2009: 34), I examine "how the past leaks through the present, breaking it up into heterogenous elements, and permitting it to be recomposed and transformed."

Second, I examine the *social constitution of the virus in scientific expertise*. I analyze the body of epidemiological, clinical, and other science generated on Zika since 2015, focusing on the *New England Journal of Medicine* (62 original articles, review articles, and commentaries from 2016 to 2017), *The Lancet* (156 original articles, commentaries, and special reports from July 2015 to May 2018), and the CDC’s epidemiological digest, *Morbidity and Mortality Weekly Report* (68 weekly reports from 2016-2017). Alongside these, I consult CDC original studies and commentaries, original studies in the *Journal of Infectious Disease*, and original studies from *PLOS Neglected Tropical Diseases*. Inspired by feminist science studies that approach scientific expertise reflexively, both making use of that expertise and dissecting its social and political architecture (e.g. Mansfield 2012), my objective is to understand how Zika risk and responsibility were framed and how costs and benefits of intervention were expressed. I also explore how, when, and with what consequences scientific expertise on Zika burst beyond the confines of journals—for example, by being cited in policy debates, in the public statements of medical organizations, or by Zika skeptics. In this regard, the dissertation is broadly concerned with Zika’s knowledge-making infrastructures, or what Michelle Murphy (2017a: 6) calls “epistemic infrastructures”: a diffuse network of exchanges between historical and contemporary expert knowledge in epidemiology, toxicology, ethnography, demography, and health economics that constructed Zika as a problem and structured responses to it.

Third, I look at the *storying of the virus as a global public health emergency*, both in literary and visual terms. In identifying the use of literary techniques such as character development, motive, and plot in accounts of infectious disease, Priscilla Wald’s (2008) *Contagious* sets the scene for this analytical strand. Wald shows the history of public health to have been narrated through potent stories of “ecological danger and epidemiological belonging” (2008: 33), with disease outbreaks set as “‘foreign’ or ‘alien’ agents that posed a national threat” (27). In Zika, this dramaturgy of ecological danger and epidemiological belonging was composed visually as well as textually. At the height of the crisis, microcephaly had a robust video and photographic archive in the *New York Times*, *Washington Post*, and *LA Times*; its “constructed visibility” (Campbell 2009) narrated Zika as a real and palpable threat to human reproduction to audiences far from areas of active transmission. My first task after the introduction is to show how Zika

was narratively and visually constituted as a public health crisis in the United States, the plotlines and protagonists of which would spiral off to inform intervention in Puerto Rican women's bodies in direct and indirect ways.

In composing this feminist geography, I make two interrelated arguments. The first is historically and geographically specific to the U.S. government's Zika interventions in Puerto Rico. My contention is that Puerto Rican women and girls were positioned as the bodily threshold between Zika's immediate biological threats and the economic future of the U.S. nation, and therefore were the principal point of state and para-state intervention. Much like U.S. government mappings of Guantánamo Bay (Gregory 2006), public health expertise produced Puerto Rico as *inside* the United States in terms of disease risk, while public health practice produced Puerto Rico *outside* the United States in terms of political rights. This contradictory production of the island allowed chemical fumigation to be undertaken without the consent of Puerto Rican women, and the insertion of Long Acting Reversible Contraceptives (LARCs) into their arms and uteri without providing infrastructures for safe removal. U.S. government Zika protocol split the reproductive body off from the social reproductive body, intervening in the former in all sorts of ways, abandoning the latter.

What is more, I take the diffusion and management of Zika in Puerto Rico as a point of departure for a wider discussion about health and reproduction amidst global ecological tumult and resurgent white nationalism in the Global North. The contemplation of these two concepts—reproduction and health—is not exhausted by their enjoinder in that of “reproductive health,” which, in the United States at least, conjures quite a narrow image of oral contraceptive pill packs, sonogram photography, pro- and anti-abortion protests, and maternal healthcare. I work beyond this image in what follows, situating the reproductive body in more-than-human worlds. Humans have never been able to completely bend the will of viral, bacterial, and other nonhuman worlds, like those that gather around the figure of the child with microcephaly; biological uncertainty is, in a certain sense, a condition of being alive (Clark 2011). The new strand of Zika that is the subject of this dissertation, with a genetic mutation that enabled the shaping and molding of the human form, spoke to fears over what is imagined to be, and perhaps

what is, an ever-more-agentic nonhuman world. It also hinted at dystopian environmental futures. Women and teenage girls in particular places are being positioned as a massified bodily threshold between this unruly nonhuman world, on one hand, and economic and biological human futures, on the other. I posit that this emergent logic is much broader than the making and management of Zika, is destructive for women, and is continually subverted by them. Let me now situate these points in wider debates about health, biosecurity, and the ever-difficult question of reproductive freedom.

### **1.1 Global health, biosecurity, and women**

When active Zika transmission was first reported in Florida in 2016, microcephaly was plotted as a possible reproductive outcome for privileged people for the first time, and like H1N1 in 2009, Zika was viewed as “a disease that threatened to cross borders between poor and rich” (Sparke and Anguelov 2012: 727). “When I saw the first picture of a baby with microcephaly, I burst into tears. It seemed so far away in the jungle, and then it was in my backyard,” one woman in Miami stated (Harris 2016). Infectious disease is raised as specter, and public health raised as antidote, when the well-being of the privileged is felt to be under threat by something “the rest” should, but cannot, contain.

“Felt” is a key word here; I am interested in exploring the “public feelings of risk circulat[ing] between experts and broader publics” (Ahuja 2016: 5). Paul Jackson’s (2013) historical geography of cholera demonstrates how fear over the arrival of the disease in Toronto (not *whether* it would arrive, but *when*) shaped the nation, neighborhoods, and psyches, while Nancy Stepan (2007) argues that the extent to which a disease can take hold of the public imagination is more potent in assembling public health infrastructures than the actual health toll it may take. Indeed, as Neel Ahuja (2016: 5) has shown in places as disparate as Hawai‘i, Panama, Iraq, and Puerto Rico, public fears of the capacity of diseases to shape the human were inextricably bound to the state’s rendering of colonized bodies and spaces as “lively domains of warfare.” And note the racialization of disease narratives: across the history of North American settler colonialism, germs, disease, and infection have been assumed to have come from elsewhere, rationalizing

restrictive immigration policies and quarantine (Markel and Stern 2002). As such, public health initiatives “cannot be thought of as reactions to a biomedical contagion alone”; their range of spatial practices have “aimed at the metaphorical and literal separation of ‘citizen’ from ‘foreigner,’ ‘clean’ from ‘unclean,’ and ‘self’ from ‘other’” (Mawani 2003).

“Public feelings of risk” and the interventions they sanction have both changed shape and intensified in the twenty-first century, amidst what Alan Ingram (2005: 532) calls the “radical dissolution of epidemiological space.” Increasing global circulations of bodies and commodities call national sovereignty into question, meaning states can “no longer rely on the defenses of distance to protect them.” This and 9/11 are the background against which a range of initiatives for trying to control biological futures for the nation through interventions realized outside the nation-state emerged in the United States, such as the multibillion-dollar programs BioSense, BioShield, and BioWatch (Cooper 2006; Fearnley 2008; Ahuja 2016). Biosecurity trades in the language of military operations: of “terrible organisms,” Tom Frieden recently stated, “like terrorism, you can’t fight it just within our borders. You’ve got to fight epidemic diseases where they emerge” (quoted in Sun 2018).

While biosecurity’s *raison d’être* can be “crudely defined as making life safe” (Bingham, Endicott, and Hinchcliffe 2008: 1528), there are of course crucial questions to be asked. Who or what may be deemed a biological threat, and on whose behalf can biosecurity measures be carried out? Perhaps unsurprisingly, research on contemporary disease control reveals an uneven global geography of interventions which, like their twentieth-century predecessors, have been mobilized on behalf of the privileged. Derek Gregory (2014), for instance, contends that international responses to Ebola functioned as “tactical vectors” for Northern militaries and paramilitaries, while Sarah Davies (2008) suggests that the WHO organizes disease intervention around the sheltering of states in the Global North from contagion. What is so important about this body of work is that it flies in the face of hopeful narratives of health.

The influential work of Nikolas Rose (2007) is emblematic of this hope. It notes an historical shift from the state management of health risk at the level of the population to what he terms

“ethopolitics,” the personal management of health risks specific to one’s genetic code. Rose’s argument begins with the suggestion that molecular biology and genetics have brought into being a public orientation to the molecular scale. That is, twenty-first century people, unlike their predecessors, think about what they cannot see, such as their unique genetic inheritance, or the unique genetic inheritances that could arise from human reproduction. These scientific advances have made a prominent mark on high-end reproductive health care. Women can choose to terminate a pregnancy based on the diagnosis of genetic conditions of the embryo or fetus, for instance. Implicit to this molecular orientation to health is an orientation to pregnancy as a time-space for “ethopolitics” to be realized.

But as critical work on biosecurity has shown, there are other ways people think (and feel) at the molecular scale. Bruce Braun (2007) has argued that the molecular age is not solely defined by the genetic risks associated with one’s own body: it is equally defined by the risks people in privileged social locations feel in connection to a global field of biological chaos. “For every story in the U.S. media that speaks breathlessly of advances in stem cell research and gene therapy, or that worries over the ‘post-human’ futures these might usher into being,” he writes, “we find two or three other stories that speak ominously of migrating birds and backyard chickens, and that mix together Vietnamese peasants, influenza viruses and homeland security” (Braun 2007: 14). Similar dystopic imaginations are evident in U.S. media reporting of Zika, in which *Aedes aegypti* mosquitoes, the winds and rains of tropical climates, the favelas of Brazil, the sexual practices of people in Honduras, and the precarious procreative futures of North American honeymooners are churned up with reports of the imperceptibility of the virus, for as I have already had occasion to note, Zika is asymptomatic in most adults. And in this mix, one image reigns: the underdeveloped craniums of children born with microcephaly.

Braun’s thesis is that self-management of health in some places depends on the extraterritorial deployment of imperial power to try to manage biological chaos elsewhere. He posits, in other words, a relationship between the “ethopolitical” and empire. But how does this relationship work? Where? And whose bodies, specifically, does it concern? Braun’s thesis is compelling but must be tested, especially because imaginaries of roiling posthuman futures have only thickened

since the avian flu emergency. So too, with the presidential election of Donald Trump and the UK Brexit vote in 2016, have white nationalist longings for the barricading of Northern states off from the rest of the world (Pérez Huber 2016; Virdee and McGeever 2017).

One subject glossed over in work on biosecurity is women's bodies, which in the Zika public health emergency were produced as the locus of danger and intervention. The exception to this general silence on women and biosecurity is Becky Mansfield's (2012) work on environmental contaminants and seafood guidelines for pregnant women, which sets the scene for my examination of Zika intervention in two key ways. First, she details the emergence of environmental health and its capacity to mark the growing human fetus as a new public health problem. "A new arena of biopolitical concern" focuses on "how the contaminated environment is changing the nature of humans" (Mansfield 2012: 2). Second, she shows the centrality of reproductive women to this biosecurity regime. Spatialized as "threshold," the corporeal gateway between a wider contaminated environment and the future, women are called upon to protect the population from environmental pollutants through responsible consumption choices.

This exegesis is in keeping with recent work in feminist theory, which has shown that women are seen to enfold a range of possible lives, and that that enfoldment is linked to a range of possible forms of population decline for which they can be "responsibilized." Feminist philosopher Penelope Deutscher (2017: 5) has argued that the image of "women as life" is tied to "the attribution to women of the counterpotential for maternal harm, negative impact over life, negative population or collective impact." Women are produced as subjects with "the capacity to propagate death (to futures, races, peoples and nations) through reproductive transmission" (2017: 65) at every turn. This is a much-needed feminist take on Foucault's (1978) points on "responsibilization" in *The History of Sexuality Vol. 1*, as well as on his wider work on discipline and the body, which is categorically "disinterested in the 'disciplining' of women" (Federici 2004: 8). Such feminist work flows directly into the story of Zika. Women in areas of active Zika transmission are called upon to behave responsibly, both in sexual relations with men and in inter-species relations with mosquitoes. They are interpellated like this to protect the population from microcephaly—or at least, that is how the story goes.

But again, I have to ask: which population? And which women, where? Zika is emphatically a global problem, enfolded in and constitutive of a wider geopolitical and racial order. Like most recent disease outbreaks, it has involved states, pharmaceutical firms, NGOs, and doctors from the Global North, while the sexual transmission mechanism of the virus renders it capable of spreading in the absence of tropical and subtropical mosquitoes. In the story that follows, I show that women were not only urged to behave “responsibly” vis-à-vis mosquitoes and sex; they were also *disciplined* when perceived to behave “irresponsibly,” demonstrating that women are exposed to greater chances of bodily and emotional harm in line with “the perception of their biopolitically promising or harmful impact” (Deutscher 2017: 116). That is, it was precisely because U.S public health and health economics experts described women in tropical locations as being of central biopolitical importance, and not in spite of that description of importance, that Puerto Rican women were subjected to harm. This discipline, I will show, was conditioned by race and geography, and in the case of Puerto Rico, was meted out by U.S. sovereign power.

## **1.2 Non/human reproduction and economization**

So far, I have focused on the roiling agency of Zika and the state forms that sought to bring it under control, identifying women’s bodies as a key but undertheorized point of intervention in contemporary biosecurity regimes. I now reach out beyond the mechanics of infectious disease control and delve deeper into questions of reproduction and reproductive governance. And I start in a rather strange place: the economic future of the nation-state. The logics, values, and tactics of governments, pharmaceutical corporations, and philanthropic organizations involved in Zika intervention were largely organized around the “pricing” of a single case of microcephaly at USD \$10 million or more across a lifetime. That price tag, as we shall see, was arrived at by health economists and other experts, who used a range of tactics of abstraction, drawing on and contributing to scientific expertise on mosquito reproduction, the sexed sociality of teenage girls, and the virus itself. The “public feelings of risk” associated with Zika reduced both health and life to impact on publicly funded healthcare infrastructures and, by extension, the economy.

In *The economization of life* (2017a), a book that has been a central interlocuter in new feminist debates over environmental change and human population, Michelle Murphy argues that practices governing lived-being according to its capacity to add to (or subtract from) the national economy became the dominant mode of population governance during the Cold War. Development-oriented family planning programs were assembled and adjudicated with the ambition of cultivating future economic prosperity, and as Kalpana Wilson (2015) argues, they often mobilized liberal feminist conceptions of reproductive choice. “Harnesses to the enhancement of the national economy,” Murphy (2017a: 7) writes, “this new era of calculative practices designated both valuable and unvaluable human lives: lives worth living, lives worth not dying, lives worthy of investment, and lives not worth being born.”

From Malthus’s prediction of a crisis of human overpopulation amidst limited Earthly resources to Nazi ideas of racial hygiene to the eugenicist projects of the American West (Stern 2005), human reproduction has long been a means for states and para-state organizations to access and shape the future. Across the long nineteenth and early-twentieth centuries, demographers, physiologists, soil scientists, and geographers reworked Malthus’s prediction into a range of eugenicist projects (Bashford 2014); in the United States, state institutions like the hospital and reservation were utilized, as well as private institutions like the women’s society, the church, and the plantation (Schuller 2017). Women’s reproductivity was cast as a foremost arena of racial and imperial engineering (Davin 1978; Nadkarni 2014). However, the valuation of different kinds of human bodies and lives strictly in terms of their projected contributions to a national economy emerged as the prominent mode of population governance in the mid-twentieth century, pivoting on the notion that some people must not be born *so that others might live more affluently*. Indeed, this logic can loosely be traced back to Darwin as much as to Malthus: there are always too many beings that are reproduced, there is always too much biological material being birthed, and so some organisms must die soon after birth, or at least before reproducing, in order for other (fitter) organisms to live. The major question in the “biological-spatial” conception of reproduction that became hegemonic in the twentieth century was this one: “in local, national, and global human ecology, which humans died (or would ideally be prevented from being conceived in the first place) to make room for the rest” (Bashford 2014: 13)?

Murphy's "economization of life" thesis tracks this idea back in time, before birth, and forward in time to the future through a lexicon of collective economic prosperity. To repeat: some must not be born so that others might live more comfortably.

"Averted birth" names such lives precluded in the "economization of life": the "better-to-have-never lived" (2017: 47), those averted by targeted family planning programs and other forms of population management. Women's and girls' bodies, family planning practices, and sexed living being are fundamental to this thesis: fetuses, girls, and women—as well as the children these girls or women *could* have—are classified by projected net worth to the national economy, which impinges on the wellbeing of others. Population, on one hand, and national economy, on the other, have become the central grammars through which governments value life, as well as the central grammars through which ordinary people think about the future, and it is these grammars I unravel in attempts to "price" microcephaly.

The ascription of different kinds of value to human bodies—old, young, not-yet-born, and unborn—may seem, on the surface, to be calculated in a strict economic register, and Murphy is clear that the family planning projects of the "economization of life" are much different from earlier forms of population control that sought to improve the "stock" of the population, forms which hinged explicitly on a biological idea of race and racial difference. However, she is also clear that the turn from the biological framework of heritability to the framework of future economic potential continued to racialize life and operate in the service of imperial powers:

The economization of life would produce new methods of racial violence that rested on economic potential rather than bodily difference. The problem of population, as a figure of aggregate life, was replete with methods for governing brown, black, poor, and female bodies that recast racial difference in terms of economic futures. Economic futures now depended on designating overpopulation as a kind of surplus life that was better not born.

Race did not have to be named in order to enact racist practices  
(2017a: 12).

Public health and reproductive health research and interventions (carried out, in many cases, with the best of intentions) became entwined with the racialized valuation of life worth. As Sophie Lewis (2019: 11) puts it, “Supposedly nonracist, universalist concerns about quality of life slip, easily, into competitive latter-day-imperial worries about being overtaken, overrun.”

We thus end up in a familiar place for intersectional and postcolonial feminism. Reproduction in the time of Zika was governed in the name of the emotional wellbeing of abstract women, and under the banner of the biological and economic well-being of a universal future child. But each of these reproductive protagonists—virus, woman, child—were constituted differently, made to matter differently, produced differently depending on social, racial, and geographical location. The oeuvre of Dorothy Roberts is key to understanding this. *Killing the Black Body: Race, Reproduction, and the Meaning of Liberty* (1997) examines the U.S. government’s longstanding assault on the reproductive capacities of black women, vitally juxtaposing policies that discipline poor women for having children because those children are “costly” in the eyes of the state (see also Hill Collins 2004), on the one hand, and advanced biotechnologies that facilitate solvent, largely white women in their endeavor to have biological children (or even to select favored genetic traits for those children), on the other. Puerto Rican women, as U.S. citizens, occupy a central place in this racialized imaginary of reproduction and public cost (Briggs 2002). Later, Roberts (2005) would reconsider the antagonistic framing of these two reproductive regimes, looking instead to their mutual constitution and fortification of biological (racial) stories of social ills. With Sujatha Jesudason, Roberts further develops this line of thought by turning to disability’s reproductive politics, a matter which I will take on more rigorously in the next chapter. Women generally are expected to regulate their reproductive conduct in conversation with their genetic inheritance, and that expectation “may fall especially harshly on Black and Latina women, who are stereotypically defined as hyperfertile and lacking the capacity for self-control” (Jesudason and Roberts 2013: 317). This, they note, ironically rescripts the argument Roberts had made fifteen years prior, as well as some of the claims about pregnancy Rose (2007) makes: impoverished women of color might now be more likely to undergo prenatal genetic

screening, not middle-class and elite women, but that is because they are encouraged—or obliged—to do so in a broader institutional environment that deems both disabled children and the children of women of color a drain on state coffers. What Asha Nadkarni (2014) calls “eugenic feminism”—the racialized endorsement of reproduction for some people and the obviation of it for others—flickers in and out of these logics; in Zika they join up with relatively new neoliberal health metrics and modes of monitoring for signs of disability that are made to seem agnostic in terms of race and nation.

Because sex is one of Zika’s mode of transmission, and because Zika’s capacity to shape the human is spatially confined to the pregnant woman’s body, pregnant or could-be pregnant bodies were delimited and acted on as the pivot between the unpredictability of twenty-first-century nature and the public economic tolls of microcephaly. In this sense, this dissertation is very much *about women*. It is about the spectrum of future biological forms and economic futures they are seen to enfold, the spectrum of state and para-state interventions into their bodies that can be realized in the name of the pure figure of the future child, and the spectrum of behaviors for which they can be punished. There are many stories to tell of Zika, but this one is of the reproductive dystopias it engendered, and how U.S. sovereign power tried to manage dystopic horizons by working on the surface and even inside the bodies of Puerto Rican women, with potentially destructive consequences for them. Puerto Rican women and girls were rendered the fleshy pivot between the dense agency of the virus and the future of the U.S. national economy, and sometimes even the human species. I am concerned with how women are discursively produced not as full human persons but as objects to be experimented on, tinkered with, and above all, administered as a means of accessing the future. Jade Sasser (2014: 3) has written of the production of Global South women in development protocol as “intervenable subjects,” “available for development from without.” I theorize a similar framing in contemporary biosecurity knowledge here, though I adapt her phrasing to “intervenable objects” to indicate a tighter linkage with the top-down power of U.S. statecraft. I insist that this positioning and the long-term health consequences it poses for those who occupy it are intensely, irrevocably geographical.

However, this dissertation is also emphatically *not about women*. What I try to do is rework the concept of reproduction so as to unhinge it from vertical gene transmission through human sex, and thereby *unhinge it from women*. Over twenty years ago, biologist Lynn Margulis and her son Dorion Sagan (1997) suggested that reproduction comprised the production of copies of living matter and, crucially, is not limited to vertical gene transfer from human parent to offspring through sex. This is a simple enough concept to grasp, but it is actually very different from the hegemonic vision of reproduction that structures modern life: human male (gene provider 1) + human female (gene provider 2) = human offspring. And Zika's reproductive cultures are not limited to human sex. The replication of the Zika virus is another form of reproduction (which is asexual); so too is mosquito reproduction. When I invoked roiling nonhuman *agency* a few paragraphs back, I indirectly invoked the specter of nonhuman *reproduction*, or what feminist literary theorist Rebekah Sheldon (2016: 118) has called "uncontrolled biological growth." Furthermore, the manipulation of the reproductive capacities of the mosquito and the attempted interruption of Zika replication through chemical pesticides are also about the governance of reproduction. Even if we were to confine the discussion to human sexual reproduction, the intractable agency of a virus like Zika, or the unforeseen activities of industrial chemicals, can actually shape vertical genetic transfer. Donna Haraway (1992: 299) has inspired me to explore the reproductive politics of Zika in terms of "the generation of novel forms," and this generation, she writes, "need not be imagined in the stodgy terms of hominids" (ibid.).

It is in this spirit that I set out the thesis that human health in its myriad definitions—the smooth functioning of vital organs and systems, the absence of disability, control over one's reproductive capacities, or merely "feeling good"—is not free. Health cannot merely be extended to everyone, as in the great fantasy of the liberal subdiscipline of health geography, and that is because human bodies are ensconced "in a material world whose vital elements form—and whom fluxes and flows inform—their aliveness" (Cohen 2009: 8). Human health, in other words, has its violence. It often visited on other human bodies, like in the history of testing the Pill on Puerto Rican women. High hormone levels of the trial version of the Pill killed some women and sickened many more, a story which is often excised from triumphant narratives of women's increased bodily sovereignty in North America (Cream 1995; Beal 2008). Or it is visited on the

bodies of nonhuman animals. Neel Ahuja's (2016) traces the mid-twentieth century development of the polio vaccine to a colony of rhesus monkeys imported from India and established as a tiny test island site off the coast of Puerto Rico's main island. The primates, he shows, recurrently disobeyed the rules of the research island, but nevertheless, U.S. national immunity from polio hinged on the extraction of their serum, and thus their death. And, as I will show, it can spread across space and time, seeping into soil and sea. Chemical fumigation in Puerto Rico in the name of future children not only compromised the environmental health of the island, but also doubled back to threaten Puerto Rican human health on extended timescales. Likewise, the provision of intrauterine devices (IUDs) to Puerto Rican women during the emergency was linked to a range of reductions in bodily autonomy, despite also being a method of choice. These symbiotic relationships are not part of a master zero-sum game, nor do they denote that health could not be "done" in other ways, but they are indicative of the uncertain, ever-shifting global interdependency of human, nonhuman animal, and viral ecologies.

That Zika was profoundly structured by place, race, and gender in responsibility, surveillance, and intervention evinces a "paradoxical picture of inequality amidst [ecological] interdependency" (Sparke and Aguelov 2012: 726). This is why my study is about reproduction instead of simply, or only, reproductive healthcare. While matters of access to birth control, abortion, and gynecological care are central to the story, I have also sought to work with a more expansive understanding of reproduction, one that considers the economies and ecologies beyond the future child (including the lives and bodily ecologies of women). Recognizing the concrete positive impacts of expanded access to "reproductive healthcare" on the lives of women and girls the world over, Murphy (2011: 225) slows down to ask "what condensing reproduction to 'reproductive health' forecloses":

Yes, human reproduction is an embodied concern, posited through the right to bodily integrity, envisioned and managed through technoscientific practices, and experienced phenomenologically as a fleshy capacity shaped jointly by larger structural conditions (such as racial, capital, and social formations) and smaller micrological entities (cells and ribbons of nucleic acids

precipitated for us by technoscience). Reproduction does reside in bodies, and lives become precarious in birth and pregnancy. But does reproduction stop there?

Her answer, and mine, is a resounding *no*. Reproduction is about the making-more of living matter. I cast an analytic net much wider than heterosexual sex, pregnant women, and micro-encephalitic babies—in other words, much wider than the corporeal forms that dominate representations of the virus. Human reproduction, mosquito reproduction, viral replication, the reproduction of ecological systems: all of these reproductive forms emerged afresh as part of a public health emergency.

So too did *social* reproduction. As I have detailed, an incisive and important body of feminist work on population governance has tracked its racial dynamics, its varied attempts to expunge the poor from the future, and its violent wresting of control over reproduction away from women. Underexplored, however, are the linkages between interventions in the reproductive body and the everyday reproduction of social life, that is, the relationship between “biological” reproduction and *social* reproduction. One thing I try to do in what follows is theorize contemporary reproductive governance, in all of its imperialist and racist inflections, alongside those myriad forms of human labor that support embodied social life. That human reproduction is embedded in a broad social and ecological reproductive process, an inter-dependency, should be the starting point for finding more just ways to “cost” human reproduction, outside of neoliberal health metrics and the reductive burden foisted onto women as progenitors of human population.

The point is not to enfold *everything* humans and extra-human natures do into a broad category of reproduction—doing so would lead us away from the distinct ways the reproductive capacities of certain women and teenage girls are freighted with fear, and the distinct ways women and teenage girls are treated as reproductive teloi to be managed instead of thinking and feeling subjects. Instead it is to direct fresh attention to the making-copies, the making-more, and the stopping-making of biological matter as a matter of political import. Doing so, I contend, is necessary for blocking the recurrent blaming of the reproductive conduct of women and girls in

certain places for the problems of environmental change, austerity, or the inability of states to bring nonhuman reproduction under control.

### **1.3 A brief note on “women” and “Puerto Rico”**

A note on signification is necessary before delving into the virus. The first concerns my use of gendered and heteronormative language to describe and analyze Zika’s politics of reproduction: I talk about “mothers,” I talk about “women,” and I talk about “girls.” This may read as outdated, given that “the singular category of ‘Woman’ has been discredited as a bogus universal for feminism” (McClintock 1995: 11), and given that many people coded as “woman” cannot have children, that many transmen can and do, that many mothers were not the ones to give birth to their children, and that many heterosexual and gay men are the primary caregivers for new babies. But following Laura Briggs (2018: 4-5), I have stuck with gendered language because the gender-neutral construction—“pregnant people”—was instrumental in blocking legal protections against pregnancy discrimination in U.S. workplaces in *Gelduldig v. Aiello* (1974), which argued that denying benefits to “pregnant people” did not constitute sex discrimination, provided that all “pregnant people” and “non-pregnant people” are treated equally by their employers. But in addition to this, my use of gendered and heteronormative language reflects the way the Zika intervention actually worked: public health agencies and NGOs targeted the homes, skins, and uteri of those coded as “women of childbearing age,” making microcephaly their national and global debt (see Rivera Amarillo 2017: 207). Being marked as having the capacity to have children can be a powerful determiner of the conditions of one’s life, even if one does not want to have children, or if one cannot have children. As such, I explore how women’s and girls’ lives are shaped by the public perception of reproductive capacity and of biopolitical import, illustrating not a universal experience of womanhood, but the construction and re-construction of reproductivity as a social category. I also show how things that are deemed “good for women” are oftentimes life-enhancing for some women in some places and life-inhibiting for others in other places. I sit inside the language of normative girlhood, womanhood, and reproduction in order to question how that language constricts female lives.

That Puerto Rico is both part of and different from the United States presents the second representational dilemma. Part of the problem is that Puerto Rico's unique form of coloniality has largely gone unnoticed in critical geography, and throughout the course of this research I have wondered how it is that a field so interested in both post/colonialism and the saturation of the globe with U.S. military infrastructures has almost completely ignored the island (for important exceptions see Berman Santana 1996; 2002; 2005; Davis, Hayes-Conroy and Jones 2007). *Antipode*, for example, has not published a piece on Puerto Rico since J.M. Blaut's string of articles in the 1970s and 1980s, where the island's position as a U.S. colony played a fundamental role in his Marxist and anti-imperialist geographies (Blaut 1974; 1975; 1983), while Alison Mountz's (2015) otherwise excellent *Progress in Human Geography* report on political geographies of islands fails to mention the one this dissertation is about—but the dearth of critical geographical work on Puerto Rico on which to report is, I think, a legitimate reason for her silence!

Interjecting in this disciplinary silence is important with respect not only to the Zika public health emergency, but also to Hurricane Maria, which in 2017 replaced Zika in mainland news. Yarimar Bonilla (2017) argues that Maria laid bare a state of colonial neglect, and when President Trump blamed the lack of federal emergency response on Puerto Rico's being “an island surrounded by water. Big water, ocean water” (quoted in Holpuch 2017), he built on the U.S. political tradition of utilizing topographical features as a proxy for race in the face of nature's wrath (Braun and McCarthy 2005). U.S. government responses to Zika in Puerto Rico in many ways foreshadow the cruelty of U.S. government abandonment of the island after Maria, while also pointing to the coercive ways that Puerto Rican women are forcibly *incorporated* into the United States, not as political subjects, but as intervenable objects.

So, when I say “United States,” is Puerto Rico meant to be included? In scholarly work that does not deal explicitly with unincorporated territories, the United States is taken to mean the fifty states represented by the U.S. federal government; only when Puerto Rico—or Guam, or American Samoa, for that matter—enters the conversation does the ground under “United States” wobble. When I discuss the United States as a place apart from Puerto Rico in what

follows, I use the term “mainland.” It is a confusing term insofar as it also encompasses Alaska and Hawai‘i, both of which lie far from the contiguous forty-eight and have their own sordid relationships with the federal government (see Goldstein’s edited collection *Formations of United States Colonialism* [2014]), but I use it here because it is often used in Puerto Rico. So too is “island,” which I adopt to refer to Puerto Rico even though it is an archipelago. When I talk about government in Puerto Rico, I take special care to distinguish between island governments (Commonwealth and municipal) and the U.S. government, to which Puerto Ricans often refer as the federal government (*los federales*).

A range of Puerto Rican government agencies were enlisted in Zika management, while ordinary people across the island obliterated sites of mosquito reproduction, educated one another on the dangers of the virus in their own communities, and rescripted sexual education. My focus in this dissertation, however, is Zika management that was organized and orchestrated by U.S. government bodies. This is the story of U.S. government *intervention* in Puerto Rico. I focus on two agencies that are premised on fostering human health: the CDC, which is the national public health agency, and Women, Infants, and Children (WIC), a federal nutrition assistance program for low-income women and children. I also examine the efforts of the Centers for Disease Control and Prevention Foundation (CDCF), the philanthropic organization linked to the CDC and its mandate. The point is not to suggest that these institutions are unilaterally harmful, or that they are monolithic arms of U.S. empire: both are peopled with Puerto Rican scientists and other officials, after all, and linked with island health, environmental, and housing departments in complex ways. Marking a clean binary between imperial and island governance is impossible, and these agencies were not the only bodies involved in Zika management efforts in Puerto Rico. Nor is it to suggest that Puerto Rican women are a unified group of people in terms of race and class, all treated the same by U.S. government agencies and patriarchal cultural norms. Rather, the point is to understand how U.S. government Zika intervention was licensed, to explore how it worked, and to consider its possible effects. Unraveling U.S. government protocol, which was buttressed and made intelligible by a century of expert knowledge-making on Puerto Rican women, is my aim.

I approach the analysis with Puerto Rican sociologist Ramón Grosfoguel's (2003: 35-36) discussion of "speaking from," as opposed to "speaking for," in mind: this work centers "the structural location of, and knowledge produced by" Puerto Ricans in scrutinizing the reproductive politics of Zika. My perspective, of course, is shaped by my mobility, my skin color, and the fact that I grew up on the U.S. mainland, and despite my longstanding commitment to the critical dissection of U.S. empire in my work, will always be partial. I privilege U.S. interventionism over Puerto Rican machismo—a culture of aggressive hypermasculinity rooted in Spanish colonialism and associated with working class men that reduces women to a mother-whore dialectic—in the analysis, not because machismo does not shape cultural norms around sexuality and reproductive duty. Rafael Ramírez (1999: 2) has argued that the idea of machismo has been utilized as an imperialist instrument, presenting its violence as "foreign to the culture of the United States"; I am interested in dissecting the longstanding and emergent forms of sexism in the logics and actions of U.S. government agencies in Zika management and in the broad scripting of climate change as a sex panic. (And to be clear, I see my critiques of these sexist logics complementing feminist critiques of machismo.) By taking special care to tune into Puerto Rican critiques of U.S. government Zika intervention—which crucially means contextualizing Zika historically in terms of U.S. sovereignty, and socially in terms of the rich social movements against U.S.-mandated austerity—I hope to contribute something new to both the global feminist discourse on the Zika emergency and the interrogation of the latest iteration of U.S. empire on the island.

Here is how I do it. Chapter 2 introduces the architecture of the Zika public health emergency in U.S. public culture. It shows how Zika was constructed as a problem through anxiety over the capacity of extra-corporeal forces—the virus and virus-bearing mosquitoes—to "malform" the fetus, but also through the lexicon of cost, which was racialized in subtle and oblique ways. In constructing the emergency in this way—tropical nature as an amorphous but capacious *source* of danger, microcephaly as tragic *outcome* that would be costly for the nation as a whole—public and medical culture set the scene for the positioning of women and girls in areas of active Zika transmission as the bodily hinge between wily nature and national economic futures.

The rest of the dissertation delves into how state and para-state agencies intervened in reproduction in the name of Zika, focusing on specific technologies and techniques: chemicals like DEET, Deltamethrin, and Naled; the copper and hormonal IUD and the contraceptive implant; and genetically-modified mosquitoes. These techniques aren't limited to physical tools: I explore, as well, the reproductive scripts at play in Zika, such as the mother-child love script and dystopian visions of human infertility as a result of climate change. I take seriously Donna Haraway's charge that "Every technology is reproductive" (cited in Sheldon 2013).

Chapters 3 and 4 zoom in on U.S. government Zika intervention in Puerto Rico. Chemical regulation of Zika's mosquito carriers, including insect repellent guidelines and chemical fumigation, was the dominant response to active Zika transmission in Puerto Rico; Chapter 3 examines how it worked and situates it in the legal geography of the island. This geography enabled the spatialization of Puerto Rican women and girls as the corporeal passageway between virus-bearing mosquitoes and the future of the U.S. population. When they were seen to fail in properly managing their bodies and homes, more coercive forms of chemical intervention were set in motion, many with unknown human and environmental health consequences. The CDC positioned Puerto Rico as both a space of biosecurity risk inside the United States, and outside the United States in an ethical sense, in which chemical fumigation could be realized without consent.

Chapter 4 examines the first program to rapidly distribute contraception in a public health emergency: the Zika Contraceptive Access Network (Z-CAN). Here, the hormonal and copper IUD and the contraceptive implant join with synthetic chemicals as tools to manage Zika's biological uncertainty. I suggest that the IUDs and implants embedded in the uteri or skin of Puerto Rico women under Z-CAN may have eugenic effects, when considered in the context of the depopulation of the island and the atrophization of its life-making infrastructures under austerity. Here, too, the biological costs of reproductive health provision are foregrounded, from the side effects individual women may experience to the investments in life-making infrastructures that could have been made. While the previous chapter examines Zika intervention through the shifting legal geography of Puerto Rico, this one turns to the lived

experience of that unstable legal geography. My objective is to detail the logic of Z-CAN and place it within historical and geographical context of the denigration of infrastructures for social reproduction.

Chapter 5, “Love in the time of Zika,” pans out from Puerto Rico to consider the cultural and technoscientific politics of reproduction in the time of Zika. The chapter reflects on the limitations for global health of routing ethical recognition through the figures of the vulnerable child and grieving mother, the use of genetically modified mosquitoes to halt the spread of Zika, and the emergence of the reproductive environmental dystopia as a central cultural form of our time.

Each of these windows into Zika is intended to open up ways to rethink the reproductive politics at the heart of the public health emergency. *Reproduction redux* signals my desire to “revive” reproduction, to rethink and rewrite it. My study of synthetic chemicals, for instance, sets out to track possible chemical exposure in Puerto Rico, thus diverting the gaze momentarily away from the bodies of pregnant women and yet-unborn babies. I contend that Puerto Rican resistance to the U.S. chemical vector control program evinces a reproductive orientation to synthetic chemicals, the spatial dynamics of which diverge greatly from hegemonic toxicological paradigms. My take on IUDs and contraceptive implants builds on longstanding indigenous and black feminist critique of forced sterilization to explore the ethical problems of emergency birth control provision; it also draws a much-needed conceptual bridge between reproductive health and social reproduction. And the exploration of the cultural and technoscientific politics of Zika in the chapters that bookend the story of Puerto Rico explicitly takes on anxieties about the future of the human race and nature’s vengeance under climate change. As I hinted above, one crucial thing I am trying to track across all of these chapters is an emergent logic that positions the reproductive capacities of poor, often racialized women outside powerful Northern states as the pivot between an unruly nonhuman world and the future, a logic I expect to become increasingly clear, and increasingly harmful, in the years to come. However, I want to make clear from the start that my central objective in the project is political: to write against the reduction of

Puerto Rican women to intervenable objects and the extension of U.S. sovereign power over Puerto Rico.

I read somewhere, or perhaps once heard a smart woman say, that the question of reproduction would have figured centrally in the history of philosophy if women had been allowed the space to think and write their place in the world. They haven't been. When they have burst beyond the confines imposed on them, their thoughts on reproduction—a topic approached at best transversally by privileged men—have not been taken seriously. What I am trying to do here is write a feminist geography of reproduction for our tumultuous ecological and social moment, one that takes on the difficult tensions between autonomy and interdependency, between reproduction as a vast social and ecological system and the unequivocal sovereignty of women. This entails questioning, from the start, what we think we know about human reproduction. Let us turn to Zika's cultures of reproduction, from the roiling agency of *Aedes aegypti* and the array of forms of biological uncertainty that run through the virus to the state forms that seek to bring those forms under control; from the public veneration of the future child to the public trepidation over the possibility of a generation of children with microcephaly; and above all, the positioning of women and girls as the bodily hinge between the Zika virus and the future.

## **Chapter 2: For the sake of the child| Tropicality, race, and cost in U.S. Zika cultures**

The Zika virus first became an object of human contemplation in the late 1940s, when it was identified in the serum of a rhesus monkey from the Zika forest in Uganda. Human Zika infections were documented in Nigeria in the early 1950s, as well as in Micronesia, Cambodia, Thailand, and French Polynesia at the dawn of the new millennium. But something happened to Zika—ZIKV, as it is known in scientific communities—as it made its way across the Pacific in the early twenty-first century. From its original character as a mosquito-borne infection associated with no more than mild illness in humans, it morphed twice: first, in 2007, to an infection resulting in massive outbreaks, and then again in 2013 to an infection resulting in massive outbreaks associated with neurological disorders like Guillian-Barré syndrome. At the time, no one knew why.

Then, in the spring of 2015, Brazilian health officials noted 7,000 Zika infections in the northeastern corner of the nation, and months later, the Ministry of Health reported an explosion in cases of microcephaly. The number of babies born with underdeveloped brain tissue and small head size had multiplied by twenty in the region (Oster et al. 2016). Scientific research including lab tests on the virus, case studies of pregnant women who have had contact with the virus at different gestational stages, and studies of larger groups of pregnant women and their children, reached two points of consensus in the early months of 2016. The first was that the virus could be transmitted by sex between people of all genders; the second was the certification of a relationship between the virus and microcephaly, especially when a pregnant woman was infected early in her pregnancy (Rasmussen et al. 2016; Rigau-Perez 2018a; 2018b). In academic journals, scientists speculated that the etiology of microcephaly was complex, such that Zika may not be its singular “source,” but one agent among many. That “something else” could have been environmental exposures, genetic factors, or other infectious agents, but again, scientists

were not certain.<sup>1</sup> From northeastern Brazil, Zika moved through huge expanses of the Western Hemisphere, moving through humans and mosquitoes in South America, Central America, Mexico, the Caribbean, and the southern United States. The outbreak in the summer of 2016 resulted in more than a half million cases, as well as 3,700 related birth defects (Pan American Health Organization 2018).

From the start, we can observe that Zika affects children: all evidence suggests that the latent threat of microcephaly exacts a significant toll on quality of life for its young sufferers. We can also observe that Zika affects women who give birth to children with microcephaly. Though women are not the only people tasked with taking care of such children, they are likely to bear most of the burden of caretaking, with clinic waits and the consolation of inconsolable babies crowding out the capacity to hold a job and teenage dreams for the good life. The Brazilian media, for example, is rife with tales of fathers abandoning babies with microcephaly, an archive that has come to be called “male abortion” (Roberts and Parrish 2016). Likewise, Zika heightened problems of restricted access to birth control and abortion. Because it raises the likelihood of miscarriage, for instance, women in El Salvador lose sleep over the possibility of being mistakenly charged for having procured an abortion, which carries a prison sentence of up to fifty years (Strochlic 2016). Given the ordinariness of sexual assault, the virus made a whole series of horror stories possible. A teenage girl contracts the virus through rape. She is unaware of having been infected; besides, what’s on her mind is not microcephaly, but how to provide for a child alone and in the face of community chastisement, or how to procure (and survive) a clandestine abortion. Sometime after she begins to show and before she is due to give birth, the virus induces a miscarriage. Because she goes to a public hospital for aftercare, she is reported to the authorities for self-induced abortion, and ends up incarcerated (ibid.). Zika is, in so many ways, a disease that nightmarishly reordered the lives of women and girls.

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<sup>1</sup> As stated in the introduction, scientists have since posited that a single genetic mutation in Zika is responsible for fetal microcephaly (Yuan et al 2017).

But was Zika's profound impact on women and children the reason it became a matter of alarm in the United States? Was concern for the wellbeing of women and girls in Brazil, in Honduras, or in Puerto Rico the root of Zika interest? This chapter broaches these questions by examining how the virus was produced as a public health emergency in U.S. public culture. After explaining Zika's transmission mechanisms and its global geography of biospheric change, I detail the reproduction of images and numbers associated with the virus amongst audiences in temperate climates.

Starting my story in the United States allows me to demonstrate that, from the get-go, the proliferation of Zika cultures was not limited to areas of active viral transmission. Zika had a rich visual, scientific, and pop scientific archive that dotted between public health and health economics experts and the ordinary readers of internet news and viewers of nightly news specials, which produced the danger of the virus and raised up a child to be protected in very particular ways. This storying of Zika was speculative; it was the *possibility* of the virus shaping the biological and financial future of the U.S. nation that grabbed hold of the public imagination and set the stage for interventions elsewhere. This production of possibility drew on the narrative arcs of earlier public health emergencies, from yellow fever to rubella to HIV, touched on existing racist "welfare queen" and "anchor baby" tropes, and became part of affective, medical, and immigration infrastructures that reduce lives to what they might add or subtract from the U.S. economy. I am interested in tracking a narrative that racially dichotomized future children into those to be cherished and those to be averted.

## **2.1 Reproductive cultures of ZIKV and *Aedes aegypti* (or, controlling Zika's tropical nature)**

Nancy Stepan (2007: 37) argues one of the central reasons for international interest in yellow fever in the early twentieth century was its terrifying allure: "dramatic epidemic character, its high fatality rate and the disruption that epidemics and quarantines caused at a time of growing trade and immigration, combined to give yellow fever a national prominence that other diseases did not have." It wasn't only yellow fever's high fatality rate that was sensationalist; it was also

its intensely hued materialization on the body. The disease seemed to strike some people down quickly and brutally, wrenching the body into a violent fever and bringing on such horrific symptoms like bleeding crimson from the mouth and gums, black vomit, and severe jaundice. Zika, which is in the same genus of viruses as yellow fever, does not dramatically register on the surface of adult human bodies. Its making into a public health emergency, by contrast, can be at least partially explained by its *imperceptibility* in most adult humans. That one can have Zika and not know about it, that it defied surveillance and detection, constituted its ecological-corporeal dramaturgy.

Like all viruses, Zika replicates inside the living cells of other organisms. To reproduce, its proteins talk to receptors on the cells of humans and mosquitoes, utilizing the machinery within these cells so as to enter and then engineer the cells to make Zika proteins and RNA. A new generation of Zika progeny virions (the complete, infective form of the virus) follows. From its entry point on the human dermis and epidermis, Zika moves to the lymph nodes, producing an immune reaction. It then enters the blood stream, which affords it access to the rest of the body. All the while it continues to replicate (Sikka et al. 2016). Zika's human hosts are unlikely to notice the chain of reproductive events unfolding in their lymph nodes and bloodstreams. In 80 percent of cases it is asymptomatic, and when symptoms do occur, they are not catastrophic. A mild rash might develop on the skin, or a fever may emerge; joints might ache and eyes might itch. After a week, however, the human will return to normal (Oster et al. 2016). Public health officials tasked with diagnosing and monitoring Zika are challenged by the indistinctiveness of the symptoms that do present, which are akin to the common cold or flu. This wily biological matter also evades blood tests and is often invisible in scans of developing fetuses. The CDC recommended two rounds of Zika testing and monthly ultrasounds for pregnant women in Zika-affected areas, but such a program could not be realized in most places of active transmission, at least for most people. Even in places with a public healthcare system like Brazil, healthcare personnel and equipment were unable to handle the increased demand for pregnancy vigilance, and in 2016 there were backlogs of Zika tests in rural areas (Rabin 2016). The presence of Zika in the human body is difficult to monitor, and in 2016 was, for a variety of infrastructural reasons, oftentimes not being monitored at all.

Zika's command of the human body is vast: the virus not only makes a home of human blood, but also of cerebral fluid, semen, vaginal fluid, and breast milk. In seminal fluid, it can linger upwards of sixty days, long after it becomes undetectable in blood (Fiorentino and Montero 2016). In semen and vaginal fluid Zika finds its second most common form of transportation: human sex.

Its primary mode of transmission, however, is the *Aedes aegypti* mosquito, whose geography spans tropical and subtropical regions of the world. *Aedes* lives almost exclusively in cities and feeds during the day. She thrives in the rubber, metal, and plastic refuse of urban landscapes: plastic bottle caps left behind, the cozy rims of automobile tires, and stagnant pools of all sorts. Her affinity for standing water means an affinity for neighborhoods with inadequate sewage systems, where streets may not be paved evenly, as well as human dwellings without air conditioning or screen barriers. *Aedes* flourishes in the puddle-dotted favelas of Brazil, for example, breeding in pockets of water left behind by humans and making meals of unsleeved arms. Her imbrication with the everyday life of humans makes her profoundly resilient, “the most dangerous nonhuman animal on the planet” as declared in a *National Geographic* piece on Zika (Gorney 2016). Hers is indeed a sordid history: she's been an agent of dengue, yellow fever, and malaria. It was via *Aedes* that the new form of Zika traversed the American continent in 2016.

*Aedes* has her own culture of reproduction. A female *Aedes aegypti* might mate only once in her life, an act from which she is able to store sperm inside her body and recruit them for later rounds of fertilization. She then lays her eggs in the water that accumulates on streets and in old tires and buckets and pots and vessels. Or she might lay a batch of eggs in a safe, dry place, where they will wait patiently for rain to nourish growth. If *Aedes* does not meet any potent insecticides, and if she manages to escape the wrath of many a slapping hand, she will do this perhaps five or six times across her month on Earth. And while she consumes plants from time to time, her quest to mate is nourished by human blood. She

hones in on you by sensing the proximity of blood from your sweat, your breath, your warmth. Her feeding apparatus, that elaborate proboscis, is a multipart marvel with a skin-piercing fascicle of tiny stylets that can suck your blood while injecting mosquito saliva laced with an anticoagulant. A mosquito can slip that fascicle into your skin so gently that you have no idea what's happening until the blood meal is already under way. She can sip your blood until she's more than twice her weight and has to lumber off someplace to rest, jettisoning the liquid and retaining the nutrients, before she can fly properly again (Gorney 2016).

In a particularly sumptuous blood-meal, she will consume three or four different humans. My sustained gendering of the mosquito here is deliberate: only female mosquitoes bite humans, and their preference is pregnant women because they are swollen with blood. It is through the blood-meal that the Zika virus can find its way into a fresh human body; the blood-meal yokes the asexual reproduction of ZIKV and the sexual reproduction of *Aedes aegypti*.

There is a global geography to the reproduction of our viral and insect protagonists, which cannot be separated from the recent recasting of the environment as the chaotic progenitor of illness in the expertise of international health bodies like the WHO (Senanyake and King 2017: 1). The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), for example, states that climate change entails not only the speeding up of disease diffusion, but also the complexification of diffusion pathways with an expanding cast of variables (ibid.). A recent piece in the *Los Angeles Times* argues that longer, hotter weather forms are prolonging the reproductive seasons of rats and rodents, expanding their population in Los Angeles, New York, and Houston and rendering the human populations of these sprawling metropolises vulnerable to bubonic plague (Randall 2019). A related critical body of literature intimates that the reconfiguration of local agricultural ecologies for large scale industrial agriculture increases the chances of new epidemics in the context of biospheric change. Wallace and Wallace (2016: 2) write

Ecosystems in which ‘wild’ viruses are controlled by the rough-and-tumble of environmental stochasticity are being drastically streamlined by deforestation and plantation monoculture. Pathogen spillovers that once died out relatively quickly are now discovering chains of vulnerability, creating outbreaks of great extent, duration and momentum.

Indeed, speculation abounded as to whether the making of the countryside into monoculture plantations in northeastern Brazil, the epicenter of the Zika public health emergency, played a role in the arrival of a new variant of *Aedes* to the region (ibid.).

The links between Zika, mosquitoes, microcephaly, fetal environment, other flaviviruses like dengue and chikungunya, changing weather patterns, and changing agricultural systems, the outbreak and its effects were not completely understood, especially in the early months of the outbreak. However, the very real heating-up of the Earth and the transformation of ecologies to plantation monoculture breathe life into mosquito-borne diseases like Zika. In the cauldrons of twenty-first century globalization, development, and climate change, humans and mosquitoes collided with circulations of viral matter, intermixing in new and dangerous worlds. Such circulations reach down to the scale of human sex and sexual reproduction; Zika fused the danger of sex with the chance of a mosquito bite, of conception, and of the manifold interactions between fetal, maternal, and supra-corporeal environment.

If there was a global geography of anxiety over disease, climate change, and reproduction in public health expertise, that anxiety was unevenly distributed, and gathered around the equator. With the reconfiguration of life cycles and geographical reach of infectious parasites and mosquitoes alike, leading climate change scientists presage new viral futures which are *concentrated in tropical zones* (e.g. Kritani 2013). There is a long history of Western anxiety about tropical nature, redoubled with anxiety over the dramatic character of contemporary ecosystem change. “Tropicality” is the cultural and political construction of the “tropics” as irrational, uncivilized, and pestilential (Arnold 1996). Its manifestations in science, literature, and tourism are varied, but they all represent tropical natures in and through the fears and

fantasies of their authors, with temperate Europe as counterpoint. If tropicality informed the pasts of European colonial exploration and exploitation, it also informs the presents of public health expertise. In the vast and influential oeuvre of economist Jeffrey Sachs, for example, one finds that

Tropical countries are doomed to poor agriculture and insect infestations, while temperate countries are said to benefit from good summers for growing food grains and healthily cold winters that eliminate insects bearing malaria, dengue, and yellow fever (Sparke 2009: 146).

Sachs's map, in which winter is understood to be "the world's most effective public health intervention" (quoted in *ibid.*), is not a stable one: "Warmer temperatures are *extending* the range of various tropical vectors," he writes in a bulletin for the WHO, "As human habitats change because of global warming, emerging and re-emerging diseases...and other zoonotic (animal diseases transmitted to humans) diseases are likely to appear" (Sachs 2016; my emphasis). The IPCC report noted above highlights that in an increasingly volatile environment, mosquitoes and other disease vectors can overcome previously solid geographical barriers (Senanyake and King 2017: 1). Public health expertise on emergent tropical disease is underscored by a politics of fear—which, in the case of Zika, encompasses the microgeography of genetic mutation, the regional geographies of *Aedes aegypti*, and the global geography of biospheric change—that tropical nature could not only befuddle outside attempts at control, but also that the agents of tropical disease could burst beyond their designated equatorial geography and rewrite human bodies in temperate climates.

Such fear is evident in scientific discussions about the possibility of Zika "herd immunity" (e.g. Siedner, Ryan, and Bogoch 2018), which takes the plummeting of Zika cases after the fever pitch in 2016 in tropical locales as a cause of concern for people in temperate ones. Is the reduction or near disappearance of Zika cases in Latin America indicative of immunity in the tropics? If tropical people are immune to the tropical virus, does that render temperate people vulnerable to the same virus, given that it can spread through sex in temperate regions, even in the absence of tropical mosquitoes? Could the disease end up sparing human reproduction in the tropical

regions armed with herd immunity, but wreak havoc on human reproduction in temperate regions?

It is also evident in the U.S. government's avowal to monitor and regulate the tropical virus in bodies and tropical mosquitoes in cities with advanced biosecurity technologies. Consider an exchange between racist British newspaper *The Daily Mail* and the United States Department of Homeland Security (DHS) that captures the anxiety about Zika's deceptive nature (Graham and Edwards 2016). When asked about border security and Zika, DHS provided a statement detailing joint efforts with the Department of Health and Human Services and the CDC, reporting that "enhanced mass screenings" for Zika would likely be ineffective because Zika is asymptomatic in the majority of cases and mirrors the symptoms of a common cold and fever combo in most others. But even as it acknowledged the inefficacy of Zika screenings, the statement stressed that Border Patrol personnel would "observe all travelers entering the United States for general overt signs of illness at all US ports of entry." In other words, DHS announced the futility of Zika screening at border and ports of entry in the same breath as announcing its commitment to relentlessly scanning the field of comings and goings for visual signs of the virus. Wendy Brown (2010: 25) has argued that checks like this "often function theatrically, projecting power and efficaciousness that they do not and cannot actually exercise." Fortressing here may be "an image of sovereign state power in the face of its undoing" (ibid). The declaration of commitment to scanning for the virus was more important than any actual surveillance infrastructure put in place, while the declaration projected efficacy in halting the spread of Zika that it in no way had. The Zika public health emergency drew on the twinned desire to bring the movements of tropical nature under technoscientific control, on one hand, and fear over the uncontrollability of tropical nature, heightened through real ecosystem change, on the other.

"Even at their most powerful, states are rarely ever able to remake life in their own sovereign image," writes Neel Ahuja (2016: vii). The latest mutation of Zika, with its blooming of biological uncertainty at molecular and geopolitical scales, in the human body and across seas, called states and para-state organizations into action for the management of Zika's nature on

behalf of certain people. But the possibility of that nature proving beyond the control of state power and public health expertise loomed throughout.

## **2.2 Fetus and child development, disability, and bodily sovereignty**

Amidst this talk of mosquito and viral reproduction, it is important to remember that Zika became a global public health problem because of its capacity to reconfigure *human* reproduction. In this way, it links up with the recent proliferation of movies and English language literature that speculate about the possibility of human extinction—the *end* of reproduction—amidst environmental change (Braidotti 2013; Clark 2017). Fundamental to this was the CDC’s exhortation for couples to postpone pregnancy for at least six months after exposure to the virus (Tavernise 2016). Beckoning self-imposed sterility, Zika stood as example of nature’s vengeance against humans, not as biochemical matter with the capacity to render humans sterile such as the toxic waste and nuclear fallout of apocalyptic futures, but perhaps as a sign of “uncontrolled biological growth” as new viruses and new mutations of old viruses emerge, threatening the ways we “do” human, including how we “do” reproduction.

Infectious disease is normally understood as a pathological hybrid condition, characterized by the presence and multiplication of microbial organisms within the bodies of larger organisms, including humans (Ahuja 2016: 8). This hegemonic understanding of infectious disease plots disease-causing or disease-bearing microorganisms as *outsiders* to the human body, parasites “that threaten the body’s functions, even life itself” (ibid.). Academic and popular publications in twentieth century immunology “tended to presume that the immune system served the purposes of protecting an identity defined independently of its own functioning” (Goffey 2015: 9), that is, a bounded body (and by extension, a bounded self). Haraway (1991) proposes that by the 1980s, immunological narratives in the United States mirrored racialized military narratives of “invasion.” And as Ed Cohen (2009: 3-4) argues, the modern Western equation of immunity with defense “radically changes not just how we imagine our bodies as living organisms but also how we imagine what it means to be an organism living among other organisms and what it means to be a human living among other humans.”

Zika's power to slip under the skin of the sovereign adult body is one matter, but its power to mark the *fetus* is yet another. In the words of Rebekah Sheldon (2016: 119), "other-than-human profusions" such as Zika "threaten to dissolve the bond that seals the child to the future." That Zika can reside in humans undetected and hitch rides in the circulatory systems of female mosquitoes became a matter of public concern because of its capacity to reshape fetuses.

Congenital birth defects have long been considered tragedies in the United States, placing the obviation of disability at the heart of national reproductive politics. The mid-twentieth century history of rubella played a profound role in constituting them as such. More than ten million adults in the United States contracted rubella in mid-1960s, but public health officials were much more worried about the infants of the two million women infected early in pregnancy. A 1965 *New York Times* article captures the panic: "As a consequence, thousands of babies bearing the marks of their mothers' infection during that epidemic will soon be born—some having been delivered already—and there is nothing that can be done about it" (LaFrance 2016). In the end, 30,000 babies were born with rubella-induced birth defects, and 20,000 more died from rubella-associated complications. Note that rubella became emergency because of the mothers and children it touched and transformed. Central to the elevation of rubella to a matter of national concern was its threat to white, middle-class women and their children (Reagan 2012). Rubella was spotlighted in popular discourse because it had the potential to rewrite privileged bodies in direct and indirect ways, and they were prioritized in medical practice over other diseases and health issues that already touched the poor. Its public pedagogy, however, was love and tragedy: love for the unborn child itself and its expected adult flourishing, and the tragedy of fetal "malformation."

By the dawn of the twenty-first century, the narrative of national tragedy gathered around child development had become a fundamental strategy of pro-choice activists in struggles to keep, at least in a legislative sense, male Republican hands off women's bodies. "Messaging and storytelling that relied on pre-natal disability diagnosis and a justification for access to late abortion" multiplied, casting "any potential disability as a 'painful tragedy' to be avoided at all costs" (Roberts and Jesudason 2013: 323). Such storying echoes across the Zika public health

emergency: feminist theorist Claudia Rivera Amarillo (2017: 204) argues that Zika's public cultures were structured around the idea of the perfect unborn child (*nonato*), with the image of microcephaly "evok[ing] fear of degeneration and the need of protection" (my translation). Much older forms of scientific expertise lay the ground for these enunciations as well. Carolyn Steedman (1995) has shown that nineteenth-century scientific expertise on physiological development was fundamental to constructions of both the modern idea of the child and evolutionary biology. The child's physiological development was yoked to the development of the human species across time, a yoking which would help delimit human reproduction as a major focus for governments concerned with the racial composition of their populations. Out of the circulation of scientific knowledge on child development between experts and publics, the child emerged as a chronicle of the great biological past of humans as well as, crucially, a receptacle of a specific inheritance that would shape the future.

With these historical linkages between ideas of fetal development and national and evolutionary development in mind, let us turn to how Zika was presented visually in U.S. medical and popular culture. In *Freakery* (1996: 1), Rosemary Garland-Thompson argues that "the extraordinary body is fundamental to the narratives by which we make sense of ourselves and the world," and the "Zika baby" was one such affectively charged image whose reproduction participated in the making of Zika into a public health emergency.

The first thing to note about Zika's visual field is its comparative element: medical diagrams show the "Zika baby" to have an underdeveloped cranium. Figure 2.1, which is centered on the CDC's description of congenital Zika syndrome, sets an image of a baby with microcephaly and one with "severe" microcephaly next to one with a "typical head size." The tape measure around each head reminds the viewer that microcephaly is a clinical term that can be described numerically, while the dotted curve arcing out from the two figures on the right are meant to show what a head *should* look like. It is worth highlighting that the image does not speak to the health problems that may accompany congenital Zika syndrome, and apart from a quick nod to "ocular abnormalities," the accompanying information on the webpage does not either. Instead,

the CDC's focus is difference in head circumference, the measuring of which with a plastic tape measurer within the first 24 hours of life is deemed of central importance.



**Figure 2.1: Shadows of normality (Source: CDC)**

This spectacle of bodily abnormality was inextricably bound to the roiling agency of both virus and tropical mosquito inhering in the emergency. Fears of epidemic infectious disease speak to the animate interdependency of the human and viral, showcasing the hybrid and ever-changing conditions of corporeal entanglements. Human musculoskeletal and neurological systems were plastic in the face of contact with the Zika virus. Just as microcephaly stoked fear of disability, so too did it stoke anxiety about the openness of the human body to nature, broaching the inside-outside bodily boundary ensconced in Western thought. It indicated an agentic nature, a nature that *can*. *Poder*, in Spanish, captures much more than just “can” as a verb: it also means both power and the state of being able to do something as nouns – this is a much closer approximation to Zika’s capacity to mark the human. Zika was constituted as global public health emergency for its *poder* to mold the human, openly flouting the rules of Western corporeal sovereignty and the given model of human reproduction. The “male gene provider + female gene provider = child” equation was rewritten into “male gene provider + female gene provider + virus (with its own unstable genetic configuration) + mosquito = ?”.

When I first started this project, and before I went to Puerto Rico, I was doing rudimentary reading on the diffusion of the virus on the island, and came across a *Washington Post* photo album. I was struck by the image that opened the album, which I unfortunately cannot reproduce here (see Sun 2016a). The photo displayed a brown-skinned woman walking next to a canal, which, the viewer learns in the accompanying text, is an ideal site for mosquito reproduction. Cast around one of her shoulders is a fabric baby wrap, and in it, she's carrying not a baby, but a small black dog. The image draws implicit connections between the "Zika baby" and the nonhuman animal. It visually captures the fear that the openness of the human to nature may come full circle: able to shape and mold the human figure into something that is almost nonhuman, thereby wrenching the human into the nature over which, transcendent of which, the human is supposed to stand (Anderson 2007). What was important about the multiplication of medical and press images of the "Zika baby" as part of the making of a public health emergency was not so much the corporeal otherness of the baby, but what that otherness signified to onlookers. Elizabeth Grosz (1996) argues that through "horror and fasciation," images of the extraordinary body fortify the normality of the viewing subject. Sensationalized images of the "Zika baby" signaled the openness of the human to the extra-human, shored up the viewer's boundedness in contradistinction to the "Zika baby," but also sounded alarms of the possibility of their own body (and their own place in human genealogy) being opened to nature, by nature. In the future, perhaps we will historicize Zika as a public clinging to the human child's development as a rejoinder to nature's hyperfertility; in other words, as an attempt to reinscribe life and agency into human genealogy at the time when Zika, as well as things such as advances in the life sciences and environmental contamination, render the Western fantasy of bodily sovereignty more and more difficult to uphold.

Concretely, though, the overwhelming majority of images in the U.S. news were of actually existing children, which tended to depict them crying or otherwise in agony. Figure 2.2 is a typical image in this archive. In contrast to the medical diagram above, almost all of the actually existing babies with congenital Zika syndrome that featured had black or brown skin. One is hard-pressed to find an image of a child with microcephaly with blue eyes.



**Figure 2.2: A typical image in the North American Zika archive (Source: LA Times)**

The racialization of Zika's visual field is surely a reflection of the fact that the virus principally affected poor people in Latin American countries. But it cannot be reduced to demography nor geography: there is a long history of Western fascination of bodily difference of people of color. In the nineteenth century, for example, Sara Baartman, a South African Khoikhoi woman, was cruelly "exhibited as a 'freak' in London and Paris on account of the presumed particularities of her body. Her most exciting features to European audiences were her alleged 'steatopygia,' (a condition resulting in the accumulation of fat in the buttocks) and the presence of the (mythical) 'Hottentot apron,' the elongation of the genital labia" (Moudileno 2009: 202). This fascination with racialized bodily difference is tied to the multifold racist discourses across the globe that animalize/dehumanize people with dark skin pigmentation (Mollett 2017), which are intensified when linked to extra-human forces like bacteria or viruses. Medical and literary pictures of the disabled and dark-skinned "leper," for example circulated widely in the United States around the turn of the twentieth century, bridging fears of disease and fears of race (Ahuja 2016). While Zika was narrated as a public health emergency that could mark any and all future children, microcephaly was visually reproduced as a problem attached to brown and black skin.

### 2.3 Economic dystopia, race, and the “economization of life”

The spectacle of “freakery,” was not the only shape public fear over Zika-related microcephaly took, less still the primary. The corporeal difference of microcephaly and other aspects of congenital Zika syndrome called governments and NGOs to public health action, but so did speculation over microcephaly’s aggregate *costs*, in terms of both public and private infrastructures of care and lost productivity. I now want to consider how microcephaly was produced as a national *economic* problem in U.S. public culture.

Diagnosed postnatally or in the womb, microcephaly is a simple descriptive term: it denotes a smaller-than-normal head size for age, and almost always indicates problems in brain development; prior to Zika, microcephaly affected 2-12 babies of every 10,000 born in the United States (March of Dimes 2017). Babies affected by Zika-associated microcephaly may have seizures, intellectual disabilities, and hearing and vision problems. These intergenerational manifestations of gestational Zika infection do not determine quality of life, but they certainly will shape it, and as public health reports around the world emphasized, even in the absence of a wide-scale Zika outbreak, the possibility of a sudden surge in congenital birth defects and other neurological problems would tax healthcare systems with limited funds. The burden of caring for “Zika babies” would fall on a mix of parents and extended care networks, private insurance, and state-funded healthcare. In the United States, state-funded care would fall under the mandate of Early Interventions B-3, a federal health program designed to provide care to babies and children under age three with disabilities or developmental delays. Multidisciplinary care would be required, including hearing and vision screenings, preventative pediatric care, and immunization rounds. Babies would need to be measured across their first year of life; to address feeding problems, lactation consultations would need to be conducted and the need for long-term nutritional therapy would have to be assessed. Neurologists would need to assess sleeping problems and general irritability (Gruendel, Gann and Reynolds 2016). This suite of measuring and monitoring professionals was imagined to be multiplied by the hundreds (thousands? millions?), and spread out and expanded across a lifespan.

The first to attribute a dollar value to a single case of Zika-related microcephaly was CDC director Tom Frieden. At a press conference following the Zika Action Plan Summit in April 2016, which 300 public health experts attended, he gave the figure of \$10 million across a lifetime, a figure arrived at by birth defects specialists (CDC 2016b). The figure was later reproduced in *The Washington Post* (Sun 2016b), *National Public Radio* (Kelly 2016), *NBC News* (Fox 2016), and the *New York Times* (McNeil Jr 2016). In the same month, alongside a long list of other organizations, the American Medical Association, American Congress of Obstetricians and Gynecologists, American Nurses Association, and American Pediatric Association signed an open letter to Congress urging the allocation of additional funding for Zika management. “In addition to the human toll on children and families,” the letter proceeded, “the CDC estimates that the average lifetime cost of caring for each child born with microcephaly will likely be millions of dollars *per child*” (emphasis in the original).

A key feature of national Zika accountancy was the uncharted character of congenital Zika syndrome: with long-term health effects unknown, so too were its costs. A report from personal finance website CBS Moneywatch utilized the language of the insurance firm to explain this dilemma.:

Children born with microcephaly, which has no cure, will require long-term care if they survive. Some microcephalics can live normal lives, but most suffer from severe disabilities. And while some could die early on from complications, a vast majority will need care throughout their lives. In insurance lingo this is referred to as a “long-tail” loss because the extend of the damage isn’t known and is paid out over many years. For example, children with Down syndrome can live well into their 60s (Leefelt 2016).

Indeed, questions abounded: Would congenital Zika shorten the lifespan? Would children who experience seizures continue to do so across their lifetime, or might they grow out of it? Would medication allay seizures, and if so, how much would it cost? What kind of learning or physical disabilities will congenital Zika syndrome produce, and what medical infrastructures would be required for care? Would speech, physical, and occupational therapy help? How often would

children need physical exams? Would CT scans be required, and if so, at what intervals? Would vision and hearing problems associated with congenital Zika syndrome diminish or grow over time, and what kind of care would be required (McNeil 2016b: 85)? In an October 2016 Puerto Rican Department of Health (PRDH) clinic on Zika procedures, a photograph of an iceberg was shown to capture both the unknown shape that congenital Zika syndrome could take, and the size of the unknown relative to the known. A consensus among public health experts congealed around the indeterminacy of congenital Zika syndrome, tied to the sizeable dent it would make in public health care coffers.

Later there were attempts to price microcephaly more rigorously than Frieden. Researchers at the CDC's Division of Reproductive Health would arrive at a more precise cost estimation with the help of Truven Health Analytics' MarketScan Commercial Database, a database of "real-world treatment patterns and costs" utilized by both public health researchers and business assess financial and clinical performance together. Using the average costs of caring for a child with symptomatic congenital cytomegalovirus as well as the paid and unpaid costs of caring for a child with severe congenital brain injury as two stand-ins for Zika-associated microcephaly, Li et al. (2017) proposed a lifetime cost of \$3.8 million. Likewise, a team of epidemiologists and systems scientists modeled the potential "economic burden" of microcephaly based on different viral "attack rates" in six states in the U.S. south. Cost estimates included direct medical costs, including to the public healthcare program Medicaid, and the societal "productivity losses" incurred from screening for the virus, monitoring the fetus, medical care for babies with microcephaly, and long-term care (Lee et al. 2017). The costs of microcephaly included the lifelong medical care required for people unlikely to be able to join the labor force, as well as the partial or full removal of their primary caretakers from the labor force.

Implicit to all of this is what Robert McRuer (2006: 31) calls "compulsory able-bodiedness," a disciplining culture with roots in nineteenth century industrialism in which "being able-bodied means being capable of the normal physical exertions required in a particular system of labor" (2006: 8). More recent roots can be found in the technical health metrics that have become central to the work of institutions like the World Bank in attempting to quantify at the level of

the population the “global burden of disease,” as in, for example, the influential 1993 report *Investing in Health* (Murray and Lopez 1996). Katherine Kenny (2015) argues that the conceptualization of health on which these metrics are based is Gary Becker’s (1962) human capital theory. His student Michael Grossman (1972) further developed this theory by framing health as a central determinant of the amount of time that may be spent on market and nonmarket activities. Driving his formulation was the idea that improving health could make more labor available for the market. In this light, lost productive *time* can be given a dollar-value. As Kenny (2015: 21) puts it,

Health as a site of investment yields life, here configured as a form of time. The return on investment in health as human capital is an increased dividend of time...Investing in one’s health extends the *duration* of possible participation in market and nonmarket activity, and maximizes the term over which investment in one’s health capital can be realized. Premature death represents the foreshortening of the term of investment. Health, on the other hand, extends life. But figuring health as form of human capital results in the reconceptualization of life as a *revenue stream*.

Becker, I should note, was also profoundly influential in the field of demography: his second most-cited work, *A treatise on the family* (1981), connected individual reproductive decision-making, microeconomics, and population governance. Jemina Repo (2018: 250) argues that “as a harbinger of our twenty-first century ontology of reproduction, Becker introduced the idea of reproduction as a matter of utility maximization.” Thus, in the context of the “epistemological primacy” of cost relations and “widespread panic about the overtaxed U.S. health care system” (Ehlers and Krupar 2017: 39), microcephaly was constructed as a national *reproductive* problem, in terms of the cost of care and lost productive time.

The widespread valuation of not-yet-born lives according to their projected credits or debits to the national economy in the Zika public health emergency evinces the biopolitical logic of the “economization of life.” The central principle of this logic is that the birth of some humans should be averted so that others, in the future, might live more comfortably. It hinges on the

contemporary governance of reproductive bodies under the banner of ostensibly utopian economic futures. The ability of the not-yet-born but could-be-born babies to contribute to the economy in the future, including the robust provision of future health care: these are the ingredients of this utopian imaginary. It is not concerned with individuals, but aggregate would-be life that can be assessed in the lexicon of currency, and women, as the grouped progenitor of grouped future life (“population”), are its point of intervention (Murphy 2017a).

This “economization of life” points to another way women, fetuses, and children were racialized in the Zika public health emergency: through the grammar of “cost” to the national economy. Reproductive accounting in the time of Zika, for example, dovetailed with immigration politics in June 2016 reports of a Honduran woman who flew to the United States and gave birth to a daughter with Zika-associated microcephaly. This brought conservative pundit Ann Coulter to tweet, “Honduran woman flies to New Jersey to give birth to Zika baby. Her anchor baby will cost AT LEAST \$1 million to treat.” News of the birth made its way through mainstream news conglomerates in the United States, Canada, and the UK, as well as white nationalist platforms like Breitbart and smaller sites and blogs aplenty. Likewise, a CNN Moneywatch report channeled Frieden’s pricing of microcephaly (now expanded into a range of \$1-10 million per case) through a series of demographic, epidemiological, and gestational probabilities: the number of women in the United States who were likely to get pregnant in the summer and fall of 2016, the percentage of those women who lived in places that could be at risk of Zika, and the percentage of children born to women who had had Zika who develop microcephaly:

So here’s the speculative—and very speculative at that—math. The Center for American Progress estimates that 2 million women in the U.S. will get pregnant this summer and fall, with nearly half of them living in areas potentially at risk of Zika. It’s important to note that the public policy group’s analysis isn’t based on the actual prevalence of Zika around the country, while even if the virus spreads only a fraction of women are likely to be infected. Still, if even just one in 10 gets Zika, the CDC estimates that up to 13 percent of their unborn offspring could develop microcephaly.

If just 13,000 babies are born in the U.S. with this disability or to women who migrated here for better medical treatment, the cost of keeping them alive and providing for their lifetime care could range from \$13 billion to as much as \$130 billion (Leefeldt 2016).

All of the above scenarios demonstrate the transformation of microcephaly from a clinical term to a site of aggregate economic speculation with latent racial anxiety, in which costs were imagined to spread horizontally across the population through medical care and lost productivity and reach temporally into the future.

The racialization of this panic draws on the persistent linkage between immigration politics on one hand and public health panics and promises on the other. There are many layers to this; the first is the longstanding cultural association between infectious disease and prospective or already-landed immigrant populations. Across the history of the U.S. nation-state, germs, disease, and infection have been assumed to come from outside its territorial boundaries, while restrictive immigration policies have been rationalized through a language of medicine and public health. It is crucial to note the discrepancies between the association of disease and foreignness and how borders are managed; that is, between the imaginative geographies of infection and the everyday effectuation of immigration policy. On the “foreignness of germs” in the HIV/AIDS crisis, Markel and Stern (2002: 777) write:

This perception was supported by immigration health policy, which required only potential immigrants and visa solicitors, not visiting travelers of American citizens returning from abroad, to undergo medical examinations before leaving their countries of origin. Thus, the realistic menace of imported germs—which scorn all boundaries and can incubate just as elusively and easily in an American tourist heading back from a vacation in the Bahamas as in a Russian visa applicant seeking to join her relatives in Chicago—was eclipsed by the recalcitrant connection between foreigners and disease.

Years after scientific communities had come to a consensus that HIV could not be transmitted

through breath, touch, or any kind of day-to-day human contact, and could only be contracted via blood or semen, the cultural association of HIV/AIDS with black foreignness and unrestrained sexuality continued to shaped border policy. From 1990 to 1993, HIV-positive Haitian immigrants were quarantined at a U.S. military base in Guantanamo Bay.

Those in favor of a categoric ban on HIV-positive immigrants also employed arguments of cost. The idea that HIV-positive people from elsewhere would immigrate and, over time, tax the U.S. healthcare system to a degree that would compromise healthcare for those that were already citizens is another feature of the cultural association of foreignness and infectious disease. There was less concern over the spread of HIV than the long-term draining of the U.S. healthcare system. A widely-circulating speech by Senator Don Nickles—who authored the bill that would re-instate the ban on HIV-positive immigrants in 1993—exemplifies this position: “If we change this policy, it will almost be like an invitation for many people who carry this dreadful, deadly disease, to come into the country because we do have quality health care in this country,” he proclaimed (quoted in Markel and Stern 2002: 779). It was U.S. vitality and millions of taxpayer dollars were at stake in the signing of the National Institute of Health and Revitalization Act in law later that year, translating a racialized biomedical specter into a racialized economic specter.

The racialization of microcephaly thus also draws on the persistent linkage between Medicaid—which, in theory, would have to bear the brunt of many of Zika’s costs—and U.S. race relations. Medicaid is the closest approximation in the United States to public healthcare; it funds medical and other health services for 75 million low-income people and people with disabilities (Terhune 2018). The program originated in post-war debates over growing medical costs, especially for the nation’s elderly population. Opponents of government-funded healthcare were appeased by the design of the Medicaid program, which merely directed government payments through private insurance providers and paid hospitals back for Medicaid-related costs. “This concession,” writes Jenna Loyd (2017: 68), “would fuel massive cost inflation in the [health] sector, and it perversely undermined the financial viability of public hospitals across the country.” Medicaid was not blanket federal healthcare program, but rather a means through which the federal government would encourage state governments to provide healthcare to low-income people. As such, eligibility and services varied profoundly between different states.

Viewed in the context of the turbulent years following the Civil Rights Act, the Medicaid program provided Southern states an enormous amount of freedom in the degree and kind of services provided for black people, enabling their exclusion from government-funded healthcare. Federal funding for matching state Medicaid contributions was reduced in 1980s, which “began a trend that would continue in coming years of delinking Medicaid from welfare, thereby opening the opportunity for states to enroll *select* categories of people (infants, pregnant women, people with disabilities, the elderly) with incomes between 100 percent and 185 percent of the poverty level” (Lloyd 2017: 69; my emphasis). This expansion of Medicaid coverage for the categories of people deemed more socially deserving such as women, children, and disabled people (Thompson 2012)—the exact categories, in theory, that would be directly impacted by Zika—was tied to broad reductions in coverage for others. And crucially, at the same time, Medicaid was painted in public discourse as a program that unfairly benefited people of color, especially black mothers, rewarding “laziness” and unrestrained fertility (Hill Collins 2004). The story of Medicaid is the story of U.S. populations being defined and structured by the twinned questions of whose body (and whose reproduction) is worthy of public investment and whose is a drain on public resources, and these questions were both posed and answered through a racial lexicon.

This racial lexicon of fertility and cost was not always overt or violent. In liberal social science translated into policy across the latter half of the twentieth century, the “dependency” of young women and girls of color on state benefits like healthcare was understood as both a reason for and outcome of reproduction. One prominent work in this genre was E. Franklin Frazier’s ethnography *The Negro Family in the United States* (2001 [1939]), which advanced the argument that the growth of black single-mother households was the result of a pernicious strain of Black culture born out of slavery and Jim Crow. Thirty years later, Patrick Moynihan prepared *The Negro Family: The Case for National Action*, or “The Moynihan Report” (1965), for US Congress. Moynihan drew heavily on Frazier’s portraits of black family life in crafting it, though stripped them of Frazier’s critique of structural inequality. The Report has enjoyed largely positive favor by mainstream media in the fifty years since its publication; its recurrent citation hints at the reach of social scientific exegesis on the domestic and reproductive lives of black women. The objective of the Moynihan Report was nominally liberal: open policymakers up to the ways in which poverty, unemployment, and racism impacted urban black families. Its

verdict, however, was decidedly racist: it held that black reproductive pathology—especially single motherhood—was a key, if not dominant, factor in the political exclusion of black people, an argument that was later enrolled to rationalize the dismantling of the welfare state (O’Connor 2009; Geary, 2015; Patterson 2012). The racialization of projected aggregate costs of microcephaly thus folded into a longstanding tradition of public vilification of the fertility of poor women of color and immigrants in the United States, especially in public discussions of healthcare. And this is a tradition that Laura Briggs (2018) argues has only intensified since the emergence of the genesis of the racist image of the “welfare queen,” with sweeping reductions in state support for both childcare and healthcare across the last forty years.

The term “anchor baby” tweeted by Coulter refers to babies born to undocumented mothers who are seen to have deliberately given birth in the United States to secure citizenship and access to healthcare. Conservatives believe that it shouldn’t be so “easy” for pregnant women to do so; they argue that the U.S. model of birthright citizenship is attracting the “wrong” people into the country. The term predates Zika; its increasing circulation of late is part of the post-9/11 ramping up of anti-immigration sentiment, coming together with the increased centrality of the fetus in U.S. political culture (Berlant 1997). The last ten years have witnessed a movement to remove birthright citizenship, referred to by Republican Representative Steve King as the “anchor baby loophole.” For example, in 2010 Tennessee lawmaker Curry Todd publicly declared pregnant undocumented women “rats that multiply,” and it is worth highlighting that this was uttered in in a conversation with the program administrators of a state-funded healthcare program called “Cover Kids.” His questions about “Cover Kids” turned on the possibility of undocumented people accessing services; the directors stated the program does not provide pregnant women coverage, but would do “unborn” coverage, because once that child was born, it would be a U.S. citizen, to which Todd responded “Well they can just go out there like rats and multiply then, I guess” (quoted in Cisneros 2013). Was it the pregnant women who were the rats, or their proto-citizen children in his dehumanizing/animalizing formulation? This slippage—in which both mothers and children become one *costly procreative mass*—is a central feature of reproductive accounting in the context of Zika. One comment on a Fox News article, for example, reads:

As if we didn’t already have enough pregnant women sneaking

over our southern border just in time to deposit their offspring here. Now we'll get all the Zika babies, who are, by our very flawed birthright citizenship law, American citizens. These babies will cost the American taxpayers a fortune in life-long care for them, and their parents, who will always be “caregivers” and also qualify for “benefits.”

In similar form, Breitbart mapped costly futures onto a child born with Zika-linked microcephaly in Texas, whose mother was Colombian:

If just 100 of these babies are born in the state, it would cost taxpayers over a billion dollars during the lifetimes of the children. The cost for the 400 pregnant women who have tested positive for Zika in the U.S. to date would total almost \$4 billion (Shadwick 2016).

These figures—the undocumented women, the “anchor baby” with microcephaly, and the numbers themselves—exemplify a discursive field organized around debits and credits to the U.S. economy, with the pregnant woman spatialized as the central site of national economic contemplation. And despite the incessant march of disembodied dollar-values, the national futures conceived through the figure of the Zika baby were conceived through race and citizenship.

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Queer theorist Lee Edelman (2004) has argued that the Child (capitalization deliberate) plays a central role in contemporary public life in the United States. An all-pervasive image of future children serves as “the perpetual horizon of every acknowledged politics, the fantasmatic beneficiary of every political intervention” (2004: 3). The Child modulates political discourse by its veneration as a source of meaning in a meaningless world, making it near impossible to speak out against any action or policy realized under its banner. In tandem with Rebekah Sheldon (2016), I contend that nonhuman excess—embodied in Zika, but not reducible to it—adds even more weight to this imagined horizon. The perfect *nonato* is supposed to become the perfect Child, and the Child—distinct from “the lived experiences of any historical children” (Edelman

2004: 11)—becomes synonymous with the future amidst environmental change. If, in the history of public health, disease has been racialized as non-white, we might by extension also say that that the healthy body ideal that public health seeks to protect has been racialized *as white*. What is true about whiteness more broadly—its recurrent positioning as a “noncategory, normal, natural” (Faria and Mollett 2016: 81)—we might also say about health. Health, often understood as “some imagined ideal state” (Kenny 2015: 16), is racialized as white, but invisibly so. The healthy, not-yet-born Child was silently raised as a white figure around which public fears of the disease took shape.

Can you see how different the “Zika baby” is from the perfect *nonato* and the fantasmatic Child? The “Zika baby” embodies the openness of the human to extra-human nature; the Child/*nonato* is the subject at the center of discourse around child development and national tragedy. The “Zika baby” is a figure of fear to whom racialized healthcare system price tags are affixed; The Child/*nonato*, silently white, is to be protected. And can you see the relationship between the “Zika baby” and the *nonato/Child*? In Zika’s visual and quantitative fields, the former is produced as racially Other and costly, *compromising the future of the latter*.

What did this all mean for women? We have already had occasion to observe some of the ways in which the public health emergency in the United States linked the wider circulation of the virus to the future of the population. The reproductive capacities of women from Latin American countries were reduced to what they could cost the U.S. nation by virtue of their proximity to the “Zika baby”; they were the pivot between Zika and microcephaly, between Zika and the economic dystopias microcephaly had the power to engender. The reproductive body linked the uncertainty of twenty-first century tropical nature to the U.S. national economy. And what did it mean for women in Puerto Rico, who in 2016 found their bodies to be freighted with significance because of their dual positioning in a tropical island (physical geography), and inside the territorial borders of the United States (political geography)? I am now going to explore this linkage in greater detail by examining U.S. government Zika intervention in Puerto Rico.

## **Chapter 3: Thresholds of empire | Risk, sovereignty, and the “intervenable” in chemical vector control**

### **3.1 Proem: “Officially on American soil”; “particularly amongst pregnant women”**

In the latter parts of 2015, laboratory and field scientists across the globe were busy deciphering microcephaly, delimiting pregnancy as a time-space of human vulnerability to the wayward agency of twenty-first century nature. There were lab tests on the Zika virus that utilized animal test subjects, case studies of pregnant women who have had contact with the virus at different gestational stages, and studies of larger groups of pregnant women and babies, from which the CDC made recommendations for women to modulate their behavior with male sexual partners and with *Aedes aegypti* mosquitoes. Contact with the Zika virus during pregnancy was increasingly linked to the birth of infants with microcephaly. It was detected in amniotic fluid, fetal tissue, the placenta, and the cerebral fluid of newborns. It was shown to restrict intrauterine growth, calcify fetal brains and turn them small, and reduce amniotic fluid. It was revealed to endure in pregnant human bodies for longer than in non-pregnant human bodies, perhaps because of how pregnancy blunts the capacities of the immune system in order to avoid immune rejection of the growing fetus. And crucially, it was posited that Zika’s potential to do damage to fetal brains and nervous systems was most potent in the first trimester, that gestational phase where the boundaries between woman and fetus are heavily blurred, and where pregnancy is imperceptible to the eyes. Other questions remained unanswered: How often is Zika vertically transmitted from pregnant woman to fetus? How often does Zika impact the central nervous system of fetuses, and how long after exposure to the virus does it take for developmental problems to manifest in the fetus?

Epidemiological surveillance was being carried out in Puerto Rico too. The Puerto Rican Department of Health (PRDH) announced the arrival of Zika to the island in May 2015, but it wasn’t until December 2015 that the CDC reported the first autochthonous case. In the early months of 2016, the CDC and the PRDH set about testing thousands of people for the virus, finding infections in 77 of the island’s 78 municipalities and accelerating transmission rates as

the months passed. PRDH officials advised pregnant women to prevent mosquito bites, and women to forestall pregnancy in the months to come (Rigau-Pérez 2018a).

In February, following the confirmation of Zika in a pregnant woman's body on the island, Governor García Padilla declared a public health emergency. Information about the possibility of sexual transmission was soon highlighted in local newspapers, and condoms and mosquito repellent were placed under price controls. The government also announced the forthcoming arrival of a range of different scientists from the CDC for Zika research and prevention activities. Director Tom Frieden visited the island in March and predicted infection rates for the summer, which found its way to the front pages of the island's major newspapers: "700,000 Boricuas Will Suffer from Zika."

The Zika public health campaign that took shape in Puerto Rico in the months that followed Frieden's prediction was structured around three imperatives. The first was to provide access to contraceptives. The second was to "protect the pregnant woman" through the distribution of Zika kits in clinics, linking women to proper care services throughout pregnancy, and disseminating public health messages through television and radio. And finally, there was mosquito control, "a major area of attention for preventing Zika virus infectious in Puerto Rico, as in most places affected by the epidemic" (Rodríguez-Díaz et al. 2017: 144). Much of the focus on vector control stemmed from the fact that mosquito bites are the most common form of Zika transmission (Centers for Disease Control and Prevention 2018), but vector control also promised to address the first two imperatives: it was carried out under the banner of protecting women and children, and, if effective, could eliminate the need to prevent pregnancies. The latter promise was important, given the Archbishop of San Juan denunciation of the CDC's and local government agencies' call for condom use (Agencia EFE 2016).

Many people were confused by the magnitude of the CDC's early prediction and the speed with which Zika took up discursive and physical space in San Juan: almost every time I asked someone who wasn't a doctor about the virus, the first response was "I don't know anyone with Zika." Surely the disbelief had something to do with the asymptomatic nature of most adult cases

of Zika. But how to *count* instances of the virus was, from the beginning, a major point of contention, and the CDC and the PRDH had divergent methods. The CDC’s approach to defining the problem of Zika in Puerto Rico was intentionally broad: they included under the Zika umbrella all possible manifestations of the disease and then only later would sift the confirmed cases out from the likely cases and the negative cases. As Rigau-Pérez (2018a; 2018b) highlights, this was very different from that of Puerto Rican government agencies, which apprehended the stakes of Zika through cases confirmed by blood tests. This approach both ensured the exclusion of viruses related to Zika (like dengue and chikungunya) from the tallies, as well as—given the dearth of resources for blood testing—producing Zika as a much smaller problem than the CDC did. Likewise, when I joined a webinar for teratologists (scientists of congenital abnormalities) in the United States, I was struck by the fact that conflicts over counting in Puerto Rico found their way into the program, which was supposed to merely review clinical research on the relationship between Zika and microcephaly (National Society of Genetic Counselors 2017). Nearing the end, someone asked, “Where did the stats from Puerto Rico come from? I have heard from colleagues down there that the stats are inflated for political reasons.” Some muffled, tentative statements emerged from the three doctors proctoring the webinar – “I don’t want to go down the political road...Puerto Rico is a U.S. territory...it is a somewhat tense relationship with the U.S. government... is there independent data?” – but no real answer to her question. The numbers, it seemed, were recurrently questioned, either inflated or vastly underreported. either Zika had been made into a larger problem than it was, or was dangerously underestimated.

Figure 3.1 illustrates the subtle but confusing way U.S. government Zika research and prevention activities materialized in the public space of San Juan, and people’s response to that materialization. I captured it on Avenida Fernández Juncos, a main road that recalls the centrality of manufacturing in Puerto Rico’s economic history, made and destroyed by U.S. tax code. It is a line of gas stations and small shops selling tools for everyday life and working-class men chatting on curbsides. The leaflet was a CDC solicitation of blood collection from people who had previously tested positive for Zika, but who were not pregnant. On top of the study information, someone had drawn an *Aedes aegypti* mosquito, stripes and all, superimposed over

a crucifix. I wondered what the amateur artist, who must had taken at least a few minutes to complete their work, meant for the crucifixion of the mosquito to mean. Was it a call for the death of Zika-bearing mosquitoes on the island? Was it a kind of prayer, enunciated in the midst of Zika's profound threat to love and life? Or did it signal chemicalized mosquito control as a potentially deadly process for Puerto Ricans?

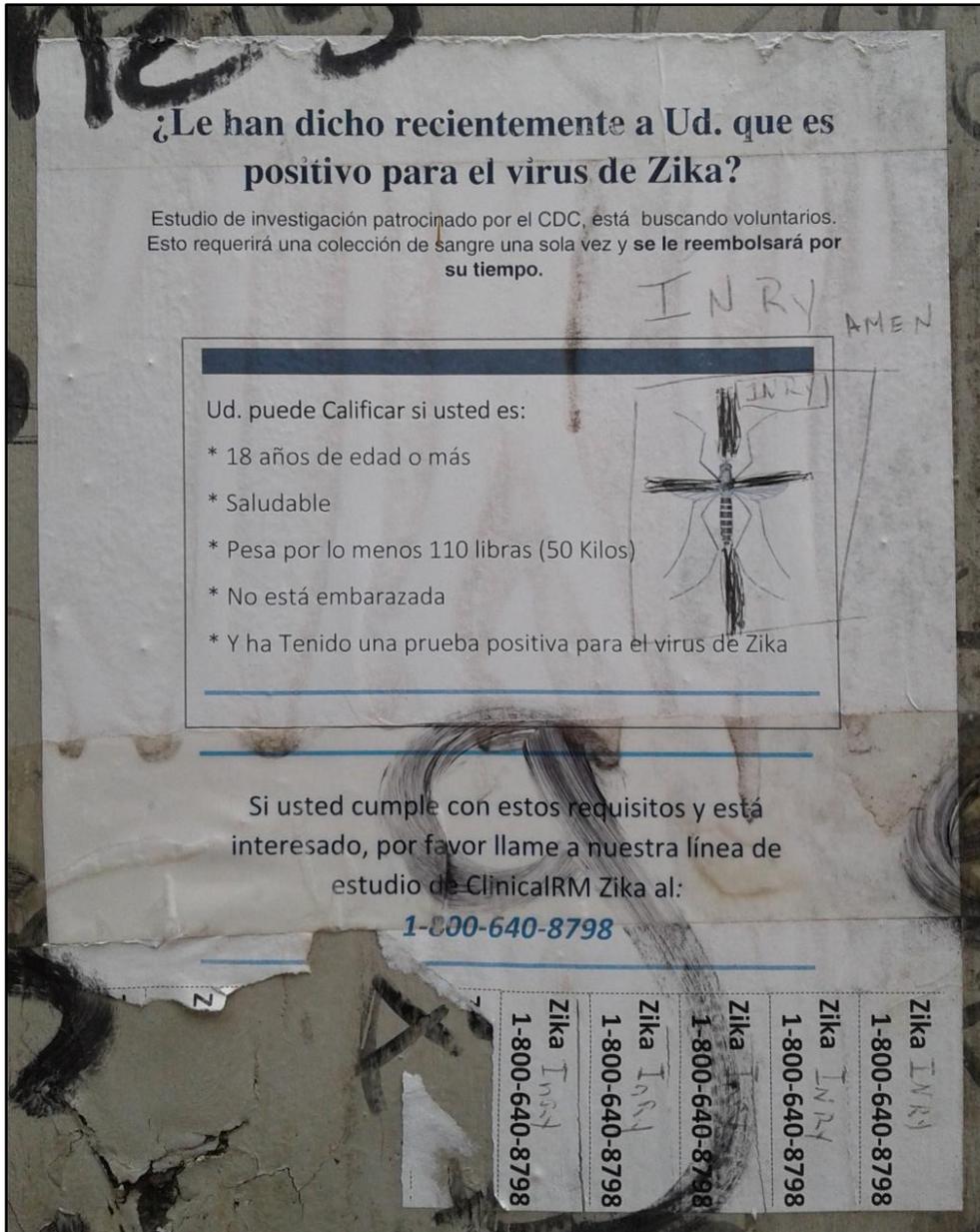


Figure 3.1: *Aedes aegypti*'s crucifixion (Photo by the author).

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The projected spread of Zika to one-fifth of the population brought the island to the forefront of U.S. politics. When *New York Times* global health reporter Donald McNeil Jr. (2016b: 68) heard of the first case of Zika in Puerto Rico, he ominously penned, “So now the disease was officially spreading on American soil.” Later, Puerto Rico would report “the first microcephaly case acquired on U.S. soil” (Coto 2016b). The repeated invocation of soil captures the island’s unique position in the geography of the virus: not merely “America’s backyard,” as Latin America has so often been deemed in U.S. political discourse (Livingstone 2009), it was *inside* the United States. Alongside the nascent pricing of a “Zika baby” at \$10 million across a lifetime, reports of Puerto Rico’s position “at the U.S.’s doorstep” (McKay 2016) and on the “front lines of the battle” (Sun 2016b) proliferated, plotting intervention in military terms.

These reports highlighted tropical climate, unruly cohabitations with mosquitoes, and a general culture of carelessness. For instance, in a plea to Congress for funding for Zika intervention, Vann Newkirk II (2016) wrote in the *Atlantic* of heat and rain, “a unique tropical climate that is an outlier compared with that of much of the continental United States”, while Bert Putterman of chemical pesticide corporation Rentokil spoke of a “laissez faire attitude among the [Puerto Rican] public” (quoted in Gooch 2017). In the *Washington Post*, health writer Lena Sun (2016a) described the arrival of the virus in terms as ominous as those of McNeil—“Zika has landed forcefully in America, in one of its poorest and most vulnerable corners...lacking a functioning health-care system, window screens and even a spray that works against mosquitoes spreading the virus in homes, workplaces, schools, and parks.” This imaginary was organized by, or infused with, fear of *porosity* at multiple scales: the porosity of bodies (whether between humans having sex, humans being bitten by mosquitoes, or between pregnant woman and fetus), the porosity of the imagined distinction between temperate and tropical worlds, and the porosity of the imagined distinction between domestic space and nature.

The boundary between home and nature—which is related to the public/private divide but not identical to it—was especially important. The windows on most island households were screenless, leaving domestic space open to the flight paths of mosquitoes, who could bite

unsuspecting women as they went about daily activities at home; installing screens and doors on public housing projects was an early task of local government agencies. The writing of science reporter Helen Branswell (2016) captures the centrality of windows screens in mainland interpretations of Zika: “On this lush Caribbean island where window screens are scarce and mosquitoes rule, public health officials are preparing for a major battle against the Zika virus.” The promise of window screens is to physically delimit a refuge from Zika’s “more-than-human profusions.” As we have learned about the resilience of *Aedes*, however, and her active seeking-out of human dwellings, window screens may not necessarily fulfill that promise. As such they also serve as what Victor Turner (1969) would call a “boundary object” (see also McClintock 1995), symbolizing a distinction between home and nature as much as serving as a solid physical impediment to mosquitoes. Air conditioning, which the CDC recommended to both tourist and local pregnant women to prevent contracting Zika from mosquito bites, performed a similar function. Air conditioning, the process of removing both heat and moisture from an interior space, was deemed to be deficient on the island, the province of only upper-middle-class and elite households. Having made possible for the first time in history “permanently sealing off the inside from the outside” (Cooper 1998: 1), it is a technology bound up in a vision of human independence from nature. An open window during the time of Zika signified, in Branswell’s (2016) take, “complacency” amongst Puerto Ricans—a major “foe” alongside the virus on which public health officials must “wage war,” a rejection of proper boundary maintenance. Viewed as temporally ahead of the mainland in the development of immunity, and behind the mainland in terms of healthcare infrastructure, attitudes about commingling with mosquitoes, and boundary making and maintenance, everyday life on the island constituted Zika risk in U.S public health expertise.

We can also observe reports on circulation of people *between* island and mainland as constitutive of Zika risk in this biosecurity imaginary. The *Washington Post* piece was accompanied by photo album titled “Puerto Rico becoming a breeding ground for the Zika virus in U.S,” with statements such as “Cases of Zika are expected to rise in Puerto Rico in the coming months. And that raises the likelihood of transfer to the mainland” framing photographs of San Juan (Sun 2016a). Similarly, a study of the virus by a health consulting firm pointed to “inadequate

attention to Zika risks arising from predictable family travel between the mainland United States and its territories” (Gruendel, Gann, and Reynolds 2016: 6). It carried on:

The CDC continues to issue stern travel warnings and information about Zika is more widely available at ports of departure (including airports), however, it is likely that families will continue traveling to visit their families in U.S. territories. Given the dramatic increase in reported Zika cases in the U.S. territories, including Puerto Rico, the number of individuals returning to mainland U.S. as carriers of the Zika virus may be much higher than we are now predicting (ibid.).

Inverting the script of the physical geography of islands as naturally amenable to quarantine in times of infectious disease panics, diasporic circulation constituted biosecurity risk to the United States in the geographical imagination of Zika.

As reports on the risk the island posed the mainland proliferated, so too did examinations of the sexed living-being of Puerto Rican women and girls. Because Zika’s threat of disability was located in the timespace of pregnancy, the body that could become pregnant was a central site of public health investigation. Surveys of the island from years past took on new meaning, and new surveying mechanisms bloomed; bodies and behaviors were tabulated and aggregate risks assessed. Tepper et al. (2016), for example, counted 138,000 women “of reproductive age (15-44 years)” that did not desire pregnancy but who were not practicing effective contraception. CDC research also centered the insect repellent practices of women who had recently given birth (D’Angelo 2017). The latter study operated as a crucial behavioral link between research on sexed bodies and research that mapped the insecticide resistance of mosquitoes on different regions of the island (Centers for Disease Control and Prevention 2017). As a suite, CDC studies framed Puerto Rican women and girls as the hinge between *Aedes aegypti* and the “Zika babies” that were projected to cost millions of dollars. Mainland public health imagination took Puerto Rican climate, habits, and bodies as raising the vulnerability of the United States to a Zika epidemic, a vulnerability that was at once corporeal and financial, and CDC expertise constituted Puerto Rican women as the central site of contemplation and intervention.

Zika in Puerto Rico remained a prominent fixture in U.S. news media and public health expertise as the months passed. This was in part because infection rates on the island were increasing, and humidity and rainfall were expected to intensify as they do every autumn. The CDC increased the prediction of cases of Zika in Puerto Rico by the end of the year to 850,000 (Rigau-Pérez 2018a), while the U.S. Department of Health and Human Services joined the list of government agencies that had declared a public health emergency for the island.

It was also because federal Zika funds were running out: after the link between the Zika virus and microcephaly was solidified in April 2016, the Obama administration sent Congress a proposal for \$1.9 billion in Zika funds for local healthcare infrastructures—including at least \$250 million in Medicaid supplements for Puerto Rico—as well as for Zika testing and vaccine development. Both the Senate and the House drew up bills of their own with less funding, but neither passed, so Obama reallocated \$600 million of unused Ebola funds for Zika management. A Zika bill still had not been passed by August, and in the meantime the Obama administration moved an additional \$81 million in Ebola and other public health funds into Zika research. By September 2016, though, Zika funding sources had almost totally dried up, leaving the nation in a difficult position concerning the forecasted lifetime costs of microcephaly: “[we are] about to see a bunch of kids born with microcephaly,” stated CDC director Tom Frieden (Taylor 2016).

The national Zika funding stalemate tapped into the moral currents of debate over public funding for reproductive healthcare, birth control, and abortion, a debate that has played an important role in US electoral politics for decades. Tacked onto the \$1.1 billion bill offered by the Republican-controlled House in June 2016 was the stipulation that Zika funds could not go to Planned Parenthood or its affiliates. Democrats refused the stipulation with the argument that low-income women depend on Planned Parenthood for both reproductive healthcare and information (Winfield Cunningham 2016). Two clinics in San Juan were caught in the crosshairs of this debate, one that offered gynecological services and one that provided abortion services. Run by local Planned Parenthood branch Profamilias, which also operates six reproductive health education facilities on the island, these two clinics provide care and education to low-

income women under the age of twenty-five. Proponents of funding for Profamilias clinics stated funding would expand efforts to educate women on the sexual transmission of Zika and its potential effect on fetuses, as well as family planning services. They also noted that that in the resource-poor Puerto Rican healthcare system, Profamilias is often the only option for reproductive healthcare for young, poor women. Opponents of funding for Profamilias argued that because the clinics did not screen for the Zika virus, hospitals and municipal health centers would be a better venue for federal funding.

The debate was not just about Zika screening: Republicans were concerned about the abortion services provided by Profamilias in San Juan. Senator James Lankford, for example, stated that “the media’s perspective is, if a child’s going to be born with any kind of deformities, we should just kill them before they come into the world...for them to immediately push and say ‘Zika could be a threat to children and the unborn and so let’s just kill them,’ instead of taking the chance that they could be born with a birth defect devalues human life.” The other side articulated concerns in the cost-benefit lexicon, citing the long-term toll “Zika babies” could exact on an already impoverished US healthcare system if the virus were allowed to proliferate. House Minority Whip Steny Hoyer marshaled the figure of \$10 million with which we are already familiar: “Every child that comes down with Zika...is a tragedy in and of itself, from a health standpoint, from the child’s standpoint. From an economic standpoint... the costs are probably in the neighborhood of somewhere around \$10 million over that child’s life.” Both of these perspectives stretch far beyond the bodies of women to, in the first instance, the value of human life, and to an economized understanding of life in the second.

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Back on the island, however, in the months between the CDC’s two infection predictions, major public controversies had frothed forth over the dominant response to Zika, chemical vector control. By the issuance of the second prediction, this Zika management strategy would be embroiled in longstanding historical conflict over sovereignty on the island, as well as the more pointed questions that Zika raised over how to define body, environment, and health.

My focus in this chapter is the CDC's call for "intensified vector control and personal protective behaviors to prevent new infections, particularly amongst pregnant women" (CDC 2016c), and its strategies for carrying out this mandate. The financial risk the island represented the mainland translated into the careful management of mosquitoes by an array of U.S. government agencies, most prominently the CDC, but also the Environmental Protection Agency (EPA), the federal agency tasked with protecting human health and the environment through regulatory mechanisms, and the federal women's assistance program Women Infants and Children (WIC), which established a temporary Zika information clinic in San Juan's largest shopping center. U.S. government chemical vector control spanned the intimate and the atmospheric, from pressing girls and young women to coat their skin in DEET, to fumigating specific homes and apartment complexes, to proposing the indiscriminate spraying of the island from planes overhead. The CDC and other federal agencies rationalized these injunctions and interventions as life-saving, but many Puerto Ricans saw them as potentially life-destroying. Which was it?

I argue that these readings are not mutually exclusive. Chemical intervention was premised on shielding the United States from the biophysical effects of the virus in the short term and lifespan healthcare costs in the future. As a promise, chemical intervention would save abstract future children from the terrors of a new and wily virus. In practice, however, it was coercive, and exposed some Puerto Ricans to chance of chemical harm. To be more precise, public health expertise produced Puerto Rico as inside the United States in terms of disease risk, and outside the United States in terms of political rights. The former geography was underpinned by the "public fears of risk" I have been tracking; the latter enabled chemical intervention on the island to be realized without consent. When Puerto Rican women and girls were perceived to fall short in properly managing their bodies and homes in relation to Zika-bearing mosquitoes, the CDC threatened aerial chemical intervention in an aggressive display of U.S. sovereign power.

I build this argument across four parts. The first contextualizes the chronology of Zika I have just recounted with the "protracted liminality" of Puerto Rico (Goldstein 2016). I do so with Mark Rifkin's (2009) provocation that any serious critique of biopolitics requires coextensive critique of territoriality and different claims to sovereignty. The second part examines how Puerto

Ricans, women and girls especially, were called upon as *subjects* of chemical vector control to manage their bodies and homes in relation to mosquitoes, and shows how they were disciplined as *objects* of chemical vector control in response to a broad perception of failure. It also analyzes the spatial logics of the CDC's plan to aeri ally fumigate the island with the organophosphate Naled without the consent of the Puerto Rican government. The third part connects the gendered biopolitics of chemical vector control with its imperial geopolitics to clarify the cruel logics of chemical vector control. The fourth part examines community-based and legal resistance to chemical vector control, pointing to alternative conceptions of body, environment, and health.

One point is necessary before I reach back in time to explain the legal geography of the island that conditioned chemical vector control: the political inclusions and exclusions I am about to describe were neither immaterial nor disembodied. However small their granules, the synthetic chemicals dispersed onto the skin or from the sky in the name of Zika can reach deep into sea, soil, and cell. Against the image of microcephaly, chemical vector control could reshape worlds. I am not the first to note this capacity. The premise of emergent research on chemical geography is that industrial chemicals – of which over 85,000 have been created (Galt 2017) —have transformed landscapes and bodies across the globe. In fact, new biomonitoring tools have produced evidence of a universal condition of contemporary life: xenobiotic chemicals with known negative health effects are present in *all* human bodies (Murphy 2017b). Yet while synthetic chemicals are omnipresent, their concentration is highly uneven. This story builds on work on environmental racism (Pulido and Peña 1998; Pulido 2000) and how chemical regulation has “biopolitically sorted” people (Guthman and Brown 2016). Missing from these bodies of research, however, is attention to imperial state forms (though see Murphy 2017b), which is what I address here.

### **3.2 Land and law in the time of Zika, part I: “Foreign in a domestic sense”**

The political geography of Puerto Rico explains, at least in part, the mappings of Puerto Rico as a space of risk in political and medical discourse in the United States. Following the Spanish-American War, sovereignty over the island was transferred from Spain to the United States, and

since 1917 Puerto Ricans have been U.S. citizens. Puerto Rico's status as "foreign in a domestic sense" to the United States, as ruled by the Supreme Court in *Downes v. Bidwell* in 1901, and as a "free associated state," as later deemed by U.S. Congress in 1952, means that the island is inside U.S. borders and that Puerto Ricans may move between island and mainland without restriction. Indeed, there is a long history of migration to and from the mainland, as well as abundant flights between San Juan and mainland cities (Grósfoguel 2003: 58). But they are mappings of Zika and island territoriality drawn from an emphatically mainland perspective, reduced to the biological-financial risks Puerto Ricans might pose the U.S. government and divorced from the lived conditions of U.S. empire. There is much more to the story.

Understanding the diffusion of Zika in Puerto Rico requires reaching much further back than the first instance of Zika or congenital Zika syndrome.

For a start, the early modern history of the island can be recounted as the colonial state's production of conditions for infectious disease and then the doubling back of the state to manage the wayward agency of disease, especially when such disease threatened colonial interests. In 1519, smallpox spread to Puerto Rico and, because of European immunity to the disease, left Spanish colonists unscathed. Coupled with the physical deterioration wrought by the work demands of the colonists and hunger, smallpox caused the decimation of the indigenous Taino population in a short time, such that colonists on the island began to purchase African slaves to replace native servants in 1521 (Rigau-Pérez 1982: 424-425). Infectious disease was of central economic concern to colonists as the plantation economy developed: slave ships were being quarantined for smallpox in San Juan Harbor well into the nineteenth century (Rigau-Pérez 1989: 419). Infectious disease, indigenous genocide, and African slavery were all imbricated in Spanish sovereignty over the island.

Later, the remaking of the island in the image of the plantation proved useful for the spread of infectious disease. In the late-nineteenth century, Puerto Rico's coastal land became the province of sugar and coffee, and a passbook labor system drew people to it from the rocky interior (Dietz 1987). Working conditions and consumption patterns rooted in sugar took their toll on Puerto Ricans—"every advance of sugar or coffee entailed an increased in the mortality rate," states

Fernando Picó (1986: 193; translated by Briggs 2002: 55)—but mosquito geographies were transformed as well. As J.R. McNeil (2010: 48) argues in his analysis of sugar storage and shipping, “*A. aegypti* could scarcely have designed more suitable cities [for mosquito flourishing] than Caribbean ports.” Though *Aedes aegypti* mosquitoes existed long before the emergence of the plantation, the imperial sugar economy laid the groundwork for mosquitoes and mosquito-borne illnesses such as yellow fever to flourish. The mosquito population that the CDC sought to manage in the name of Zika therefore bloomed with colonial commodity production and circulation; it was not and is not a transhistorical human health concern.

What structured the approach of government agencies to Zika, however, were the shifting legal geographies of sovereignty and citizenship that blanketed and infused governance on the island in the wake of the Spanish-American War. “What Puerto Rico is and who Puerto Ricans are” (Fonseca 2019: 6) was ensconced in law in contradictory ways across the twentieth century, and these constructions of island sovereignty and personhood were the conditions of possibility for Zika chemical vector control.

U.S. sovereignty was inaugurated in the 1898 Treaty of Paris, which transferred sovereignty over the island from Spain to the United States. The Treaty reaffirmed the status of Puerto Ricans as colonial subjects, as well as rendering them stateless: Spanish citizenship was revoked as U.S. citizenship was denied (Meléndez 2013). The Supreme Court was tasked with defining and rationalizing U.S. sovereignty. In the *Downes v. Bidwell* (1901) case, the Court opined that the “natives” of Puerto Rico (and other recently acquired lands like the Philippines) were of inferior biological stock and therefore unworthy of citizenship or full incorporation into the nation. That this was the same Court that handed down the “separate but equal” ruling in *Plessey v. Ferguson* (1896), upholding the racial segregation of public space in the United States, corroborates Goldberg’s (1993: 9) claim that modern state power is inherently racial, because of its mandate to “define, determine, and structure populations.” “Power is to the state and the state to power as blood is to the human body,” he writes, and he means for this metaphor to connote the racial – blood, kinship, genealogy – and its connection to a broader body politic. Almost twenty years later, in the 1917 Jones Act, Congress deemed Puerto Ricans U.S. citizens, but *Balzac v. People*

*of Porto Rico* (1922) counters any hopeful gloss on the story of citizenship rights. (So too does the fact that one month after the Jones Acts was passed, President Wilson called for the registration and recruitment of men between the ages of twenty-one and thirty-one on the island; U.S. citizenship was “a vehicle for drafting Puerto Rican men into the U.S. military” [Denis 2016: 139].) *Balzac* used U.S. citizenship as a point of departure for reframing hegemonic perceptions of Puerto Rican inferiority from human biological to territorial. Crucially, it determined that the citizenship rights extended to Puerto Ricans were distinct from—that is, not—constitutional rights. Edgardo Meléndez (2013: 130) states that “in *Downes*, it is the ‘alien nature’ of the people living in the territories that explains why Puerto Rico became an ‘unincorporated territory,’ but in *Balzac* it is the nature of the territory that defined the character of their citizenship.” These so-called “Insular Cases” established Puerto Rico as an “unincorporated territory” through nineteenth century notions of racial hierarchy, which then conditioned the granting of U.S. citizenship to Puerto Ricans. According to Déborah Berman-Santana (1996b: 466), in both North American law and academic knowledge, Puerto Ricans have been understood as “genetically and/or culturally inferior natives of mixed African, indigenous, and ‘degenerate’ Latin descent” in contradistinction to a “White race.”

In 1952, U.S. Congress established the Commonwealth government amidst President Truman’s (1952) proclamations that “Puerto Rico will have a government fashioned by the people of Puerto Rico to meet their own needs, requirements, and aspirations.” But while this shifted the organization of local governance, it left the early twentieth century legal geo-graphing of the island as a colony under the dominion of the United States intact. The island remains an “unincorporated territory” under U.S. sovereignty, and the five plebiscites over the sovereign status of the island that have taken place since the ratification of Commonwealth status have been realized under the plenary power of Congress. What is more, in the words of Fonseca (2019: 7), “The U.S. Constitution does not apply *ex proprio vigore* to Puerto Rico, and its residents – although U.S. citizens with the possibility of legally emigrating to the United States – are still colonial citizens who cannot vote in presidential elections or have an elected representative in Congress.” Built into the legal architecture of the Commonwealth designation is the impossibility of lawful political opposition, which is what Fonseca calls “colonial

entrapment.” The U.S. citizenship of Puerto Ricans is therefore ambiguous, though both haunted by scientific racism and divested of political rights.<sup>2</sup>

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<sup>2</sup> The racialization of Puerto Rican territory and citizenship in U.S. law does not mean that the operation of race on the island is simple, or that race functions along a mainland-Puerto Rican binary. An example from my fieldwork will help illustrate the constant remaking of racial categories in everyday life. Early on I stayed in an AirBnB guesthouse run by a young Puerto Rican couple with white skin, whom I will here call Isabel and El Peque (no one ever referred to El Peque by his real name). The couple were variously involved in San Juan’s music scene, though it was the rental income is what sustained them financially. The house was in the heart of Santurce, a riot of art and music rapidly being gentrified. Most of the other people living on the street had darker skin and were much poorer than Isabel and El Peque; their terrace out back overlooked some precarious housing. Along with Isabel and El Peque in the house was a dark-skinned black man from the southern United States, whom I’ll call Chris, who had permanently moved to Puerto Rico within the last year and did not speak Spanish. From what I could tell, Chris and El Peque had struck up a deal in which Chris could stay in one of the rooms in exchange for doing all of the housework to keep the rental faculties of the house up and running. He cleaned the common areas and the terrace, washed the rugs and towels, and took out the garbage. That I had purchased my way out of doing this labor by way of my AirBnB fee, and that it was being conducted by a black man, made me feel uncomfortable.

One night I felt both race and nation rearrange themselves around me. At some point, a young white Argentine man called Jules came to work on some music with El Peque for a few weeks, though because I was going to bed very early, I didn’t really know he had joined us in the house. Late one night Jules burst into my room without knocking, and started shouting at me with a wild look in his eyes. I was in bed in just a towel, terrified by the sudden intrusion, and couldn’t understand what he was saying (or even what language he was speaking). My towel fell off as I physically fought him out of my room, then locked the door. It all happened very fast, and as I sat there, shaking and searching for clothes, Jules pounded at the door and continued to shout. It was only at that moment that I began to interpret any of his noises as language. Alternating between Spanish and English he begged me to let him in. I heard Chris on the terrace screaming loudly, heaving and sobbing as well. Through the closed door, Jules told me that he and Chris had been doing acid together on the terrace, that Chris suddenly “turned into an animal,” and Jules was afraid Chris would hurt him if he went back to his own room. Then I heard sirens: someone in the neighborhood had called the police. Responding to a call about a “man behaving like an animal” at the house, the policeman demanded to see Chris. El Peque, now alert to what was going on, went to try and calm him down, but Chris started crying at mention of the police. In the end both Chris and El Peque left with the police.

The Puerto Rican-United States legal binary cannot account for situations like this. The only Puerto Rican persons involved were El Peque, a white-skinned landlord that performed frequently in cities across the mainland and the brown-skinned policeman. I myself did not look very different from Isabel and El Peque, and only when I opened my mouth and out flowed my strange Spanish was I coded as not-Puerto Rican; I was always, however, coded as white. And despite being from the mainland, Chris was described as an “animal” for, from what I could tell, being very loud out on the terrace. The experience conforms to historical work on race the island, which describes a complex hierarchy of skin color inflected by class

In territorial terms, Puerto Rico has occupied a privileged position in the U.S. military imaginary, functioning as a sort of military laboratory. This is in part because of its access to four strategic maritime routes in the Caribbean—the Paso de Yucatán between Mexico and Cuba, the Paso de los Vientos access route to the Panama Canal, the Paso de Anegada off Puerto Rico’s eastern coast, and the Paso de la Mona between Puerto Rico and the Dominican Republic—which proved strategic for the housing of the command center for the South Atlantic fleet (Grósfoguel 2003: 51). U.S. sovereignty has enabled the testing of weapons and procedures and training of military personnel on massive landholdings in Puerto Rico until the present day. If, in San Juan, you walk along Avenida Fernández Juncos, you’ll end up at Sagrado Corazón station, from which you can take the metro through the cities Hato Rey and Guaynabo, all the way to Bayamón. You’ll pass many neighborhoods and the banking district on your way, and though you won’t realize it, you’ll also pass Fort Buchanan, a U.S. military base in which some 15,000 people live and work, on land with a real estate value of \$560 million. The sky will change by the minute as you traverse these streets; first a dark and vigorous mist envelops you and the sun, the atmosphere charged with the possibility of a lightning strike out on the sea. Then sunshine bursts through again, seeming to carry a greater wattage for having been forced through a tiny aperture in those ominous clouds. Then a military plane demonstration breaks the afternoon lull. The island is suffused with U.S. military infrastructures both obvious and subtle.

The spatialization of the island as a U.S. military laboratory finds its purest historical expression in Vieques. Less than ten miles to the east of Puerto Rico’s main island, dreamy sapphire seas meet the creamy white sands of *isla nena*, the “little girl island” that is home to under 10,000 people. In the 1940s the U.S. government forced *viequenses* from eastern and western sides of the island to a small central part in order to conduct military exercises, which, not surprisingly,

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that conditions all of social life, which cannot be funneled through a U.S. model. Ileana Rodríguez-Silva’s (2012) book *Silencing Race* is enormously important for showing how the question of race is “silenced” in Puerto Rican social life despite the persistence of cultural anti-blackness (see also Suárez Findlay 2000). All of this being said, what I am interested in doing here is to unravel the political geography of the relationship between the U.S. government and island territoriality, which means focusing on the racialized making of Puerto Rican citizenship vis-à-vis the federal government.

disturbed both export sugar production and subsistence agriculture (McCaffrey 2002); by 1948 over 60 ships, 350 planes, and 50,000 U.S. troops were involved in operations on Vieques (McCaffrey 2006). Fisherman argued early on that they were experiencing health problems related to military activity, but the large-scale war games continued on for decades, and between 1983 and 1998 the U.S. Navy dropped over 17,000 tons of bombs on Vieques, as well as testing Agent Orange, Napalm, and depleted uranium (Davis, Hayes-Conroy, and Jones 2007: 168). Activists succeeded in bringing U.S. military activity on the island to a close in 2003, but occupied lands were never returned to the municipality; control was turned over to the U.S. Department of the Interior as a wildlife refuge, and in 2005 was named a “Superfund” hazardous waste site by the EPA (Davis, Hayes-Conroy, and Jones 2007). The effects of the military laboratory linger on in toxins sedimented in the land and the fatty tissues of humans and nonhuman animals. Dangerous amounts of arsenic, copper, cyanide, and lead have been detected in and around the bombing zone, which flow on easterly trade winds into the civilian zone and seep into the water supply. Rates of cancer, reproductive, respiratory, and skin ailments are much higher on Vieques than the main island of Puerto Rican (Berman-Santana 2002: 41-42; see Figure 3.2).

The dense presence of pharmaceutical firms like Pfizer, Merck, and Bayer on the island joins this genealogy of environmental racism. Pharmaceutical multinationals have been a prominent fixture on the island since the 1970s, when U.S. tax law exempted federal and local taxes on profits accrued there. As foremost members of a broader chemical industry, these firms, in their promise to deliver life-saving cures to people across the world, produce a range of ill health consequences for people that work in and live near their plants. Anthropologist Alexa Dietrich (2013) argues that the wellbeing of Puerto Ricans is never assessed independently of the wellbeing of the pharmaceutical industry, the operation of which is altering the flesh and functioning of human bodies: girls who grow up near the plants that produce oral contraceptive pills in Puerto Rico, for example, begin menstruating before they enter school (Jagessar Chaffer 2009). These health effects and the dearth of means of political redress have helped ontologize ill health as both a corporeal truth for Puerto Ricans and a spatial truth for the island). They also demonstrate a precedent of mapping the island as outside the United States in an ethical sense, in

which political rights—already tempered by notions of racial and territorial inferiority—may be selectively suspended, at great corporeal cost.



**Figure 3.2: *Vidas Viequenses Valen* (Viequen Lives Matter): *Viequenses* call for decontamination and healthcare (Photo by the author).**

The jostle of sovereignty and citizenship on/of the island continued into 2016, when the Zika virus was constituted as an “American” problem, when public health research was looking to the reproductive bodies of human women and female mosquitoes as points of intervention, and when the “already limited sovereignty seemingly granted by the island’s free-associated status” (Goldstein 2016: 2) was dramatically reduced. Three legal reconfigurations of the island in June 2016 reworked Puerto Rican territory and personhood in relation to U.S. state power yet again.

First, on 9 June, the U.S. Supreme Court ruled in *Puerto Rico v. Sanchez Valle* that an individual cannot be tried twice for the same criminal offense under the same sovereignty. This case posed the question of whether Puerto Rico was a separate sovereign like the fifty states of the United States for double jeopardy. Each U.S. state is a separate sovereign in this respect, meaning that a person committing a single criminal act can be prosecuted and tried for it twice. In this way, one act can become two distinct criminal offenses—one under state law and one under federal law, each with their own legal proceedings—without the Double Jeopardy Clause of the Fifth Amendment to the U.S. Constitution being violated. *Sanchez Valle* was a criminal case that not only struck at the heart of the island’s ambiguous sovereign status, but changed the very terms in which questions of that ambiguity could be posed. In Puerto Rican jurist Juan R. Torruella’s (2017: 126) reading of the case, the Supreme Court argued that it was not the “degree of autonomy” that mattered, but “the source of Puerto Rico’s power to prosecute.” It is worth pausing over the Court’s approach to “dual sovereignty doctrine” here. Because each of the fifty states were sovereign entities before joining the United States, they possessed an independent source of sovereign power, a source that originated with the state which was not expunged through incorporation into the nation. By contrast, the Court said, Puerto Rico’s power to prosecute originated in Congress; it was Congress that deemed Puerto Rico a “free associated state” in 1952, it was Congress that bestowed upon Puerto Rican the power to author its own constitution, and it was Congress that then had to approve said constitution.

With recurrent descriptions of Puerto Rican state power as flowing from U.S. Congress, this criminal case hardened the island’s subordinate legal territoriality whilst naturalizing U.S. state power as organic, almost divinely mandated. It is a picture that ignores the various systems of governance that predated the establishment of the United States and the forceful inclusion of more and more land into its system of governance, as well as well as the ongoing claims to sovereignty by indigenous nations on the mainland. Mark Rifkin (2009: 94) calls these “older/other political formations,” and indeed, there are important parallels to be drawn between Supreme Court decisions concerning Puerto Rico and those concerning indigenous governance, which frame native nations as “quasi-sovereign” while reifying the “inherent” or “overriding” sovereignty of the U.S. nation state. The *Sanchez Valle* ruling confirmed “that Puerto Rico is not

‘alike in power, dignity, and authority’ to any of the fifty states, but rather is in a subordinary condition under the Territorial Clause, i.e. *in a colonial status*” (Torruella 2017: 126; my emphasis). And in the solidification of that status, U.S. state power was solidified as well.

Just four days later, the Supreme Court passed down another judgement that would manipulate the island’s status in law. *Puerto Rico v. Franklin California Tax-Free Trust* responded to a subversive maneuver made by Governor Alejandro García Padilla a few months back in April. García Padilla had declared the island government’s \$72 billion public debt unpayable and signed into law an emergency bill that enabled island municipalities to cease payments on the debt. The debt was born of the inside-outside legal geography of the island we have been tracing, with its genesis in the same 1917 law that deemed Puerto Ricans U.S. citizens. The Jones Act enabled island governments to fund governance and service provision through the issuance of bonds that are exempt from U.S. tax (Rodríguez-Díaz 2018: 31). These bonds, as Marisol LeBrón (2017: 115) argues, were junk rated, at once cheap and high-risk in addition to being tax-sheltered. Investors (referred to as “vultures” [*buitres*] on the island) bought them up, linked them to the pensions of ordinary people in the United States, and then charged extremely high interest rates to Puerto Rican municipalities in return (Ora Bannan 2016: 287). And while to be sure, “mom-and-pop mutual funds” count themselves amongst investors in Puerto Rican public debt, it is hedge funds that have come to possess the majority (Morales 2015). What prompted such an audacious move on the part of García Padilla was the circulation of a draft of how U.S. Congress would address the recurrent defaulting of payments on the public debt, which suggested that a financial control board would be established to “oversee” the island’s internal financial decision-making in order to ensure payment of outside hedge funds.

*Puerto Rico v. Franklin California Tax-Free Trust* ruled that standing federal bankruptcy law, which deprived Puerto Rico of the right to declare bankruptcy that municipalities in the United States have, precluded the local bankruptcy law the Puerto Rican government had authored as a first pass at restructuring the debt in 2014. The *Ley de Quiebra Criolla*—literally “creole bankruptcy law,” with “creole” in this formulation signifying native or autochthonous—had carved out a legal avenue through which island municipalities and island government agencies

could access relief from debt repayments. *Franklin* was the hedge funds' challenge to island bankruptcy protections (Ora Bannan 2016: 301); in the end it annulled the *Ley de Quiebra Criolla* and reaffirmed Congress's prerogative to restructure the island economy as it saw fit (Caban 2018: 13-14).

The ruling was not a straightforward mapping of the island as under the sovereign power of the United States. Barring the island government from restructuring debt with the livelihoods of its residents required a fair amount of legal gymnastics, which produced the island as variably outside and inside the United States. U.S. Bankruptcy Code holds that the fifty states in the nation cannot themselves file for bankruptcy; however, the power to authorize municipalities to file for bankruptcy resides in the states. In *Franklin*, the Supreme Court ruled that in terms of Chapter 9 of the Bankruptcy Code, Puerto Rico was a state, but in the same ruling, also barred Puerto Rico from authorizing its municipalities to file for Chapter 9 Bankruptcy (Torres Rivera 2016; Torruella 2017). Stripped down: Puerto Rico functioned as one of the fifty states in terms of constraints to restructure debt, but was excluded from the category of statehood when it came to avenues through which debt could be lawfully restructured. These gymnastics were bizarre in their lack of basis in reason, however contrived. An amendment to Bankruptcy Code enacted in 1986 barred Puerto Rico (as well as the District of Columbia) from marking out who or what could qualify as a debtor under Chapter 9. In the dissenting opinion, Justice Sotomayor highlighted that "Nobody has presented a compelling reason for why Congress would have done so, and the legislative history of the amendment is unhelpful" (*Franklin* 2015: 1953). The point, though, is that the Court produced Puerto Rico as two conflicting territorialities at once: as one state in the United States, which made the island subject to U.S. bankruptcy law, and as not-of the United States, which ruled it out of the relief that U.S. bankruptcy law could provide municipalities. What is more, the unspoken territoriality in these legal gymnastics, the territoriality lurking in the shadow of the Court's decision, was Puerto Rican sovereignty—the ability to author and realize its own "creole" bankruptcy law. Its negation was the condition of possibility for the former two mappings.

Third, on 30 June President Obama signed the Puerto Rico Oversight, Management, and Economic Stability Act into law. Passed by Congress the same day of the *Sanchez Valle* ruling and drawing explicitly on the terms set out by *Franklin*, PROMESA instantiated a financial control board that would have *total authority* over public spending on the island (and whose expenses would be covered by Puerto Rican taxpayers). It became known as *La Junta* on the island, suggesting parallels between the control board—which would be comprised of seven presidential appointees, only one of whom would be a resident of Puerto Rico—and a military dictatorship (LeBrón 2017). (Its acronym is the Spanish word for “promise,” and was subverted by activists during my fieldwork with the catchphrase *se acabaron las promesas*—promises are over.) PROMESA’s mandate to disallow or annul any local legislation that would tend to local healthcare, education, infrastructure, or other public services over debt repayment explicitly prioritized the vitality of mainland hedge funds over the vitality of Puerto Ricans.

How everyday life was rewritten in the shadow of PROMESA as relates to the Zika emergency will be further fleshed out in the next chapter. Here I want to continue dissecting conflicting expressions of U.S. sovereignty over the island, and on that, PROMESA was clear: *La Junta* would hold the sovereign power to overrule Puerto Rican public authorities. PROMESA’s logic drew on the idea that the degree of self-governance that the island had been granted by Congress in 1952 (the “free” of the “free associated state”) had been revealed to be inefficient and irresponsible; Déborah Berman Santana (1996b) has called this the “doctrine of nonviability.” This is a surface reading of the “debt crisis” as simply a matter of the local government borrowing more than it could afford. As Puerto Rican lawyer Alejandro Torres Rivera (2016: 47) argued, PROMESA was much more than an economic measure; it was “a political measure directed at throwing back...the model of government created in the 1950s” and “accenting the colonial power of the United States over our country (2016: 48; my translation). The “free” of the “free associated state” of Puerto Rico has, as we have seen, always been locked in and constrained by U.S. sovereign power, but PROMESA stripped the island of even the pretence of self-governance. All of these developments wore down ordinary people’s trust in U.S. government agencies, as well as trust in the ruling Popular Democratic Party (PPD), the same party that had engineered the island’s political status in 1952.

It is easy to see why Puerto Rican historians Ayala and Bernabe (2006: 335) designated the island a “possession of but not part of the United States,” a designation that has taken on even stronger colonial tones in the last few years. The density of U.S. government interventions into the island as place, the racialization of its people in U.S. law, and the territorial ambiguity of the island as space recall Stoler’s (2006: 128) description of the “imperial formation,” in which “technologies of rule thrive on the production of exceptions and their uneven and changing proliferation.” She continues:

Critical features of imperial formations include harboring and building on territorial ambiguity, redefining legal categories of belonging and quasi-membership, and shifting the geographic and demographic zones of *partially* suspended rights.

The Zika chemical vector program engaged territorial ambiguity and quasi-membership by “responsibilizing” Puerto Rican women for Zika’s bodily and financial futures in a broad U.S. national reproductive system. They were included in the nation as subjects and objects of vector control but excluded from ethical consideration through the selective stripping of corporeal autonomy and limited island sovereignty.<sup>3</sup> And, as we shall soon see, if women were made intervenable by this regime, so too was the island at large.

### **3.3 Subjects and objects of chemical vector control**

The reconfiguration of the island for the obliteration of mosquito reproduction in the name of Zika began with a range of U.S. and island government agencies, and community groups, enlisted in the effort. Municipal governments set out to remove millions of discarded tires from neighborhoods and ditches, as *A. aegypti* have a special affinity for tires that have collected rainwater as a place to deposit fertilized eggs. The PRDH installed screens on doors and windows on apartments and the removed debris in and around homes for the elderly and public housing projects. In partnership with the Department of Health, orientations on Zika vector

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<sup>3</sup> Sundberg (2015)’s work on a similar dynamic at work in the U.S.-Mexico borderlands has helped me frame this as such.

control were carried out for the boards of the 332 public housing projects that dot the island. Fumigation brigades were formed from Zika job recruitment fairs; the one I attended drew thousands of would-be workers, shuffling from station to station amidst loud pop music; and this attendance on an afternoon of torrential rainfall which raised water as high as the curbside. Ordinary people across the island were drawn into chemical vector control, whether as a means of formal (but temporary) employment, in the self-regulatory task of dusting their bodies with insect repellent, or in their interactions with federal and island public health agencies. The CDC's program, however, explicitly linked ordinary women's conduct with a kind of U.S. sovereign power.

### **3.3.1 Women's bodies: "Wear DEET like perfume"**

At the scale of the body, we can first observe the CDC'S recurrent call for people to apply a coat of DEET-based insect repellent in the morning and throughout the day. Everyone was told, in radio public service announcements, by doctors, on the advertisements that punctuate YouTube videos, in street signs, in grocery stores, and even on billboards over Puerto Rico Highway 2, to make a daily practice of wearing strong insect repellent (see Figures 3.3 and 3.4).<sup>4</sup> But crucially,

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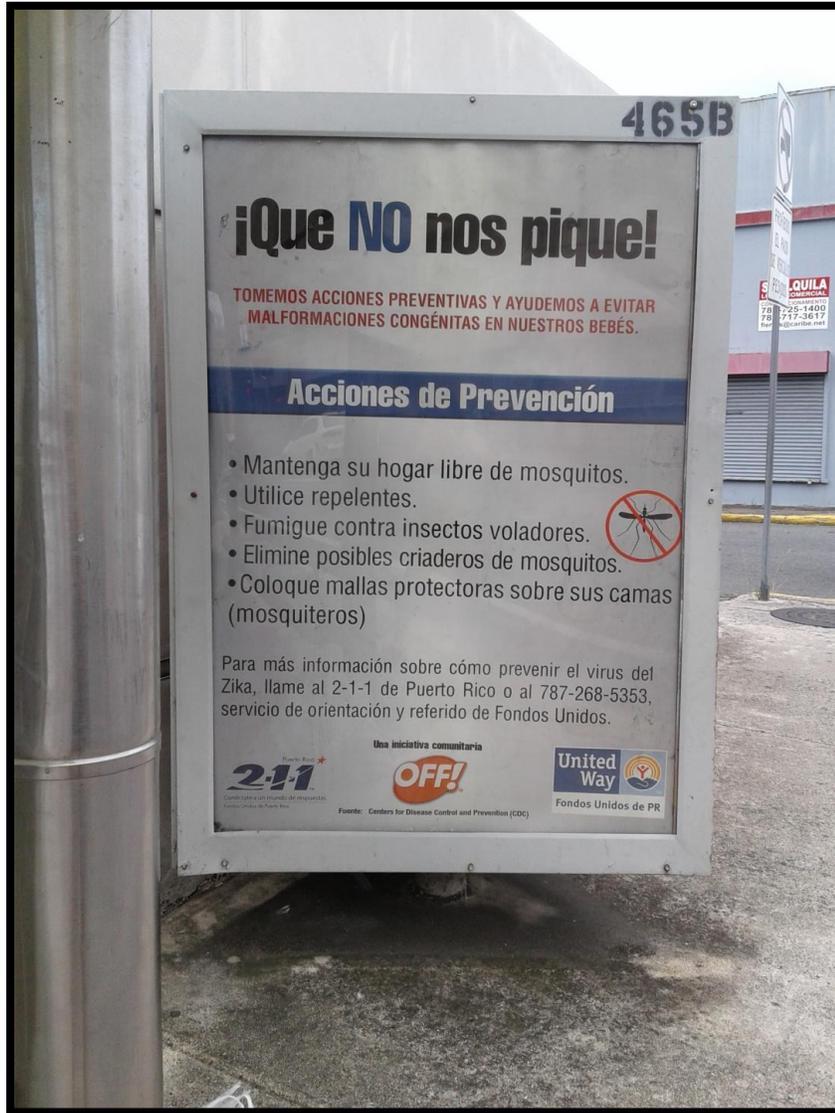
<sup>4</sup> The denomination of Zika a public health emergency offered repellent companies the opportunity for crafting a self-image as on the forefront of struggle against new tropical epidemics. Zika kits, the public health goodie bags repellent distributed by the CDC exemplify the private-public partnership at play in insect repellent guidelines. The CDC Zika kits distributed in Puerto Rico contained, in addition to bed nets, condoms, and standing water treatment tabs, one can of insect repellent with DEET. But if one followed the CDC guidelines of applying repellent multiple times per day, the maintenance of a DEET barrier on the skin was a costly endeavor for ordinary people, even in the context of government price controls, and in providing cans to the CDC, chemical companies like SC Johnson and Spectrum Brand gained access to a large consumer base. This was, at least in part, about asking consumers to protect one's immediate family as a marketing strategy for repellent companies, and it worked: when the link between the Zika virus and microcephaly was sharpened, sales of the "insect repellent and rodent control products" in the market year ending January 2016 already exhibited an 11.2 percent increase from the previous market year. Spectrum Brand, which produces Cutter brand repellent, reported sales 30 to 150 percent higher than a year earlier, with demand highest in Texas, Louisiana, Florida, and Puerto Rico (Berr 2016). Chemical companies like SC Johnson, the maker of Off! brand repellent, took to donating units of their products (Kaufman 2016), which was as much a marketing strategy as philanthropic endeavor, allowing companies to position themselves as protagonists in the fight against a dangerous disease. By the time the WHO deemed Zika a Public Health Emergency of International

these injunctions focused on women and girls. During my research, doctors, public health officials, and public health educational material implored Puerto Ricans to “wear DEET like perfume,” an exhortation bound up in perceptions of female beauty rituals. And crucially, public-school teachers were explicitly instructed to distribute repellents to *girl* students (McNeil Jr. 2016a). This immediate focus on girls echoes emergent “Girl Effect” development programs that render girls responsible for development in their communities (Wilson 2015) and sexualize them as proto-pregnant subjects.

U.S. government agencies also targeted Puerto Rican women through government food assistance. This targeting was principally realized through Women, Infants, and Children (WIC), a program that provides over 90 percent of pregnant women in Puerto Rico nutritional and childcare counseling and food vouchers (Adams et al. 2016). The role of WIC in chemical vector control exemplifies the deep presence of the U.S. state in everyday life in for most women in Puerto Rico, at once providing a monthly lifeline in the context of island food insecurity (LeBrón 2016) and instructing women on the chemical mitigation of mosquito bites. Through WIC over 21,000 pregnant women were instructed on how to prevent Zika and given insect repellent, and according to the CDC, WIC was utilized as an institution for Zika management in order to access as many women as possible (ibid; see also Gooch 2017). Figure 3.5, a PowerPoint slide from a CDC presentation in Puerto Rico, illustrates the results of a survey which found over 60 percent of participants to have been interpellated as subjects of the Zika public health emergency by WIC, compared with 40 percent by television, 25 percent by a doctor, and less than 20 percent for Facebook and other websites, indicating relative success in this endeavor, or rationale for continuing to make use of the agency to reach women. Puerto Rican women and girls were therefore in the first instance made into *subjects* of chemical vector control: through their chemical self-regulation, the U.S. population could be secured against Zika’s biological and financial threats.

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Concern in February 2016, the *Wall Street Journal* had estimated demand for repellent would outpace that of the previous year two to three times (Terlep 2016).

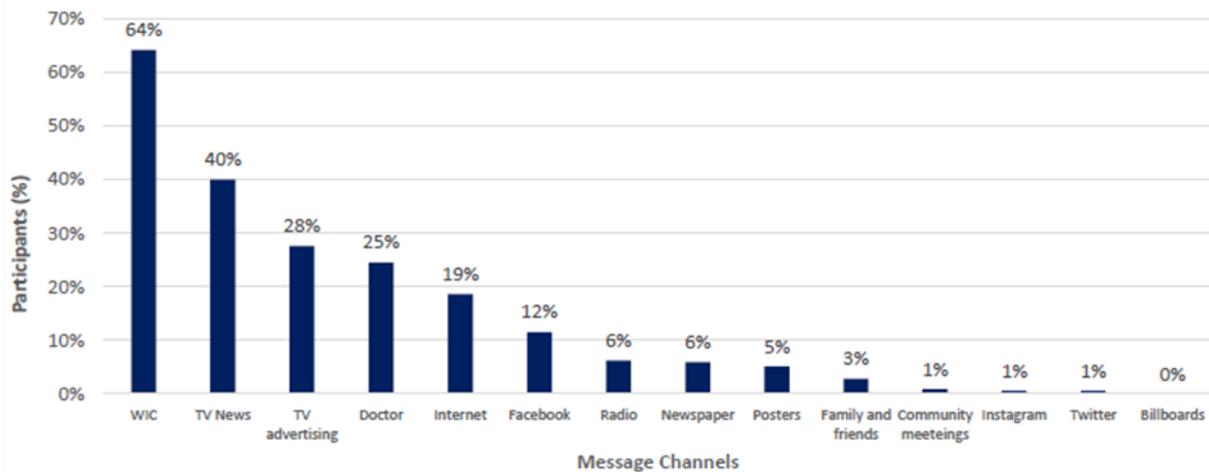


**Figure 3.3: Zika public service announcements in the San Juan neighborhood of Santurce. This one, sponsored by the Puerto Rican government, Off! Repellent company, and the United Way, reads “So they WON’T bite us!” at the top, and continues “Let’s take preventative actions and help avoid congenital malformations in our babies.” Below, preventative actions are listed: “Keep your home free of mosquitoes; use repellents; eliminate possible mosquito breeding areas; set up mosquito nets over your beds” (Photo by the author).**



**Figure 3.4: Repellent advertisement in a San Juan grocery store: “Protect yourself from the mosquitoes that can transmit the Zika virus” (Photo by the author).**

## ¿Dónde están las mujeres embarazadas escuchando mensajes de prevención contra el Zika?



**Figure 3.5: “Where are pregnant women hearing Zika prevention messages?”**

PowerPoint slide from a CDC presentation (Source: CDC).

It is crucial to note that the CDC’s instructions for women in Puerto Rico to maintain a DEET skin barrier did not differ from instructions for women on the mainland: women in areas of active Zika transmission on the mainland were urged to do exactly the same (Begnaud 2016).

Where women’s self-regulation on the island differed was its interlinkage with coerced chemical intervention at the scale of the home. In the summer of 2016 physician Wanda Beltrán brought a case to the attention of the Puerto Rican Civil Rights Center, proclaiming that WIC beneficiaries had been coerced into signing a form that allowed government officials to freely enter homes for fumigation (Departamento de Salud 2016). Reports over how many women signed vary; some

say over 20,000, some say closer to 10,000. They were not allowed copies for themselves and were told not to discuss the matter with their doctors. WIC sent the registry of signatories to the CDC, which then coordinated the fumigation of over 2,000 homes with the chemical pesticide Deltamethrin.

Chemical intervention into Puerto Rican domestic space proceeded on the premise that women's self-regulation was insufficient: homes needed to be chemicalized directly. The forced fumigation of the home echoes public health proselytizer Fred Soper's unleashing of mosquito brigades across Brazilian metropolises in the name of yellow fever in the early-twentieth century, during which fines were imposed on those whose domestic space had been contaminated by evidence of breeding mosquitos (Stepan 2007). This modern approach to public health holds that the home is a space of human reproduction from which mosquito reproduction must be banished. Figure 3.6, for example, is a game for children created by the CDC as part of their collection of Zika educational material in Spanish; it directs the child to guide a family and their pet dog through a maze, avoiding biting mosquitoes so that they can arrive safely home. By presenting mosquitoes as obstacles one must overcome to "win" the game, and making "winning" synonymous with "home," the game suggests that domestic space is—or at least should be—space sealed off from mosquitoes.

The forms made no mention of what chemical might be sprayed, nor of any associated health risks, and released Puerto Rican and U.S. governments from liability over any health damages related to fumigation (Criollo Oquero 2016; Quintero 2016b; 2016c). In the preceding months, CDC scientists had been gathering *Aedes* specimens from municipalities across the island to assess whether, and to what extent, they were resistant to Deltamethrin in bottle bioassay tests. Collected mosquitoes were first circumscribed to CDC laboratories, and then to glass bottles, the inside of which coated with the pesticide; the range of death rates was simplified into three categories: "resistant," "partially resistant," and "susceptible." Maps like Figure 3.7 of chemical susceptibility released later depict the limits of the organization's capacity to bring *Aedes aegypti* mosquitoes under control, to jam their nervous systems so as to obliterate them and cut off Zika's most well-traveled

pathways between human hosts: mosquitoes were resistant to Deltamethrin in many areas, including the urban areas of San Juan and Ponce. Yet public disclosure about insect tolerance for Deltamethrin and other insecticides was limited; so too was information about the effectiveness of insecticides in actually preventing mosquito bites (Garriga-López 2016).

It also appears that U.S. government agencies assumed Puerto Rican women's self-regulation to be insufficient from the beginning. As news of the WIC- and CDC-coordinated domestic fumigations began to circulate, people noted earlier rounds of unauthorized fumigation of 3,000 pregnant women beneficiaries of WIC. Carried out by Oliver Exterminating Corporation, this round of fumigation happened without the mediation of a signed document (Quintero 2016c) and therefore without even the pretense of transparency. Chemical intervention into domestic space thus did not follow the dissemination of instructions for women's self-regulation of body and home as escalating stages in Zika management, but was carried out alongside that dissemination, secretly. If U.S. biosecurity knowledge focalized Puerto Rican women's bodies as the site of self-intervention, biosecurity practice dispossessed women of autonomy over domestic space. And because the dispossession of domestic space was enacted through spraying a synthetic chemical that would encounter and pass through the body, this practice also dispossessed women and their families of bodily autonomy. Self-regulating subjects of chemical vector control were also objects of chemical vector control.

### **3.3.2 Island: "With or without consent"**

The CDC's aerial fumigation plan scaled up the injunction for insect repellent use and the covert fumigations of domestic space. It sought to rapidly reduce *Aedes aegypti* numbers across Puerto Rico by spraying the organophosphate Naled from airplanes.

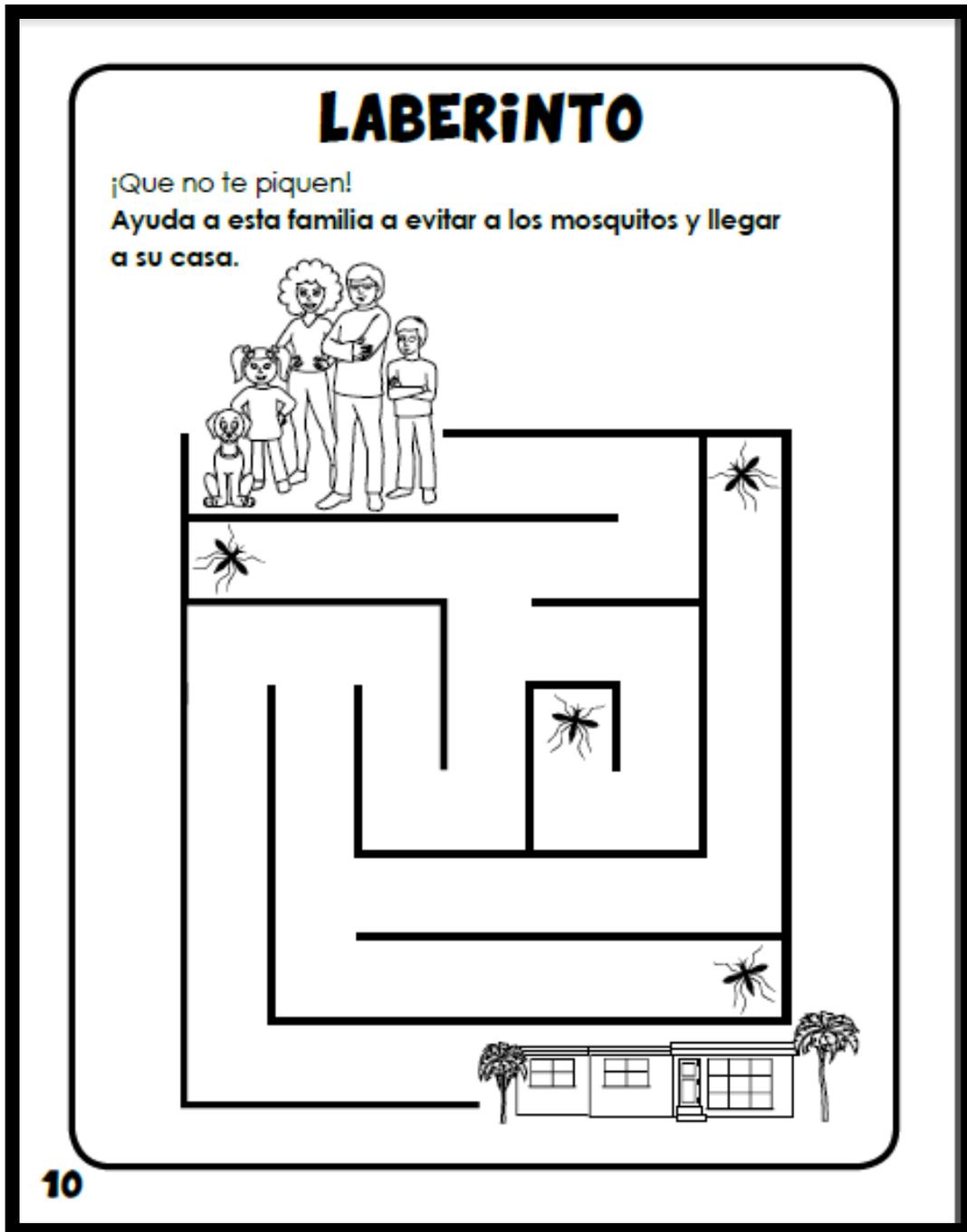


Figure 3.6: Game for children created by the CDC: “Help this family evade mosquitoes and get home” (Source: CDC)

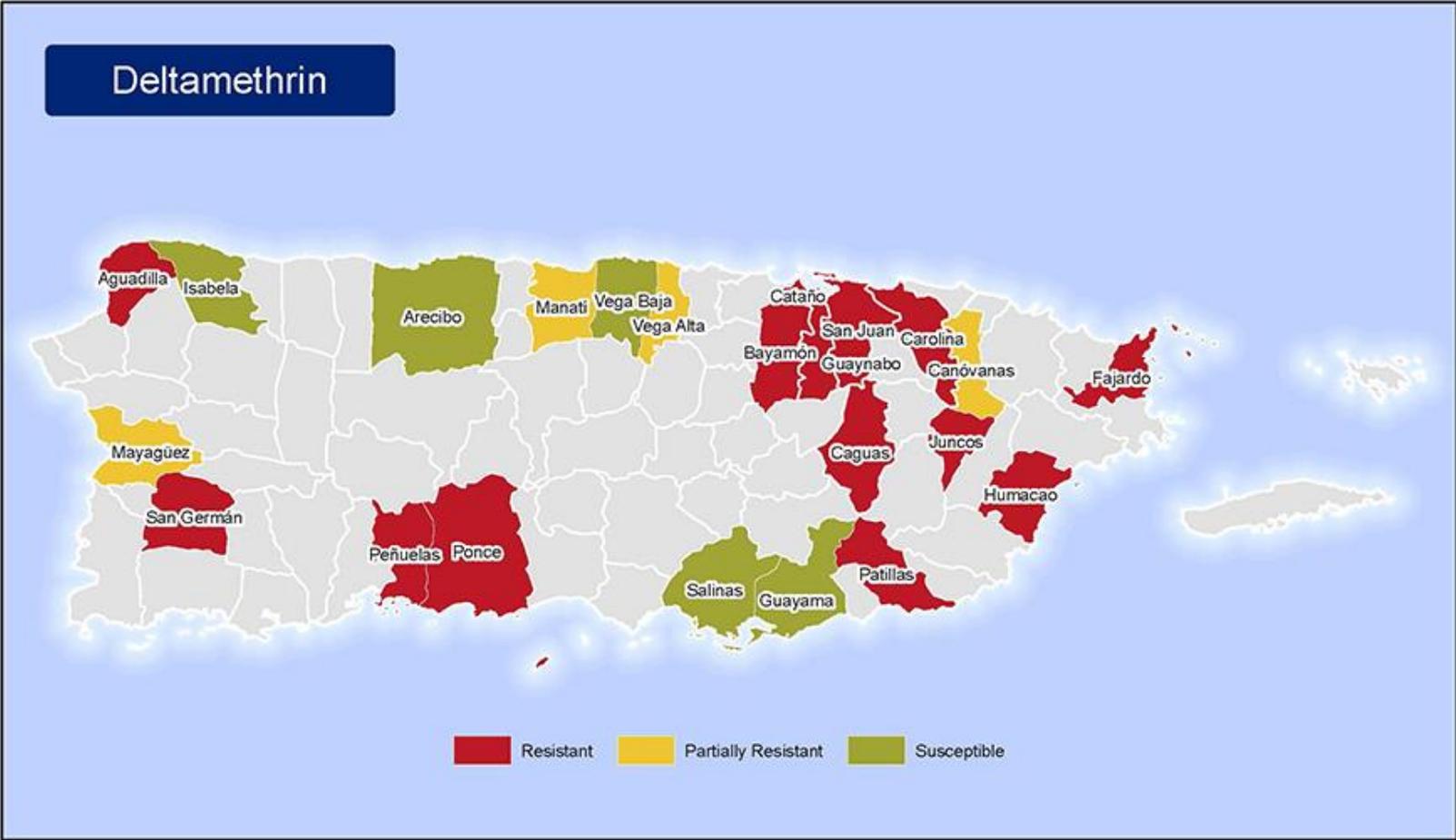


Figure 3.7: *Aedes aegypti* resistance to Deltamethrin (Source: CDC).

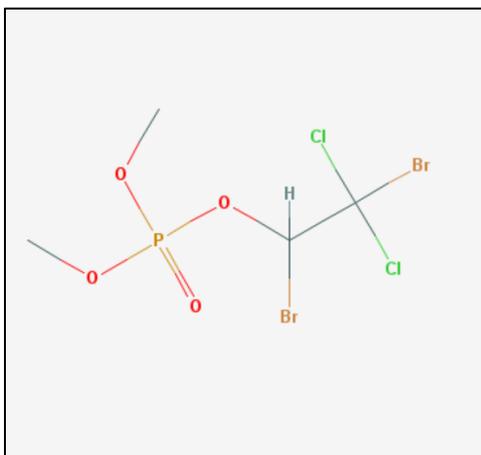
Three logics of chemical vector control at the scale of the island must be highlighted. First, aerial Naled fumigation was premised on the obliteration of mosquitoes across large areas on the island. As Vanessa Agard-Jones (2014) has noted, spray technologies encompass the enjoinder of liquids and solids in correct ratios to “bring chemicals to ‘life’” and the pressurization of the reconstituted liquid into a mist that may be dispersed. It is the granularity of spray technologies that allow broad coverage, and this was especially true for the “ultra-low volume” Naled spray proposed for Puerto Rico. Developed by U.S. military entomologists in World War II, aerial chemical vector control is “referred to as a space spray since the goal is to drift droplets through a particular space resulting in contact with flying insects” (Breidenbaugh and Haagsma 2008: 55). Naled, also known as Dibrom, is an organophosphate pesticide. When dispersed from airplanes in tiny aerosol beads, a chemical suspension forms. Hanging in the air, it comes into contact with mosquitoes and inhibits the enzyme acetylcholinesterase in their bodies. Acetylcholinesterase is necessary for the smooth functioning of the nervous system; when compromised, the mosquito is unable to break down acetylcholine, a neurotransmitter that plays a role in human and insect bodies alike. This results in the death of the mosquito, as well as bees and other insects. Aerial “space spray” is celebrated for being able to access areas that may be inaccessible to backpack or truck-mounted spray units—or to kill mosquitoes that would otherwise reach the surface of the skin of people not using repellent.

In addition to the minutiae of aerial spray technology, the CDC’s plan promised expansive spatial reach over the island in the geography of fumigation. This is another way chemical vector control in Florida and Puerto Rico diverged sharply: the CDC’s discussions of the former concerned a 6-block area where active Zika transmission had been identified, while in Puerto Rico the geography of fumigation wasn’t made clear to the public, though it was expected to “cover large tracts of a geographically diverse island” (Rigau-Perez 2018b: 28).

Second, the Naled plan was pitched as a form of anticipatory environmental governance against an explosion in Zika infection rates amongst Puerto Rican pregnant women generally, and cases of microcephaly more specifically. “If any part of the continental U.S. had the kind of spread of Zika that Puerto Rico has now, they would have sprayed months ago. This is more a question of

neglect that anything else,” stated CDC director Tom Frieden, continuing, “If we wait until children with microcephaly are born, it will be too late” (quoted in Coto 2016b). The CDC invoked an abstract image of future children as “the fantasmatic beneficiary” (Edelman 2004: 3) of aerial fumigation, asserting that Naled was the “island’s best defense” (Coto 2016b). It was in the name of the Child’s future that Naled was pitched, at a potential health cost to actually living people. The former was the site of Zika speculation; the latter was the site of Zika intervention. The former served as the hinge between unruly nature and the health and well-being of the latter. And crucially, this rationale was tied to insect repellent guidelines: WIC Puerto Rico director Dana Miró stated aerial fumigation was necessary *because Puerto Ricans were not following CDC guidelines for mitigating against mosquito bites* (Noticel 2016). The expansive spatial reach of proposed aerial Naled fumigation, therefore, was deemed a corrective measure against Puerto Rican irresponsibility in self-management.

Third, the aerial fumigation plan was rationalized as safe through the logics of dominant toxicological paradigms. Toxicology frames chemicals as discrete and isolated units, making chemicals visible to the human eye by structural diagrams (see Figure 3.8), and naming them “one by one, as isolate entitles of purely technical qualities without context” (Murphy 2017b: 495). It is also written into a functionalist legal framework that cannot account for compound or unforeseen reactions with other synthetic chemicals or living matter. This habit has a long history which bears on the way risk of chemical exposure is conceived.



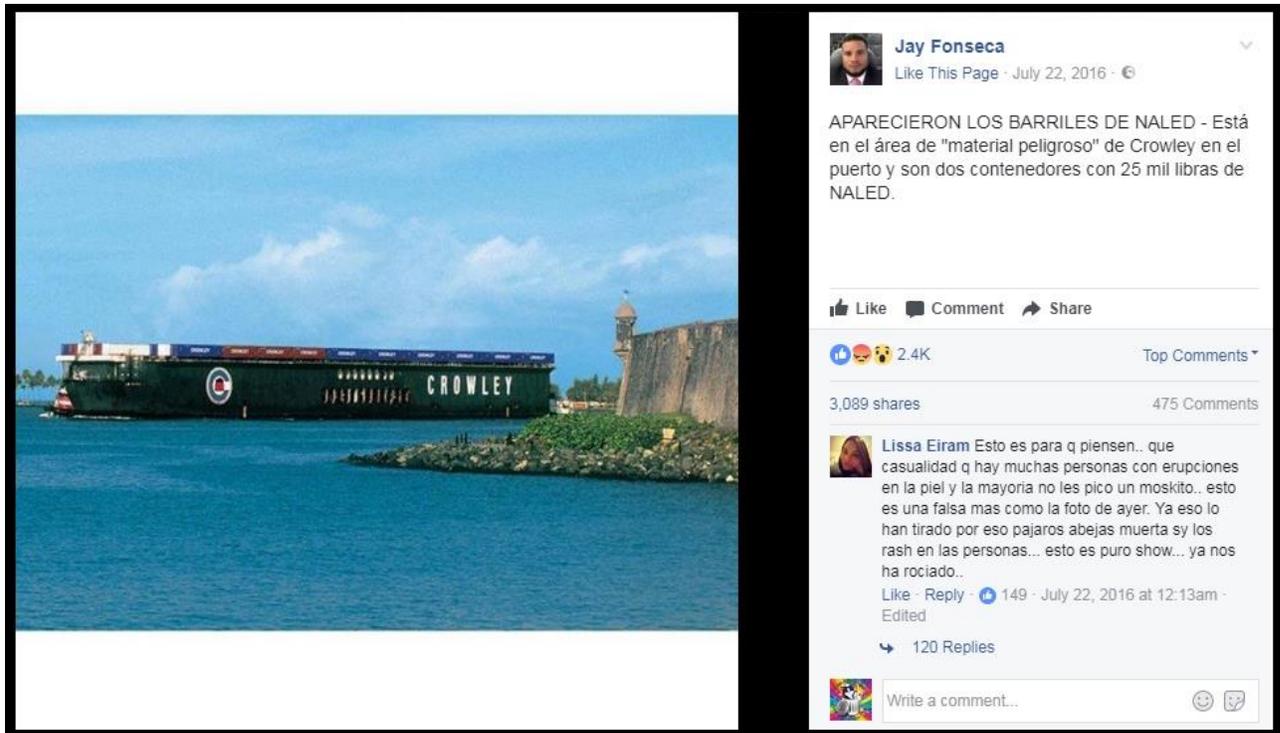
**Figure 3.8: 2D structural diagram of Naled (Source: PubChem).**

The idea of chemical exposure emerged in the rough waters between industrial production and environmental regulation in the early-twentieth-century United States. According to Linda Nash (2008), modern toxicology finds its origin in the first regulations of air quality, which sought to limit work-related diseases among factory workers. These regulations were authored with the spatial configuration of the factory and worker productivity (as opposed to worker health) in mind. From “homeostasis,” physiologist Walter Cannon’s notion that bodies are inherently self-regulating, early toxicologists developed the concept of the chemical threshold, which holds that the human body can handle toxins without suffering permanent damage, provided the exposure level is low enough. The result was a science of correlations between specific, quantifiable exposures of worker *environment* and specific, quantifiable effects in the worker *body*. Put simply: environment was external to health.

The transposition of the factory onto the wider world helped fortify the idea that “industrial chemicals are a normal part of the environment, and that the only relevant question to ask was at what level” (Nash 2008: 656). As such it had profound implications for the regulation of chemicals and litigation related to human health. When farm workers started to fall sick as chemical pesticides became fundamental to U.S. agriculture in the 1940s and 1950s, the toxicological toolkit in place worked only through proving concrete linkages between discrete chemicals and discrete illnesses. This transposition also has profound implication for contemporary legalities of chemical use: the litigators of pesticide industries are practiced in strategically arguing the “multiplicity of exposures, which subverts the ability to isolate the harmful effects of any specific exposures in an era where chemical exposures are only regulatable and litigatable as specific entities” (Murphy 2008: 700-701). Furthermore, the 1976 Toxic Substances Control Act (TSCA) grandfathered “existing chemicals” into the umbrella of “safe” chemicals, making pulling of chemicals from the market extremely difficult (Cordner 2016). Even with recent reforms of the TSCA (and by contrast to current EU chemical regulations), U.S. law approaches synthetic chemicals with an “innocent until proven guilty” logic.

The aerial Naled fumigation plans brought the abstractions of the early-twentieth-century factory in U.S. law to bear on life on the “unincorporated territory.” CDC documentation cited the chemical’s 1959 approval by the EPA and its half century of use in mosquito control and agriculture on the mainland as evidence for its safety (Centers for Disease Control and Prevention 2016b). It also argued that the small ratio of active Naled to the area of application—less than two tablespoons per acre—was below the ratio that could cause negative health impacts in the area of application. CDC calculations of Naled’s safety conformed to the U.S. legal orientation to chemicals, despite, as Rodríguez-Díaz et al. (2017) have noted, legitimate concerns over the toxicity of Naled for humans and bees having been raised in scientific studies (e.g. Hoang and Rand 2015), the pressing point that dependence on insecticides could facilitate viral resistance (Garriga-López et al 2016), and the EPA’s reliance on industry-sponsored studies (Rigau-Pérez 2018b: 27).

But the most important aspect of the plan for chemical vector control at the scale of the island was that it was kept secret from the people who would have to live its effects. In July, *Telemundo* reported that the CDC had sent a massive shipment of Naled to Puerto Rico without the knowledge of local authorities (Gómez 2016). Conflicting reports about the location of and jurisdiction over the Naled shipment emerged in the island’s major news media. *Metro PR* said La Fortaleza had registered a shipment of Naled from the CDC to the Isla Grande hangar (*Metro PR* 2016), while *El Nuevo Dia* re-reported what had come through on Radio Isla: a massive shipment of Naled was on the island, not at Isla Grande, but somewhere, and the Puerto Rican government did not know where it was. Hours later, *El Nuevo Dia* reported that the Puerto Rican government had located the Naled—25,000 pounds of it—in a large container ship off San Juan Harbor (Caro González 2016). Later it came to light that, in an earlier meeting, the CDC had informed representatives of Puerto Rican municipalities and government agencies that the island would be fumigated with Naled “with or without the consent and cooperation of local authorities” (Municipality of San Juan v. the Center for Disease Control and Prevention 2016).



**Figure 3.9: Jay Fonseca breaks the story of Naled shipment in San Juan Harbor (Screenshot by the author).**

The report of the shipment Naled on the nightly news added a jolt to already buzzing street talk about chemical fumigation. In the days that followed, Chief of Staff of the Puerto Rican government Grace Santana Balado and Director of Emergencies and Disasters Ángel Crespo were interviewed on Radio Isla. Not only did they declare that a search of the Isla Grande hangar had been conducted without finding Naled, they also declared not knowing where the Naled might be. In other words, they affirmed that the CDC had shipped the pesticide to the island and stated that they had nothing to do with it.

The drama over the shipment's location was reported on Facebook by Jay Fonseca, a prominent Puerto Rican commentator (see Figure 3.5). (His page garners a large following; with almost one million "likes," it reaches not only many people on the island, but deep into the diaspora.) Fonseca also broached the veracity of whether island government agencies did not know about the shipment of Naled. This he does in an informal interview with investigative reporter Valeria

Collazo Cañizares. Together, they addressed the widespread speculation that the local government had lied about not knowing about the shipments of Naled to the island, stating that, although difficult to believe, it appeared to be so. Fonseca argued it wouldn't be the first time the federal government had done something without the permission of the local government. "That the *federales* brought in Naled...without the governor knowing, that does not seem strange to me," he trails off, adding that admitting the lack of knowledge made his cabinet look foolish. "No governor wants to tell the world that he doesn't have any power," he quipped. Collazo Cañizares, for one, offered that she had spoken to people at the Department of Agriculture involved with pesticides branch, who kept saying "that is impossible, that is impossible," due to inspection rules which may or may not have been followed – all pesticides and accompanying devices arriving to the island must be registered with the Department (Oficina de Agricultura 2014). Fonseca's page then became a forum for people to speculate about whether aerial fumigation with Naled had already been carried out in secret. Thousands of people wrote of skin rashes, feeling unwell, and breathing problems, and submitted photographs of mass bee deaths (Fonseca 2016; see also Caro González 2016).<sup>5</sup>

The many questions raised by the Naled shipment exemplify of course the *ambiguity* of island sovereignty. Such questions, however, cannot be separated from the declaration that aerial fumigation would be realized regardless of Puerto Rican government consent, which indicate the *hardening* of U.S. sovereign power. It is the relationship between this twinned ambiguity and hardening, on one hand, and the lives of women and girls on the other, to which I now turn.

### **3.4 Biopolitics, geopolitics, and chemical harm**

Because of the dual position as an "unincorporated territory" of the United States and a tropical island with active local Zika transmission, public health knowledge and mainland popular discourse mapped Puerto Rico as both inside and outside the United States. Women and girls on

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<sup>5</sup> Note that skepticism ranged from specific concerns with the science behind the Naled plan, to the discussion of pesticides and environmental contaminants in a broad, amorphous sense, including speculating about their relation to conditions like autism or Parkinson's disease.

the island were spatialized as the threshold between the agency of the Zika virus and its mosquito carriers, on one hand, and the future of the U.S. population on the other. I mean this future in both embodied and disembodied senses: microcephaly exemplified the capacity of extra-human nature to shape and mold the human form and carried with it unknown but inevitable debits to the national economy in cost of care and lost productivity. The present conduct of Puerto Rican women was bound to the financial and biological future of the U.S. nation. The island was thus *incorporated* into the U.S. nation through an imaginary of biological and national economic risk—despite its status as “unincorporated territory.” At the same time, Puerto Rico was also produced as outside the United States in an ethical sense, in which chemical intervention was planned and in some cases realized without the consent of the ordinary people whose bodies were targeted.

This tangled geo-graphing of public health risk blamed the self-regulating Puerto Rican woman for rendering the U.S. population vulnerable to the dangers of the Zika virus. Risk, as Becky Mansfield argues, is very different from biological uncertainty: it is a mode of managing biological uncertainties on the behalf of specific communities. As such, it is a “biopolitical technology for governing the population in the name of security” (Mansfield 2012: 970) that is often tied to “responsibilization.” In public health knowledge on contaminated seafood, for example, pregnant women are spatialized as the “threshold” between a wider polluted environment and the health of the population and urged to modulate fish consumption to protect the fetus. This biosecurity regime reduces contamination—a problem with surefire connections to industrial practices—to one of individual women’s conduct, yoking the future vitality of the population to the present actions of women. Likewise, Zika risk is very different from Zika’s uncertainty. That Zika can be transmitted through a chance mosquito bite, reside in humans without producing symptoms, and harm growing fetuses speaks to the uncertainties of living on a dynamic planet, of the “precarious global interdependency of human, animal, and viral ecologies” (Sparke and Anguelov 2012: 726). By contrast, in the chemical vector program’s framework of risk, the global problem of vulnerability to new infectious disease was reduced to the individual actions of Puerto Rican women and the ripple effects those actions might hold for the U.S. population.

Here it bears repeating that the CDC's biosecurity regime was part and parcel of the U.S.-Puerto Rican imperial formation; this is the context in which insect repellent guidelines were both produced and interpreted. The territorial ambiguity of the island, "quasi-membership" of Puerto Ricans in the United States, and the partial suspension of Puerto Ricans' legal rights adds another dimension to the risk and "responsibilization" dynamic unpacked by Mansfield, for the scales of chemical intervention—body, home, and island—were connected: covert domestic fumigation and the Naled aerial fumigation plan were deemed necessary because Puerto Rican women had not properly amended their comingling with mosquitoes on the surface of their bodies and in the spaces of their homes. They were interpreted to have flouted insect repellent guidelines, exposing themselves to the bite of *Aedes aegypti* and thereby exposing the U.S. population to chance of costly microcephaly. Accordingly, U.S. paternalism held, they must be shielded from the mosquito by other means.

The other means was the threat of spraying a chemical associated with toxicity concerns from above without the consent of Puerto Rican authorities, a move that can be read—and indeed, was read by many Puerto Ricans—as an aggressive display of U.S. sovereign power. Chemical vector control in Puerto Rico sought to secure the U.S. population with synthetic chemicals, a population in which Puerto Ricans were included as self-regulating subjects and excluded in terms of knowledge of and consent to chemical intervention. Here we might think of Agamben's (1998; 2005) space of exception, as well the constitution of U.S. territoriality, at its core, through "the coercive inclusion of Indigenous peoples...and simultaneous denial or restriction of their political rights as autonomous polities" (Sundberg 2015: 223). The Naled fumigation plan was biopolitical insofar as it would, if realized, expose some Puerto Ricans to chance of long-term chemical harm in order for others in the United States to live more prosperously, given the anticipated public costs of microcephaly. Furthermore, the vertical structure of the aerial fumigation plan was both a callback to more overt expressions of U.S. sovereign power on the island (especially bomb testing) and a reminder of U.S. territorial control over the island. "Biosecurity weds biopolitics with geopolitics," writes Braun (2007: 25): the CDC's chemical vector program tied the incitement of Puerto Rican women's self-management to the threat of the

deployment of chemicalized sovereign power at the scale of the island. As *thresholds of empire*, the liminal space of the pregnant body and the liminal space of the island needed to control themselves or receive outside control.

It is crucial to be clear about what chemicalized sovereign power could entail, if deployed. The “granularity” of chemical spray technologies is bound up with peril as much as with promise, as Agard-Jones (2014) argues, such that the expansive spatial reach of planned aerial Naled fumigation was bound to the expansive reach—in both spatial and temporal terms—of its possible ill health effects. Recent research on synthetic chemical use calls into question the ideas of chemical thresholds and discrete cause and effect around which the Naled plan was rationalized. This research points to “enmeshed land and body” (Murphy 2017b: 497) and the unruly activity of synthetic chemicals, suggesting that a chemical like Naled could exceed the space designated for application. As the emerging field of epigenetics shows, exposures can shape how bodies respond to new exposures (Guthman and Mansfield 2012; Mansfield 2017). The molecular relations of chemicals like Naled do not abide by the human legal frameworks; you can’t follow them along a line from producer to space of application, and while they often congregate in human bodies, they do so in ways that are difficult to measure, or they accrete across extended temporalities. Their relations with other substances are unknown - past exposures could shape how bodies respond to new exposures - and they exceed both spaces of application and human bodies, moving into and spatially across the Earth on sultry Caribbean winds and rains. The point is any deployment of chemicalized sovereign power would engage bodies and lands. It could stretch the partial suspension of Puerto Rican rights during the Zika public health emergency into intergenerational futures. And while the threat of Naled may on the surface seem to be a single hostile act, it was the structural racism ensconced in U.S. law that enabled the enunciation of an environmentally racist plan (Pulido 2000). The racialization of Puerto Ricans in U.S. law on the basis of presumed biological difference could, in effect, write racism into the biologies of both body and land. Receding bodily sovereignty was part and parcel of the expanding sovereignty of US imperialism.

### 3.5 Land and law in the time of Zika, part II: Resistance

Many people in Puerto Rico knew this, of course: the chemical accretions of U.S. empire brought them to question the CDC's guarantees of Naled's safety and subvert the Zika public health program's reduction of public and reproductive health to microcephaly.<sup>6</sup> It is therefore also crucial to be clear about why aerial Naled fumigation was ultimately *not* carried out by the CDC. Conceived in secret and threatened to be realized without consent, the plan was resisted through street activism, dense anti-Naled discourses in Puerto Rican news media, and active legal resistance by a Puerto Rican municipality within the United States court system.

Opposition to Naled bloomed quickly in the heady summer of 2016, with the formation of the "United Front Against Aerial Fumigation" with its own assemblage of expertise: the "colegios" (mandatory guilds) of physicians, engineers, and chemists, the University of Puerto Rico School of Public Health, a prominent oncologist, lawyers, and ecologists from academic and community based institutions" (Rigau-Pérez 2018: 27). Thousands gathered for demonstrations, including one in front of the CDC building in San Juan, as well as nighttime discussions throughout the city. People held up signs that said, "Don't fumigate us" and "I'm not your fuckin' experiment" (*No soy tu fukin experimento*), and charged the CDC of "environmental terrorism" (Quintero 2016a). Opposition ranged from the demand for more information, to assertions of unsound scientific evidence, to accusations of U.S. government experimentation. Naled's illegality in the

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<sup>6</sup> One need not reach back to Vieques for a reason for widespread skepticism around chemical toxicity. Consider that news of the unauthorized Naled shipment broke merely days after about 200 police accompanied five large trucks belonging to a U.S.-based private energy company called Applied Energy Systems. The trucks contained coal ash set to be dumped in a landfill near the southern town of Peñuelas; people had been protesting the dumping on health and environmental grounds since 2015. (A sample of the ash would later be analyzed by Osvaldo Rosario, chemist at the University of Puerto Rico - Rio Piedras, and found to include both mercury and arsenic [Estrada Torres 2016].) That the Puerto Rican police—largely accepted as ordering the island in line with mainland interests instead of "keeping the peace"—was protecting the deposition of toxic ash by a U.S. company thickened the feelings of the island's non-sovereignty.

European Union was a recurring point of reference in articulating its danger,<sup>7</sup> as was its toxicity classification by the EPA as a “category 1” with respect to eye irritation and dermal irritation (Environmental Protection Agency 1995), which means it is capable of seriously injuring workers engaged in spraying. Chemist Jorge Colón Rivera called for transparency on the quantities of Naled proposed and the specific areas delimited for spraying, as well as guidelines for Puerto Ricans to minimize health risks (Colón 2016). Epidemiologist Cruz María Nazario condemned “exposing people to a dangerous pollutant as part of a CDC experiment” on health grounds as well, but also alternative grounds of risk. While she did not dispute the existence of Zika or its capacity to harm fetal life, they asserted that the CDC overstated the risk of microcephaly and did so with unsound scientific evidence. In particular, they charged the CDC with an overreliance on Cauchemez et al.’s (2016) study of Zika in French Polynesia, which utilized a sample of eight women, and Brasil et al.’s (2016a) descriptive study of 88 women in a Brazilian hospital mistranslating their conclusions so as to stoke fear in the pregnant populace. (The study has since been expanded and updated: see Brasil et al. [2016b].) Neither of these provided a proper evaluation of Zika’s risk to Puerto Rican health for María Nazario.

What united these disparate strands of opposition was concern over the unknown human and environmental health consequences of Naled, the fact that consent of the Puerto Rican authorities had not only not been sought by the CDC, but openly flouted, and the lack of transparency on the geography of planned fumigation. The Naled plan drew on a long history of public health abuse by the U.S. government and exemplified the position of Puerto Ricans as “outsiders looking in”

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<sup>7</sup> But even this is a tangled web: the anti-Naled movement was quick to point to its “banned” status, but proponents argued it was not actively “banned,” but rather pulled from the registry because its manufacturer had decided potential profits from the European market were not worth the cost of evaluations for EU approval. After the *Miami New Times* wrote that Naled was “banned in the European Union,” the Florida Department of Health recoiled, stating in a FAQ that has since been removed that the substance had not been registered in Europe; “banned” and “not approved for use” were very different. The *Miami New Times* answered by citing a 2012 decision to take Naled off the European market (Iannelli 2016). The substance had indeed been actively removed, despite Florida government claims otherwise, demonstrating how rationales for regulatory mechanisms take on a life of their own in wider epistemological struggles over chemical danger.

on U.S. sovereignty (Derby 2008: 294). It also threatened the full, if momentary, stripping of already-compromised Puerto Rican sovereignty over the island as a means of addressing the perceived failure of women's self-regulation.

In the United States District Court, San Juan Mayor Carmen Yulín Cruz-Soto filed a suit on behalf of the municipality of San Juan. (Recall that less than a month before, the U.S. Supreme Court had reaffirmed the incapacity of the Puerto Rican government to either author its own bankruptcy law or authorize municipalities like San Juan to restructure debt.) Pursuant to the Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA), the suit demanded a trial by jury for a long list of defendants, including the CDC, the Commonwealth government of Puerto Rico, and three corporations. The objective of the suit was to prevent the CDC from spraying until an environmental impact statement has been provided as required by NEPA, which was designed to involve the public in federal decision making related to environmental health. Juanita Sundberg (2015: 217) asserts that, “Although there are no guarantees, NEPA legitimizes the concerns of citizen-subjects about clean air and water and about culturally significant landscapes indispensable to the fabric and long term wellbeing of multispecies communities.”

The suit at least hints at the “double-internality” (Moore 2015) of human bodies and ecosystems (human-in-nature, nature-in-human), evident in many indigenous cosmologies—an orientation to both body and nature that is much different from those found in the U.S. legal orientation to toxic chemicals. It argued aerial fumigation would “pose a significant risk to the well-being of several species of fish, wildlife and plants” (Municipality of San Juan v. the Center for Disease Control and Prevention 2016). In addition to endangered species, it highlighted water systems, noting Naled's label warning that the chemical not be used in or around bodies of water. “The quality of the multiple waterways and the San Juan estuary systems, as well as the safety of wildlife and fish that inhabit said ecosystems and bodies of water directly affects the health, recreational, aesthetic, commercial, and environmental interests of the MSJ [municipality of San Juan],” the plaintiffs charged. The lawsuit's appeal to water quality came just weeks after U.S. Geological Survey threatened to stop operating 177 hydrologic stations on the island because of

an unpaid debt of \$2 million as part of the broader politics of austerity, thereby shutting down water quality monitoring (Coto 2016a). In other words, the closing down of the capacity to assess water quality as part of austerity had coincided with the plan to fumigate the island with Naled. The threat of indiscriminate aerial fumigation was tied to a preemptive refusal to assess its ecological impacts.

The suit also centered the chemical's capacity to interfere with the health of pregnant women and babies, the figures in the name of whom the Naled program was authored in the first place. Here I quote from it at length:

Naled is also hazardous to humans as it is toxic, causes serious eye damage, is harmful if inhaled and may cause skin irritation. Also, there have been recent findings linking the presence of organophosphates and behavior problems in babies whose mothers were exposed to this type of chemical during their pregnancy. Also, gestational exposure to several common agricultural pesticides that contain organophosphates, such as Naled can induce developmental neurotoxicity in humans, and has been associated with developmental delay and autism. As such the CDC's local spokesperson advised, in a radio interview, that he agreed with the P.R. Department of Health's advisory that pregnant women and asthma sufferers must remain inside while spraying surely exposing the possible effects from direct exposure.

Fear over Zika's intervention in human reproduction had bred a chemical management plan that could interfere in human reproduction in homologous ways.

On the back of mounting public outrage over the CDC's concealment and coercion, as well as the lawsuit, Governor García Padilla publicly rejected the Naled program. As the sun melted into the horizon on 27 July, the Puerto Rican Department of Agriculture declared that the CDC would "recall" the 25,000 pounds of Naled slated for aerial fumigation and send it back across the sea to Florida. On 8 August, the CDC notified the Puerto Rican Government by email that it would

discontinue the Deltamethrin program to evaluate the results. WIC director Dana Miró reported that many people “did not cooperate,” and because of their lack of cooperation, the fumigation effort was “incomplete or null.” With that, the summer’s chemical saga drew to a close, with Puerto Rican agricultural, environmental, and medical groups warning everyone to keep an eye out for strange planes streaking across the skies.

What Derek Gregory (2006) has articulated in his exegesis on Guantánamo Bay in Cuba – that law represents a crucial site of struggle within contradictory legal geographies of empire – proved true in resistance to chemical vector control in Puerto Rico. While the story of chemical Zika intervention surely demonstrates a virulent biopolitical logic that chemically worked on the bodies of Puerto Rican women, turning them into intervenable objects so that the U.S. population might live better, it also demonstrates that this logic was contested time and again.

## Chapter 4: De/population | Averted birth and social reproduction in the Zika Contraceptive Access Network

### 4.1 Disease, debt, and sexed life

As summer turned to fall in 2016, infection rates continued to rise. Of Puerto Rico, *The Atlantic* reported, “American is already experiencing a Zika outbreak. The disease has already infected almost 20,000 American citizens and more than 1,500 pregnant women—with some estimates reaching as high as over 10,000 infected pregnant women... This year’s cases are just the beginning, and it looks like the virus could become endemic on American soil in the near future” (Newkirk 2016). As Congress went back and forth over whether to allot additional funding for Zika, Puerto Rico was proclaimed to be “at a stage well beyond the reach of a preemptive strike” (ibid.). Given this, and given the rejection of chemical-based methods of disease control, expert discourse shifted from the immunizing logic of the “preemptive strike” of aerial Naled fumigation to questions foregrounding the cost-effectiveness of reproductive healthcare provision. As we have already had occasion to observe, the potential costs of children born with microcephaly to the U.S. healthcare system were being tabulated ever since scientists declared a concrete link between the virus and microcephaly; now, in the wake of successful community resistance to covert chemical fumigation, microcephaly’s speculative costs would be measured against the cost of alternative modes of Zika risk management.

Alongside the disease, another storm was brewing, one which tied the island to the mainland through finance capital, and one which weakened the local reproductive health infrastructure that could mitigate the chance of microcephaly, whether through supplying birth control, monitoring pregnancies, or providing abortion services. That storm was the \$72 billion public debt, whose formulation in U.S. law I raised in the last chapter. Debt featured prominently in the lexicon of mainland reports on Zika in Puerto Rico, in headlines like “Zika’s threats come at a time when Puerto Rico is trying to pay off a massive debt” (Cornish 2016), or “the virus has been yet another blow to a debt-ridden island” (Associated Press 2016). The suffix of this construction, “-

ridden,” is the back-formation of the word “bedridden,” which means “confined to bed because of infirmity or illness.” Painting the island as “debt-ridden” casts it as a body burdened by physical ailments to such a degree that the body is relegated not just to the home, but also the bed, implying that the body is unable to perform labor. It also gives debt physical form and biological capacities. In “debt-ridden” Puerto Rico, Zika intensifies the problems of indebted medical infrastructures—the lack of equipment, the out-migration of physicians, the backlog of laboratory analyses, and power outages in hospitals and clinics—which, in turn, threaten higher rates of both Zika infection and microcephaly. The relation between debt and disease here is mutually empowering, with one folding into and intensifying the other, and this mutual empowerment was not contained by the edges of the island, given its dual position in U.S. mappings of Zika risk.

Zika, reproductive bodies, and debt thus became intertwined in a number of respects: in public deliberations about what the island “owed” finance capital amidst a public health emergency; in discussions of whether it was the debt crisis or Zika that had overwhelmed the Puerto Rican healthcare system; in scholarly estimations of what “Zika babies” would cost the nation; and, as we shall see, in the question of whether investments in reproductive healthcare services in Puerto Rico would, in the long run, save money. Their fusion was crucial in sustaining the economized imaginary of disease risk and licensing mass birth control provision as the second key form of Zika intervention, which is what this chapter analyzes.

The Zika Contraceptive Access Network (Z-CAN) centered Long-Acting Reversible Contraceptives (LARCs), most prominently the intrauterine device (IUD), a contraceptive device implanted in the uterus by doctors. The copper variant of the IUD releases copper into the uterus, destroying sperm, while the hormonal variant causes cervical mucus to thicken such that the sperm cannot fertilize the egg. Alongside the IUD, there was the contraceptive implant: a diminutive and flexible plastic rod that is embedded under the skin in the upper arm, from which it steadily releases progesterone; this impedes ovulation, as well as thickening cervical mucus and thinning the lining of the womb. The hormonal and copper IUD and the contraceptive implant join the synthetic chemicals examined in the previous chapter as technologies for

managing Zika's "uncontrolled biological growth" by working on the bodies of women and girls. It was not a Zika prevention strategy, but a *birth aversion* strategy, and it was celebrated for its cost-effectiveness: the birth of children with Zika-associated microcephaly and all of their care costs across the lifespan would be deterred, forestalled, obviated. Yet again the logic of the "economization of life" is evident.

My objective in this chapter is twofold. First, I want to continue along the pathway of examining the changing political geography of the United States and Puerto Rico. The colonial relationship here is subtler than the unauthorized deployment of chemical violence as a kind of biosecurity tactic for the United States government: I dissect the pricing of Zika, microcephaly, and island-wide birth control provision in public health, gynecological, economic, and social science expertise, showing how these calculations are constitutive of U.S. empire on the island, as well as of global field of reproduction whose primary register is deferred economic value.

Second, I want to crack open hopeful narratives of the Zika virus as a boon to feminism because it generated the public support necessary for free or low-cost birth control for women and girls. A strong caveat is required at this point: considering the difficulty women and girls face in procuring the kind of contraception they might desire, the cultural setting of abstinence-only sexual education in which women and girls are both coerced into sex and socially punished for expressions of sexual agency (Rodríguez-Díaz et al. 2017), and rape (American Civil Liberties Union 2012: 103-118), the expansion of access to contraception in Puerto Rico is a good thing. I want to honor the concrete positive impacts of Z-CAN, especially as the relentless epidemiological surveillance of women and girls in other areas of active Zika transmission has not opened up access to contraceptives (which I will discuss in the following chapter). However, IUDs are not merely "provided" to women and girls. They are, in a very concrete sense, pushed through the cervical canal and embedded in the uterus. The introduction of the speculum—a tool developed from the "speculum oris" used on slave ships to prise open slaves' mouths and force-feed them (Cliff 1991: 36)—is uncomfortable; even with the aid of a cold swipe of lubricant, and the introduction of the insertion tube into the cervical canal is a strange accompaniment to the presence of the speculum. Implantation itself is a sharp pinch felt deep inside. And the

“provision” of IUDs to women and girls is not a mere donation, as the CDCF and pharmaceutical corporations might have it: it is wrapped up in a broader non-innocent racial regime of cost-effectiveness that values healthcare and lives in term of debits and credits to the economy, a regime which may have eugenic effects. My task is to take a step back and consider how the rapid, targeted implantation of IUDs and other contraceptive implants amidst a public health emergency links up with a historical trend in translating reproductive healthcare into national economic futures. As will become clear, this trend cannot be separated from U.S. empire, especially the denigration of public infrastructures in Puerto Rico through austerity.

#### **4.2 Sex and reproduction in demographic, clinical, and ethnographic expertise**

The health expertise underpinning Z-CAN centered the sexual behavior and birth control use of women and girls on the island, spatializing their bodies as the threshold between the Zika virus and costly aggregate futures presaged. Let us slow down to consider the movement from research that tabulated women and girls in the form of a massified sexual problem to the proposal of a solution, articulated in the language of cost-effectiveness, in the form of a technology to be inserted into female bodies.

From the start, as Adriana Garriga-López (2016) has noted, Zika public health expertise sexualized teenage girls and stigmatized teenage pregnancies, thereby producing the teenage girl body as the “focal point of control” (my translation). One example of this was the CDC’s reinterpretation of the 2013 Youth Risk Behavior Surveillance System through the lens of Zika. The survey examined behaviors amongst teenagers across the United States that could result in morbidity or mortality, notably including teenage pregnancy as a negative public health outcome. This survey was especially important in establishing that half of women and girls aged 15-19 “were assumed to be sexually experienced,” and highlighted a birth rate that was almost double that of the U.S. mainland. At first glance, this may seem to be a simple citation on the part of CDC researchers in order establish the number of people who might be affected by Zika in Puerto Rico. However, the use of data on teenage sexual activity and pregnancy to underpin birth

control-based Zika intervention warrants deeper contemplation, because it constructs both problem and the solution in specific ways.

Alongside HIV/AIDS, teenage pregnancy was marked out in this public health survey and many others as one of the most important negative public health outcomes to which “risky” individual choices around sex could lead. The dominant perspective on teenage sexuality in U.S. popular culture, which is the cultural context in which public health surveys of risk behaviors are produced and deciphered, combines Freud and Darwin, telescoping the rich range of possible expressions and experiences of human sexuality down to that which could result in pregnancy or disease. (Note that the “scope” of this telescoping is much narrower for girls than for boys.) Teenage sexuality is understood as a powerful biological drive that will overtake all form of moral or common sense if left unrestrained by “civilizing” forces, and teenagers are assumed to be driven, above all, by sexual impulses. The social context of adolescence is reduced to biology, which is assumed to both order and disorder teenage life (Lesko 1996). This context is important for our story not so much because it is wrong—though as any sex-positive feminist sexual education practitioner will tell you, it most certainly is wrong—but because the marking out of the hypersexual teenage body as a public health concern is the first step in producing it as an object of public health *surveillance*, and possibly *control*. Targets of state intervention—whether military targets, or the “population targets” of public health agencies, do not merely exist; they must first be produced as targets. Laina Bay-Cheng (2003) has noted important parallels between the effects of the conflation of hypersexuality and adolescence in U.S. culture and the conflation of anal sex and homosexuality in eighteenth and nineteenth century France on which Foucault (1978) worked: in both cases, the interest in sexual behavior gives that behavior an “analytical reality,” rendering it examinable on a grid of intelligibility. Stripped down, the Youth Risk Behavior Surveillance System and similar public health surveys of sexuality do just that: turn human sexuality into a system of classification. While such surveys could be and have been operationalized for progressive purposes, the reduction of teenage identity to a biologically mandated hypersexuality is the condition of possibility for surveillance of teenage lives and intervention into their bodies. The construction of teenage hypersexuality as *risk* licenses attempts to control it.

Why the concern over teenage pregnancies as part of the Zika emergency? Why is it “the preferred site of intervention in a context of increasing poverty and gender violence?” Garriga-López (2016) posed these questions about Puerto Rico in the U.S. imaginary early on. Much of the public concern over teen pregnancy comes, at least in part, from legitimate concern over the futures of girls. So often teen pregnancy is framed as a causal mechanism for adult poverty: in a remarkable abstraction of social circumstances (including systemic racism and sexism in the labor market) and constricted employment opportunities more generally, the girl is seen, quite literally, to have birthed her own poverty. It is important to question the commonsense notion that teenage pregnancy is unhealthy for both teenage mothers and their children and therefore a major public health problem. Sociological research has shown that the children of teenage mothers are not healthier and do not perform better in school or secure better jobs than the children of women in similar circumstances who had their children later in life. There may also be more informal care networks for a teenage mother to draw upon than a mother in her twenties or thirties (Geronims and Korenman 1991; Lawlor and Shaw 2001), and in areas of high chemical toxin saturation due to environmental racism, the children of teenage mothers may have better health than their peers, because of the better health of their mothers (Roberts 2012). When accounting for social and environmental circumstance, teenage pregnancy is actually a *rational* choice for many girls in many places. They understand that they are unlikely to be in more financially secure positions from which to parent if they were to wait for a decade (Briggs 2018: 56-57). For these reasons, it is erroneous to assume, paternalistically, that young women not using contraception do not desire pregnancy. (And to be clear, I see this as an issue separate from both open access to contraception for teenage girls and the pressuring or forcing of young Puerto Rican girls into sex by machismo culture.) Teen pregnancy must not be taken at face value as evidence for birth control-based interventions.

Alongside legitimate concern over the life trajectories of teenage girls, however, there has been widespread racist concern over what Puerto Rican teenage mothers might cost the state in health benefits and other forms of public support. This, of course, draws on cultural associations between hypersexuality and both working class womanhood (irresponsible; lacking foresight)

and brown and black skin color (aggression; biological drive), associations which intersect for women and girls of color (Hill Collins 2004). Constructions of teenage sexuality broadly in U.S. public health expertise applies to Puerto Rican teenage girl sexuality more intensely and more specifically.

These are more than diffuse cultural association: the sexual conduct and fertility of Puerto Rican women figured prominently in the academic expertise produced by U.S. universities across the twentieth century. I wish to briefly highlight three genres of this expertise —demographic, clinical, and ethnographic—as a means of showcasing linkages both conceptual and concrete between scientists and policymakers.

*Demographic:* Comparative tabulations of Puerto Rican sexuality (for example, in contrasting percentage points of teenage pregnancy between island and mainland) draw on a history of apprehension about overpopulation on the island, which rotated around the working-class or *jíbara* woman. In the 1920s and 1930s, Puerto Rico was framed as an exotic, enticing sex worker at once beautiful and disease-ridden, and Puerto Rican families as too large because of unrestrained sexuality. Public health journals argued that poverty, crime, prostitution, homelessness, and disease were all the result of overpopulation, which was a problem that could be examined through basic arithmetic: graphs plotted statistical relationships between birth rate and death rate, between population and food production (Briggs 2002: 84). Fears of overpopulation were rooted in eugenicist concerns over IQ, heredity, and the specter of national biological decline (Hanson and King 2013: 198), and demographers carried this Malthusian-Darwinian ethic into the middle of the century with Puerto Rico as a persistent reference point. *Human Fertility: The Modern Dilemma* (1951) by geneticist, demographer, and eugenicist Robert C. Cook was a major work of reference in the field of population control during this period (Womack 2010: 5). Puerto Rico is one of the places Cook (1951: 15) described when he wrote of “unbalanced and unchecked fertility ravaging many lands like a hurricane or a tidal wave,” overwhelming the island’s clinics (1951: 39). Cook advocated a “vigorous” government birth control policy. Kingsley Davis (1951), another prominent figure in mid-century

demography, wrote a piece on population in *Foreign Affairs* arguing that “for a permanent improvement of living standards in Puerto Rico, fertility must come down.”

The history of geographic thought in the United States was linked to the demographic via the “doctrine of nonviability.” This is the idea that Puerto Rican sovereignty was not viable due to its small size (space) and lack of natural resources (landscape), geographic obstacles to viability that were all the more impassable by over-reproduction. Déborah Berman Santana (1996b) cites a raft of PhD dissertations in geography that contributed to this racist perception of the island despite the lack of empirical evidence; a widely circulating textbook, for example, described it as having incurred the “doom of Malthus.” What defines this body of expert knowledge is its presentation of discrete causal links between Puerto Rican fertility and all manner of social issues on the island.

*Clinical:* In 1955, in her endeavor to develop oral contraceptive pills for women everywhere, American philanthropist Katherine McCormick called for a “cage of ovulating females to experiment with” (Marks 1999: 263). The main island of Puerto Rico, hemmed in by vast stretches of sea, would come to serve as one of those cages. Following norms of clinical research at the time, researchers looked at the island with a “monarch-of-all-that-I-see” lens and interpreted a bounded space, a group of women that could be effortlessly monitored and a medical school that had “the American approach.” Just as crucially, the Comstock Laws, which prohibited the publication or distribution of “obscene” information, contraception, and contraception research in the United States did not apply in Puerto Rico, parting the way for researchers to set up experiments. By 1963, half of the 730 trial participants in Puerto Rico had pulled out; Ramírez de Arrallano and Seipp (1983:123) report that eight died. The Pill was approved by the Food and Drug Administration largely on the back of this data (Cream 1995: 149).

These studies were not simply thrust onto a passive, uninformed group of women. Many cooperated; Puerto Rican feminists interacted with the tests in complex and contradictory ways. Women dropped out of trials after side effects like lethargy and loss of libido were not taken

seriously by researchers (Ramírez de Arrallano and Seipp 1983: 116), and of those who completed the trials, many did not comply with the prescribed protocol. And finally, when researchers tried to narrow the bars of the island “cage” to an actual cage, the Women’s Correctional Institute at Vega Baja, “resentment on the part of the female prisoners toward the project proved enough to disrupt the discipline of the prison” (Marks 1999: 271). There were, however, kindred logics between demographic expertise on island fertility and the clinical investigational exuberance of the pharmaceutical firms that carried out birth control studies. Expertise itself reproduces.

*Ethnographic:* In Chapter 2 I noted the Moynihan Report as a significant piece of social scientific knowledge on the domestic and reproductive lives of African Americans, translated from the earlier well-meaning ethnographic explorations of E. Franklin Frazier. There is, as Laura Briggs (2002b) has documented, a Puerto Rican corollary: Oscar Lewis’s (1967) study of a Puerto Rican family that bridged island and mainland, *La Vida: A Puerto Rican Family in the Culture of Poverty*. The latter part of the subtitle, “culture of poverty,” is the social scientific concept the piece develops. The book held that disorderly sexuality and mothering styles were the root of Puerto Rican poverty, painting rich portraits of this “culture”: absentee fathers, large families headed by women, fixations on sex, and teenage pregnancy. Lewis’s “culture of poverty” flowed into Moynihan’s description of the “tangle of pathology” of Black families; each bolstered the claims of the other, providing social scientific data and an interpretive lens for a range of thinkers and policymakers intent on delimiting a reproductive root to poverty. Anxiety about the “culture of poverty” evinced understandings of reproduction not only in the way we have come to understand it—heterosexual sex, pregnancy, birth—but also the reproduction of cultures of poverty over generations. The fundamental point, though, is that anxiety over women and girl’s sexual conduct and “matrifocal” households is rife in U.S. social scientific knowledge on Puerto Rico, and this knowledge was tightly linked with the changing shape of the U.S. state across the twentieth century.

This genealogy of expertise is defined by the perception that Puerto Rican reproduction is a drain on U.S. government resources and that Puerto Rican women and girls therefore constituted a

legitimate point of intervention. This brings me to the foremost specter haunting Z-CAN, the sterilization of up to one-third of women of childbearing age in Puerto Rico in the 1970s and 1980s, demonstrating the endurance of eugenicist policies well beyond the first half of the twentieth century. Briggs (2002) argues that the narrative of U.S. social control in Puerto Rico through forced sterilization needs to be complicated, because it banishes Puerto Rican feminist and birth control activism to the margins. Indeed, many Puerto Rican women had fought to establish birth control and sterilization clinics; many others actively sought sterilization, whether for financial reasons, health reasons, or beliefs about scientific modernization. Additionally, Briggs shows how the framing of sterilization and birth control as a coordinated genocidal scheme of the U.S. government can shore up traditional ideas of family and femaleness. Ultimately she holds that the story of mass sterilization at the hands of the federal government ignores the fact that sterilization was actively sought after by Puerto Rican women from a range of social groups. And yet two facts remain: first, even though involuntary eugenic sterilization was never officially ordered (despite the calls of demographers and food and soil scientists and contraceptive activists), sterilization rates in municipal hospitals Puerto Rico in the 1970s and 1980s were some of the highest in the world, with many questions remaining as to how ‘voluntary’ the procedures were; and second, that population control was the primary lens through which mainland politicians and experts apprehended the island. These two points, as well as the broader shift in the grammar of population control from ideas of tropical biological difference to one of limited resources and economic development, condition birth control provision in Puerto Rico as a Zika public health technique.

With this record of social scientific expertise on sexual and reproductive conduct in view, it is easy to see why data about teen pregnancy on the island was a statistical starting point for CDC researchers in calculating Zika risk and assessing avenues for intervention. The chance of mass microcephaly posed by the virus added another layer of systemic racialized cost to a public culture that already constructed the public costs of teenage pregnancy as high, and did so through a panicked racist lens. The utilization of a nationwide survey of “risky” behaviors in Zika science marked out Puerto Rican high school girls as a cause for concern in familiar ways. (Of these girls, a CBS Moneywatch report declared, “Preventing pregnancy...could prove harder than

stopping Zika” [Leefelt 2016].) The data was available, and an intuitive choice for researchers, because of the well-worn track in U.S. science and public policy of utilizing the sexed bodies of Puerto Rican girls as a means of abstracting from politics, an abstraction that fits hand-in-glove with the construction of Puerto Rican reproduction as costly to the U.S. government. Framing the reproductive conduct of teenage girls as something to be studied as a massified group, I think, is a first step in constructing them as something to be placed under scrutiny, or in erecting intimate and expansive infrastructures of intervention. I want this point to hover as I turn to the models and metrics employed by CDC researchers to assess the economic viability of mass contraceptive provision to Puerto Ricans in the time of Zika.

### **4.3 Microcephaly’s metrics: Decision-tree modeling, HLY, and aggregate economic impact**

Through the examination of population-level surveys about teenage pregnancy and “unintended” pregnancy in Puerto Rico, researchers named a gap in contraceptive use that the problem of Zika demanded be addressed: 138,000 women “of reproductive age.” Discussions about filling this gap focused on the promise of the IUD and other LARCs as Zika intervention technique, those methods of contraception deemed “highly effective” for ease of use and long-term station in the uterus but employed by less than 1-percent of women in Puerto Rico.

Through interviews with bureaucrats in the federal agencies in operation in Puerto Rico such as Center for Medicare and Medicaid Services and the Office of Population Affairs, and family planning and reproductive care providers and experts affiliated with the Puerto Rico Department of Health, Title X federal family planning grantees, and the Puerto Rico Health Insurance Administration, CDC researchers were able to name the barriers to IUD use on the island. Perhaps most obviously, the cost of the device itself was often not covered by insurance, private or public (and this says nothing about the cadre of women without health coverage of any kind). As the CDC notes, the cost of hormonal IUDs can cost as much as \$900, and while they in theory can be offered at a lower cost in Puerto Rico’s Title X clinics, insertion fees can range from \$100 to 500 (Centers for Disease Control and Prevention 2016b).

Acquiring an IUD on the island required the navigation of different administrative contexts.

Manuel, a Puerto Rican gynecologist, explained these contexts to me as such:

If a doctor writes out a prescription for a woman to get an IUD, it still won't be easy for her to get one, especially if she is going to use her *tarjeta* (health insurance card).<sup>8</sup> The pharmacy could say it [the device] isn't covered, so the doctor will have to call the insurance company and explain to the case manager just why she needs an IUD.

The permission of both doctor and insurance case manager is therefore required to get an IUD; the willingness of the former to engage with the latter is especially important. But beyond this fragmented and paternalistic system of acquisition, the devices were scarce. Hospitals, Title X family planning clinics, private medical offices, and community/municipal health clinics were consistently out of stock, and only a limited number of care providers were trained in IUD insertion. Thus, even if women were to break convention and ask for an IUD, and even if she were able to afford the associated fees, she wouldn't necessarily be able to have an IUD implanted in her uterus. Addressing the reproductive faculties of Puerto Rican women and girls amidst the Zika emergency to avert microcephaly would therefore require both a significant increase in the supply of devices and the training of physicians and nurses who could administer

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<sup>8</sup> It is crucial to point out here – and contra the self-conception of the U.S. government as the bearer of public health to the island – that before the 1990s, the Commonwealth government of Puerto Rico had provided universal healthcare through a regional system of community clinics, which provided physical and mental healthcare without enrollment restrictions and, on the large part, free of charge. A range of market-based reforms were implemented in the 1990s, designed to bring the Puerto Rican health system more in line with that of the U.S. mainland by shuttering public health facilities and enrolling eligible Medicaid beneficiaries in health plans managed by private firms. This, as Jessica Mulligan (2014) argues, made Puerto Ricans into “consumers of private insurance coverage” —the federal and Puerto Rican government contracted private health insurance corporations to deliver health services—and their bodies objects of cost-benefit health calculations. The implementation of *La Reforma*, as it is known in Puerto Rico, converted the healthcare mandate of the Puerto Rican government from universal healthcare to the regulation of private health insurance corporations, which would provide care when monthly premiums were paid. Mulligan's work shows that the promises of *La Reforma*—an island healthcare system that could be more efficient, more empowering, and of higher quality than the universal system it transformed—were unfulfilled. Also, because the *tarjeta de salud* was restricted to those living below 200-percent of the federal poverty line, *La Reforma* produced a cadre of uninsured Puerto Ricans for the first time.

them. CDC researchers thus turned to testing the cost-effectiveness of increasing the LARC supply and training doctors in IUD-care on the island in a project led by the Senior Economist of the Division of Reproductive Health—and it is surely significant that this division, which is in charge of issues of reproductive health, maternal health, and infant health, should employ economists.

One assessment tool was the “decision tree” model (Li et al. 2017). Decision-tree methodology weighs the aggregate financial burdens of clinical interventions against one another, delimitating “a point at which the cost differential makes one decision truly superior to another” (Werner, Wheeler, and Burd 2012: 2). The recent rise of decision-tree analysis demonstrates the centrality of market logics to contemporary healthcare decision-making, as well as the broader cultural reduction of lives to economic imprint. The “target population” of the decision tree was defined as fertile, sexually active women with male partners, not desiring children within a year and not utilizing permanent contraception such as tubal ligation. The tree measured non-intervention against same-day, no-cost provision of contraception; costs spanned the pills and devices themselves, training and compensation for the insertion and removal of IUDs and other contraceptive implants, and education materials and media campaigns. The cost of intervention was tabulated at \$33.5 million, or \$206 for every individual in the “target population.” One “output measure” of the model was the number of microcephaly cases avoided.

The weighing of costs and benefits did not end with cash-in, cash-out arithmetic. In cases where interventions prove costlier than non-intervention, researchers quantified the value of intervention in other ways. Another key “output” measure of the Zika decision tree was Healthy Life Years (HLY) gained. HLY is metric of “population health” that functions as a “disability-free life expectancy indicator” (Robine et al. 2013: 1-2), and it employs an arithmetic very different from that utilized in descriptive epidemiological studies before the 1990s, which looked at brute numbers of deaths resulting for specific diseases. Metrics like HLY try to account for “the impact of diseases and conditions that may not be fatal, but by virtue of their duration and disabling effects contribut[e] to losses in the form of diminished productivity and strain on health systems” (Kenny 2015: 16). The aversion of microcephaly was translated into the years of

disability-free life that could be gained, increasing economic productivity and reducing public expenditures on healthcare. Thus, the purpose of utilizing HLY in the Zika decision tree was to capture how mass birth control provision could *optimize* the population, even in situations where the model predicted intervention costs to exceed non-intervention costs. And crucially, it captured intervention benefits in a dichotomous financial register of work (good) and public care expenditure (bad).

In the end, the model predicted the aversion of twenty-five cases of Zika-associated microcephaly in a single year (sixteen of which would have resulted in live births), projecting \$31.7 million in savings in the most likely scenario. Overall, the proposed birth-control intervention was deemed cost-saving in 92.11 percent of the model's possible outcomes and cost-effective in 98.1 percent of outcomes. This second figure includes the small percentage of outcomes in which intervention would fail to save money but was still deemed "cost-effective relative to accepted cost-effectiveness thresholds" in adding disability-free years to the population.

These models and metrics constructed the relationship between individual and group health, the state, and the future in a very particular way. The HLY metric is similar in logic to the Quality Adjusted Life Years (QALY) metric (Delogu 2016: 57), in which the quality of each year of life is quantified into a "utility" on a scale from 0 (immediate death) to 1 (perfect health), with "utilities" totalled across a lifetime (McGregor 2003). The use of the word "utility" here conjures its lay meaning of a state of being useful or profitable to someone or something, as in, for example, the utility of lives to circuits of production and consumption. However, where the QALY assigns utilities on a sliding scale, HLY is a dichotomous metric that slots lives into a 0-1 binary, where 0 signifies disabled and 1 signifies perfect health (Murray, Salomon, and Mathers 2000: 985). Both of these metrics literally *devalue* years of life lived with disability, not over fear of bodily difference—or, at least, not only this—but through the matter of contributions to or deductions from the economy. Furthermore, implicit to this model is the suggestion of the existence of a point at which investments in healthcare are no longer "worth it." This is because in decision tree modelling, a financial threshold must be agreed upon at which gaining a single

HLY through healthcare intervention is no longer “cost-effective” in the more expansive sense than dollars in, dollars out. This is the point around which the whole framework operates.

As a final point, the HLY metric, as Kenny (2015: 16) observes of related metrics, “represents an internationally standardized quantum of life measured as a unit of *time*, that is, time as life-years.” This is distinct from disease statistics, which discern the prevalence of a disease across the population, and also distinct from vital statistics, which look at the condition of a single body across a lifetime. HLY measures the optimization of health through future productive time, eschewing lifetimes for “*life/time*, life-as-time” (2015: 16). It breaks down lifetimes into units that may be measured and monitored against one another, without—and this is key—stooping to the cultural taboo of ascribing brute dollar-values to human life.

Of course, as we have seen, brute dollar-values *were* recurrently affixed to the “Zika baby.” However, there is a distinction between those price-tags and the use of the HLY metric in decision tree analysis. The former was more clearly wrought by resurgent white nationalism; the latter was enrolled to buttress well-meaning attempts to present mass birth control provision as worthy of investment even if, on the surface, such provision may cost more than the money that would be saved. HLY is an explicit recognition that public or public-private expenditures on healthcare can be “worth it” even if they are expensive. But such metrics add weight to the tyrannical framework of cost-benefit analysis, which Matthew Sparke (2009: 141) has argued is bound to “healthcare rationing in market-based systems,” foreclosing “ethical invocations of health as a basic human right, replacing them with a de-contextualized and thus methodologically flattened landscape of health services as commodities as metrics.”

And it would be a mistake to suggest that this mode of reducing lives to future economic impact is agnostic in terms of race and nation. Its central logic was that the birth of some humans should be averted so that others, in the future, might live more comfortably; without naming race or nation, its cost-benefit analysis set racialized adjudications of life worth in place. For example, Z-CAN outreach material promoted LARCs as the favored contraceptive method for their longevity and ease of use. On the part of the Z-CAN website aimed at providing prospective

patients with information on available methods, IUDs were (paternalistically) described under the heading “One time, that’s it” (*Una vez y ya*) like so:

If you forget even to eat breakfast, these are the option for you.  
[LARCs] are long-term and highly effective contraceptive methods.  
In just one visit you can acquire birth control that can last from three to ten years, depending on the type of IUD you choose. These methods are reversible, so if at some point you want to have children, just visit us and we will remove it. All of these methods [hormonal IUD, nonhormonal IUD, implant] are covered by the Z-CAN program; that is, you don’t pay anything” (Z-CAN, 2017; my translation).

In addition to ease, however, the IUD was promoted because its effectiveness in preventing conception translated directly into cost-effectiveness at the level of the population through the aversion of costly lives. In the decision tree model, CDC researchers noted the sensitivity of Zika’s aggregate future costs to the proportion of Puerto Rican women using contraceptive methods high on established hierarchies of effectiveness. Every time an individual woman selected the IUD over another form of birth control, the lower the incidence of unintended pregnancy and, it follows, fewer Zika-associated microcephaly cases in the population. In the cost-effectiveness paradigm, IUDs held explicit horizontal (aggregated across the population) and vertical (projected forward in time to encompass the lifespan) promises, as well as the implicit utopian promise that the mass aversion of microcephaly would enable others to live better. Or, with the wider cast of characters in the Zika public health emergency in mind, we might say this program sought to avert the Puerto Rican “Zika baby” for the sake of the Child.

#### **4.4 The Zika Contraception Access Network: Eugenics, austerity, and Maria**

Whereas the historical epistemic infrastructure constructed the Zika problem in terms of terms of Puerto Rican fertility and sexuality (especially young female sexuality), the present deployment of models and metrics like HLY and decision-tree analysis translated the problems of young female sexuality into speculative futures, in which productive time is scuppered by the present emergence of many cases of microcephaly, or saved by physical interventions into women’s

bodies. The consultation and compilation of surveys of sexual behavior, fertility, and birth control use in the name of the Zika virus became the basis for an on-the-ground intervention into the lives of women and girls. Z-CAN, the Zika Contraceptive Access Network, sought to prevent “adverse pregnancy and birth outcomes associated with Zika infection during pregnancy.” To the knowledge of its developers, it is the first program to rapidly provide contraception in the midst of a public health emergency.

Z-CAN was premised on the prevention of future life during the Zika outbreak, and like chemical fumigation, it took Puerto Rican women and girls as its chief point of public health intervention. This time, however, the uterus itself was centered: Z-CAN sought to embed IUDs in the uteri of thousands of women in the space of a year. The idea was that easy provision of IUDs would, in reducing unintended pregnancies, reduce the incidence of adverse birth outcomes associated with the Zika virus, an idea which surely organized the call for donations from pharmaceutical companies. Corporations like Merck and Bayer donated contraceptive devices and pill packs and the Bill and Melinda Gates Foundation and Pfizer donated funds. Philanthropic-pharmaceutical assemblages like this have, as Kalpana Wilson (2015: 816) has noted, played a prominent role in the recent shift to population control in international development, while the pharma-companies themselves have been prominent fixtures in island employment and environmental landscapes since the 1970s. Funds were channeled through the CDCF, a nonprofit created by Congress to marshal philanthropic and private-sector resources in support of the CDC’s public health mandate. Women were drawn into Z-CAN by doctor suggestions and posters in health centers, and Z-CAN community engagement events. activities, or from friends or family; a Z-CAN website and Facebook page also provided general information to curious women.

The program trained clinical staff in contraceptive counseling and the insertion and removal of LARCs in single day-sessions, to eventually provide free contraception in 153 public and private clinics across Puerto Rico (Lathrop et al. 2018). Figure 4.1 shows the geographical distribution: more private clinics along the coast, more community health centers in the mountainous interior, with some interior municipalities without a serving clinic at all. The emergency timescale is

reminiscent of what the United Nations Population Fund (2009) has called “task-shifting” in its family planning development work:

Task-shifting means moving certain tasks, where appropriate, from doctors or other highly qualified health workers to health workers with shorter training and fewer qualifications. The aim is to make more efficient use of the available human resources for health.

Note how the language of “efficiency” elides the structural reasons for deficits in fully trained doctors and nurses; consider also that health risks could accompany the implantation of contraceptive devices by personnel trained in single-day sessions.

In June 2016, the CDCF had only raised enough money and trained enough doctors to provide contraception to 700 women. Few of the donated IUDs had ended up in the uteri of the “target population,” bringing the CDCF to call for an additional \$20 million to train Puerto Rican doctors in IUD insertion and follow-up care (Mincer 2016). However, by August 2016, 102 of the 300 gynecologists on the island had become officially authorized Z-CAN providers. The Puerto Rican Department of Health assumed greater control over the program in April 2017, and by August 2017, over 20,000 Puerto Rican women had received contraceptive counseling, with 95 percent returning home with a new contraceptive method or replenished supply of oral contraceptives at no cost. The vast majority (68 percent) chose and received an IUD or implant; project organizers highlighted that of the over 14,000 women in whom contraceptive devices had been implanted as part of Z-CAN, almost 11,000 had used condoms, withdrawal, or no method of birth control prior to their counseling (Lathrop et al. 2018).

How did Z-CAN actually work? Amidst the proliferation of island-wide tallies of sexually active women and speculative economic futures, the intimate sensations and health consequences of mass IUD implantation could easily be lost. Explaining Z-CAN’s principal technology for microcephaly aversion thickens the story of what the program sought to do and hints at how it could live—indeed, how it has lived—beyond the temporal bounds of the public health emergency.



Figure 4.1: Z-CAN clinics (Source: Zika Contraceptive Access Network).

IUD insertion begins with a series of polite orders punctuated by the insertion of different objects—fingers, speculum, the IUD itself, and scissors—all provoking the clenching of the jaw and a sharp intake of breath:

Please take two ibuprofens approximately thirty minutes before your appointment. Please refrain from eating a large meal before your appointment, but please ensure that you are nourished. Please bring a menstrual pad. Please sign this form here, indicating that you do not have an ongoing pelvic infection such as cervical gonorrhea or chlamydia, and that you are not currently pregnant. Please be aware that menstrual cramps and bleeding may increase with the use of an IUD. Please wait until you hear your name called. Please put on the gown, remove your clothes and underwear, and step up to the table. Please place your feet in the stirrups. Please relax while I determine the size and position of your uterus with my hands [places two fingers in the vagina and the other hand on the abdomen]. That's good. Please take a deep breath and exhale while I insert the speculum [inserts speculum] and take a look at your cervix. Looks good [grabs tenaculum; grips the anterior lip of cervix]. Please keep breathing, this will all be over soon. Are you doing okay? Good, I am now going to insert the IUD [opens a small package to reveal the IUD; loads it into the insertion tube]. You will feel a quick, sharp pain and then it will be over [pushes insertion tube through the cervical canal until it finds resistance at uterine fundus]. There, that was it [removes insertion tube; procures long-handled scissors and inserts]. I am going to trim the IUD strings now [trims IUD strings]. Please sit there for a moment to make sure you're okay. Are you okay? Good. The bleeding is normal. I am going to step out now, please put your clothes back on, and the menstrual pad you brought. Your IUD can

stay in you for up to five years. Moderate bleeding and discomfort are normal in the first three to six months but come see us if you experience anything beyond that. Please book an appointment to remove your IUD if you intend to get pregnant or for any other reason. Do not attempt to remove your IUD without your doctor.

The above protocol illustrates two simple but critical features of the IUD: it must be embedded in flesh deep inside the body, and both that embedment and any removal are supposed to be administered by physicians. The first feature means that the device may often be situated beyond the physical reach of its owner-operator; the second means that it is under the jurisdiction of healthcare professionals. Briggs (2018) has made the point to preface the word “LARC” with the words “physician-controlled” to locate *final* reproductive control outside the body of the woman in which the contraceptive is embedded (see Figure 4.2). The spatial politics of physician-controlled LARCs means that the well-meaning vision of expanding access to easy, long-term contraception may result in fragmented control of participants over their bodies.

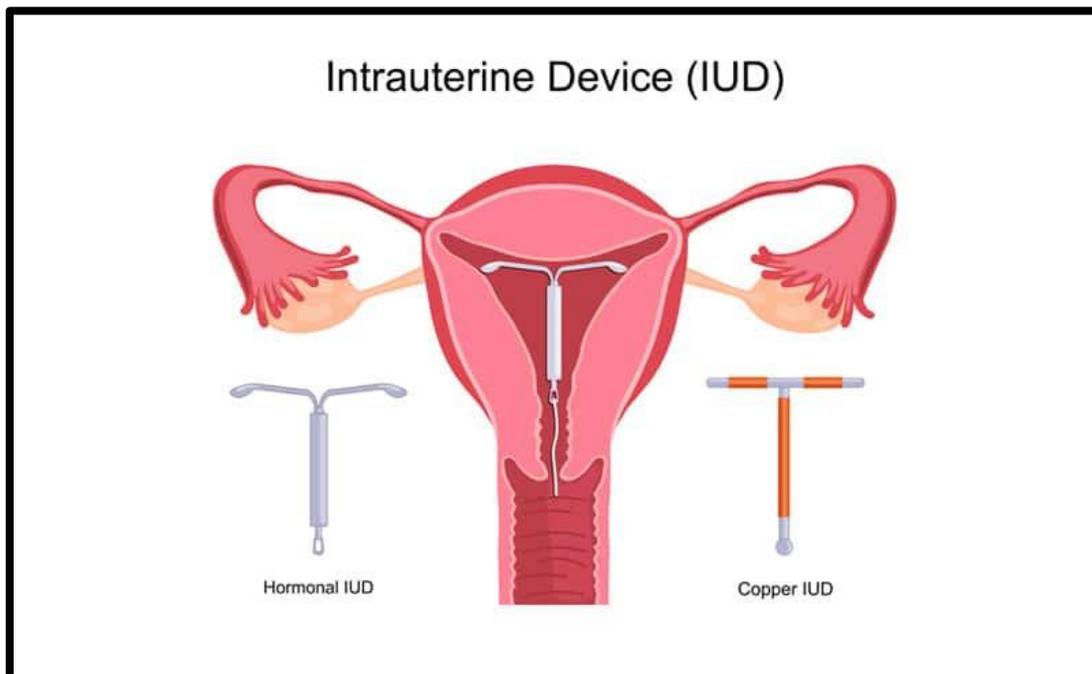


Figure 4.2: Locating the IUD (Source: Marie Stopes).

The implantation of small T-shaped devices into uteri is intelligible to us in the twenty-first century. Women and girls doing this—or more accurately, women and girls having this done to them—makes sense. It make sense in a way that a man having a plastic device lodged in his body but out of reach of his hands, does not, much less a “population” of men.<sup>9</sup> The spatial politics of physician-controlled LARCs means that any provision of these devises to a specific group of people must be placed in social and historical context.

A key point here is that mass LARC insertion was part of an *emergency* effort that neither sought to maintain nor establish long-term reproductive control or access to reproductive healthcare for Puerto Rican women. Funds and personnel were provided for implants to be inserted cheaply and quickly, and while the reimbursement fee to be paid out to doctors was bundled to allow for both insertion and removal, many reports contradict the program’s promise of free and easy IUD removal. Z-CAN’s “Ante la Duda, Pregunta” (“When in Doubt, Ask”) Facebook page, with a following of over 25,000 people, outlined the procedures for having a LARC removed: return to the same or another Z-CAN provider and make sure to bring your Z-CAN identification number. However, conversations amongst recipients on the page demonstrate that while many women were satisfied with Z-CAN, many found it difficult to access removal. Several recipients posted about being refused removal or charged several hundred dollars for it. For example, a Z-CAN participant wrote “I went to the same doctors that put in my implant for removal, and they told me they were charging me \$100 to remove it...I didn’t pay anything to get it put in... I am about to pull it out myself because it’s hurting me. I’m crazy to get rid of it.” The device stationed underneath the skin of her upper arm of which she wrote was Nexplanon, developed by Merck. Its forebear, Implanon, was the device of choice for the UK’s Department for International Development to provide contraception to 14.5 million of the world’s “poorest women”; it has been widely criticized and, in some places (including the UK), discontinued for its propensity to

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<sup>9</sup> I composed the above description of IUD insertion from my own experience with the device, in conjunction with descriptions of standard insertion protocol. The narrative of the passage that follows is inspired by the way Julia Cream (1995: 158-159) opened her incisive piece on the naturalization of women ingesting oral hormonal contraceptives in the twentieth century. I am trying, like her, to make the Intrauterine Device strange.

“disappear” inside the body (Wilson 2015: 816-817). Nexplanon is distinguished from Implanon by its detectability by X-Ray, a technological enhancement that requires access to both equipment and expertise to address any problems that could arise during the station of the device in women’s bodies (ibid.). Another woman commented that she too had been quoted \$100, followed by another who had paid \$150 for removal because of side-effects. There was also speculation amongst women about whether free device removal hinged on a minimum one-year tenure in their bodies, and many of these posting about prohibitive removal charges prefaced their complaints by saying they had already had the device for more than a year. “Ante la Duda, Pregunta” acknowledged in a post in April 2018 that women should not have been charged for removal, yet reports of financial barriers to removal continued to be posted.

Likewise, many recipients reported that their original Z-CAN providers had moved from island to mainland owing to the confluence of the financial control boards program of austerity and Hurricane Maria. The impact of the former on the everyday lives of non-elite Puerto Ricans has been devastating. Hundreds of public schools have closed; water, gas, electricity, and food prices have skyrocketed, health benefits and pensions have been cut, and public-sector workers have been laid off (LeBrón: 2016). Medical institutions have been hit especially hard. Major cuts and doctor out-migration—one doctor per day was said to leave the island—have meant unstaffed clinics, often without electricity (Allen 2016). Sparke (2017: 288) calls the ever-present grind of ill health under austerity “biological subcitizenship”; the “sub-” prefix of this formulation is apposite for the contradictory incorporation of Puerto Rican women’s bodies into the United States.

Rote descriptions of infrastructural neglect, however, do not capture how austerity actually feels, or how it reconfigures the rhythms of everyday life. One example from my time in Puerto Rico can help illustrate this. A few weeks after I arrived, and just as the Z-CAN program of mass birth control provision was really taking off, the island was enveloped in darkness for three days. Except for businesses and wealthy homes with private generators, it was a nationwide blackout. The fans stopped working everywhere, school was cancelled, traffic flows were tense and jagged in the absence of stoplights. A great many people in San Juan lost basic water services. *La luz*

left on Tuesday afternoon, and everyone assumed it would be momentary. The reports came that it would be back later that evening, but they kept pushing its promised arrival back in time. The first night I wandered the streets, which were filled with people sitting around drinking warm beer, bachata and reggaetón punching out of parked cars with engines running. I charged my phone at the Starbucks in the rich and touristy neighborhood of Condado; powered by a generator, it was filled to the brim with teenagers with Frappuccinos in hand doing the same. But the mood started to change in the nights that followed. People were still outside at night, but more out of necessity than for fun. It was just too dark inside when the sun went down, and without the help of fans, too stuffy. The power outage dragged on, gathering all public interactions into its currents: “I heard tomorrow at seven; well they got it back over at such-and-such edge of Santurce; we still don’t have water, how about you?”

The *apagón* was at once a symptom of austerity and a foreshadow to its deepening. It was a symptom insofar as the cash-poor state-run power-generating company PREPA (Puerto Rico Electric Power Authority) began buying energy from two private electrical companies that had recently burst onto the scene. The privatization of PREPA rippled off in many directions: in addition to laying off full-time workers in exchange for subcontractors, administrative and commercial responsibilities were conferred to Banco Popular, a major Puerto Rican bank. It was a foreshadow insofar as the blackout entered into debt-related conversations as evidence in favor or privatizing said company. It reminded everyone of the recent Supreme Court rulings that had struck out an already-tenuous island sovereignty—or, as Puerto Rican scholar and activist Maritza Stanchich (2016) suggested, revealed island sovereignty to have been a farce all along. And finally, the *apagón* mimicked the sensation of austerity in Puerto Rico: its primary effect was to make taking care of one’s self and others difficult. Its darkness and heat had weight. It made eating and putting kids to bed and tending to ill family members more difficult. It made *social* reproduction more difficult. People in San Juan scrambled for packaged food at Walgreens or fast food at Wendy’s, which with the help of private generators shone like oases against inky Caribbean skies. The dismantling of a single infrastructure impedes a whole range of other infrastructures and forms of labor needed to keep people alive and well.

A few months later, I walked with demonstrators against the *La Junta*'s first meeting. I was struck by the *geography* of it all. The meeting was bolted off from the public. It was held early in the morning at a hotel in Fajardo, a city some thirty miles from San Juan and thus well removed from the ongoing demonstration against the *Junta* in San Juan, the *campamento* (camp). The hotel was a luxury one called Hotel Conquistador (Conqueror), with a single entrance atop a hill. It was a stormy morning, and bright orange and blue barricades and police in raingear lined the street, blocking those protesting against the closure of public schools and cuts to the university systems, and in defense of Puerto Rican healthcare infrastructures and pensions for public sector workers, from the restricted space of decision-making. The circumscription of the field of Zika analysis to wombs was concomitant with the circumscription of governance over life-making infrastructures to a barricaded luxury hotel and the expansive spatial reach of austerity.

Hurricane Maria, which replaced Zika in mainland news, further destroyed local life-supporting infrastructures: powerlines not just structurally under-resourced, but gone; hospitals not simply missing doctors, but gone (Mazzei and Sosa Pascual 2017). Communication networks were down; a curfew was imposed on San Juan. 80 percent of the island's crops were razed by the hurricane, a percentage given even more weight by the fact that, as an inheritance of the Spanish plantation economy and the Jones Acts, Puerto Ricans already depended on imports for 85 percent of food (Klein 2018: 35). One month after the hurricane made landfall, 78 percent of people on the island were still without electricity. In this context, bundling insertion and removal in physician reimbursement for Z-CAN has had the consequence of *structurally disincentivizing removal* by requiring the time-, cash-, and equipment-strapped healthcare providers that remained on the island to see a patient without further compensation. Though the LARCs at the center of Z-CAN were not meant to be permanent, and though many women actively chose them, "physician-controlled long-acting contraceptives are in a sense the technological inheritors of the social impulse embodied by eugenic sterilization in an earlier generation" (Briggs, 2018, p. 128). Viewed in this light, Z-CAN may have eugenic effects.

The chronology here matters: the curtains on Z-CAN were drawn in September 2017, the same month the hurricane tore through the island and Puerto Ricans were cruelly abandoned by the

Trump administration in terms of emergency response (Bonilla 2017). Amidst the relentless drive to count reproductive bodies, Maria showcased that *lives* were not being counted: those that had been lost in the Hurricane, for example (Sanchez 2018), as well the number of elderly and disabled people discharged from under-resourced and understaffed hospitals with possibly fatal infections and other ailments (Sosa Pascual, Campoy, and Weissenstein 2018)—the people “economized” understandings of life devalue. Furthermore, Z-CAN’s program of averted birth cannot be extricated from what Naomi Klein (2018) has called the “depopulation” of the island, as investors seek to transform it into a tropical paradise for global elites. The Federal Emergency Management Agency (FEMA) constructed “airbridges”—transporting Puerto Ricans from the island to the mainland and providing funds for hotels for a few months—in lieu of restoring the island’s electrical grid. Of the “evacuation,” Puerto Rican attorney Elizabeth Yeampierre states, “What they [investors] want is our land, and they don’t want our people in it” (quoted in Klein 2018: 58). Post-Maria “depopulation” adds an additional layer to the logic of averted birth.

One thing “economized” understandings of potential and proto-life in “family planning” experiments do is focalize the uterus as the site of life-making, and they do so at the expense of the range of social infrastructures required for actually existing children and adults to reproduce themselves day in and day out. The field of immediate analysis (and thus the field of potential change in protocol) is delimited as the womb, and the womb (or more accurately, a massified group of *wombs*) serves as the single explanatory frame. Z-CAN functioned as an emergency measure for averting the lifespan costs of microcephaly while healthcare infrastructures and general conditions for social reproduction in Puerto Rico deteriorated and some women lost control over their reproductive lives. Tabulations of the sexual behavior of girls multiplied while life-making infrastructures deteriorated and the island was depopulated. Contraceptive implants were framed as a gift that Puerto Rican women could indulge by “choice,” while austerity measures denigrated collective life-making infrastructures and FEMA built infrastructures for the “depopulation” of the island of Puerto Ricans. Z-CAN’s telescoping of the reproductive body cannot be separated from the desertion of the social reproductive body by FEMA and *La Junta*.

As such, this well-meaning and historically informed program, premised on getting women fitted with LARCs or provisioned with a supply of oral contraceptives as quickly as possible, cleaved the reproductive body off from the social reproductive body. The former is the body externally defined by potential for “dangerous pregnancies” (Reagan 2012), an always-potential vessel pointed at economic futures; the latter is the living body that supports their own life and that of others, the “activities that sustain human beings as embodied social beings who must not only eat and sleep but also raise their children, care for their families, and maintain their communities, all while pursuing their hopes for the future” (Arruzza, Bhattacharya, and Fraser 2018: 68). Pluralized, the former is the massified group of reproductive potential (a “population”); the latter is the collective or commons, the life force that exceeds the interventions to which people are subjected. Of this force, in the immediate wake of the hurricane, Puerto Rican historian and politician Rafael Bernabe (2017) wrote:

Let’s start with the admirable: the reserve of solidarity, of community, of generosity, that lives on in the country despite three decades of neoliberal preaching and practice that pushes the private over the public, competition over collaboration, egoism over the community, immediacy over forethought, fragmentation over democratic integration. I could give dozens of examples: the ride I have been given when walking somewhere for something (for lack of gas), the food I have been given (because I did not have cash), the coffee offered by my neighbors, the use of a borrowed burner to heat something up for my baby to eat, the doctors and healthcare personnel working in a hospital that had run out of electricity (when we had to go to the emergency room the day after the hurricane). There is no doubt that our people understand and feel, despite everything, that human relationships, even amongst strangers, are more and should be more than the cold bond of cash (my translation).

#### **4.5 The (social) reproductive body**

My ambition in this chapter has not been to assess Z-CAN's effectiveness as a public or reproductive health program. What I have tried to do is move beyond simple judgements of good, effective, or even "desired" healthcare in a democratic sense, pausing instead over the historical significance of the use of physician-controlled birth control to avert future lives deemed costly, amidst the abandonment infrastructures for social reproduction. For the avoidance of doubt, my own fervent support of the fact that women were able to acquire desired forms of birth control coexists with my wariness of the logic of the intervention. I am troubled by the anxiety over the reproductive capacities of women and girls amidst a culture that denies them agency. I am troubled by the unequal incitements of insertion and removal, when the global system of life-valuation prized the aversion of microcephaly above all other considerations. I am troubled by the linkage of intrauterine and arm implantations for some women in the present to the economic vitality of others in the future. And I am troubled by the enduring logic of working on (and in) the reproductive body as the social reproductive body is deserted.

This is in many respects a recapitulation of a gendered logic that reduces women to biological reproduction, one that intersects with race, disability, and imperialist stratification. What the case of Zika shows is that relatively new health metrics have linked up with the adjudication of life worth according to future economic contribution in the global politics of reproduction. Such metrics recoup and rework eugenicist anxieties and programs in all sorts of ways: in, for example, longstanding anxieties about the reproductivity of women of color in government policy and scientific expertise, the more explicit eugenicist rhetoric of averting disability, and the possible eugenic effects of Z-CAN. Feminists must continue to keep a vigilant eye on the many shapes new forms of eugenics might take.

It also shows that the abandonment of the social reproductive body is part and parcel of the focalization of the reproductive body in experiments in reproductive healthcare. Social reproduction is a hitherto undertheorized aspect of feminist work on "economization of life" biopolitics, and it speaks to the lived reality of being included in "target populations." This too warrants further feminist scrutiny, for as we careen through uncertain ecological futures and as

discourses about limited Earth for humans amidst environmental crisis are recuperated (Ojeda, Sasser, and Lunstrum 2019), the reproductivity of certain women and girls is being focalized and tinkered with by experts, governments, and private institutions in new ways. The theoretical task for feminism, I think, lies in explicating the relationship between forced or prohibited biological reproduction (the reproduction that involves what Sophie Lewis [2019] calls “gestational labor”) and the range of forms of labor involved in *social* reproduction.

For guidance, we might look to the persistent foregrounding of social reproduction by feminist political organizing that took place alongside the reproductive health program I have analyzed. Decolonial and anti-capitalist feminist group La Colectiva Feminista en Construcción emerged in the rough waters of the debt crisis and regularly contests the denigration of infrastructures for social reproduction by austerity. Their feminist brigades (*brigadas feministas*) sent out food and supplies in the wake of Maria. They demanded redress for the post-Maria surge of gender-based violence across the island (Oficina de la Procuradora de las Mujeres, 2019) and, having been mocked by the Rosselló administration in a leaked Whatsapp chat, they were central in the movement that saw him removed from office. Their work in distributing condoms, encouraging dialogue about sex, and connecting pregnant women with medical support is inextricable from their organizing for social reproduction.

## **Chapter 5: Love in the time of Zika | Experiments in reproduction and death**

### **5.1 The normal course of events**

In the thick of the Zika public health emergency, epidemiologist Beverly Paterson (2016) wrote, “Love, sex and babies are the foundation of human existence. Without them the human race ceases to exist. Zika, a virus that few people had heard of a month ago, has suddenly disrupted this normal course of events.” The disruption to which Paterson referred surely wasn’t the waves of chills, then sweat washing over the small percentage of those who experience Zika symptoms, or the aches in the joints and behind the eyes. It was that Zika could mark a growing fetus, even—usually—while staying silent in its adult host. Questions about how long Zika lingers in semen, how often Zika moves between adults having sex, when and how likely Zika is to mark a fetus, and how much faith to put into the shifting terrain of scientific knowledge on Zika slid seamlessly into questions concerning the health of one’s future children. Given the general condition of uncertainty surrounding Zika in 2016, women in particular pondered how to approach matter as diverse as mosquitoes, the heat and rain of the tropics, condoms, ultrasounds, the abortion pill, and of course, the dangerous domain of sex with men.

Paterson’s “normal course of events” is an assumed relationship between love, heterosexuality, and the future of the human-as-species that an effective public health program could restore. What follows is a critical exploration of this assumption through the analysis of popular culture and science. The mood and method of this chapter is different from the ones that precede it: my overarching objective is to think through what I see as an emerging and thickening collective affective orientation to the figures of the child and the reproductive woman amidst the wayward agency of an Earth that is heating up.

The chapter proceeds in three passes. First, I examine Zika’s politics of maternal love and child vulnerability, reflecting on the promises of the focus on the mother-child dyad for logging ethical relations across geographical distance. In the end, I suggest that a politics of child vulnerability and maternal grief may hinder a truly radical global health politics. In the second part I examine utopian ambitions to rein in Zika’s agency through the modification of its mosquito transporters,

*Aedes aegypti*, so as to obliterate them. The subject of the final section is the resonance of the Zika problem in the flowering of human sterility and extinction narratives. Here too the wrath of nature is at stake; I explore how the Zika problem latched onto preexisting structures of feeling concerning the future of the human species.

My objective across the three passes is to comment on the forms of reproduction and non-reproduction that the international Zika public health emergency has brought into being (or at least intensified) and reflect on their implications for feminism, the globally uneven distribution of health, and climate change. I think that there is much to learn from the way anxieties about human reproduction and nature's vengeance converged in the Zika public health crisis.

## **5.2 Child vulnerability, maternal love, and blood**

Elizabeth Povinelli (2016) has posited “the Virus” as one of the central imaginaries of geontopower, a tactic of late liberal governance that steadies and shapes the distinction between Life (which includes death) and Nonlife (the extinction of humans or all biological life, or the annihilation of the planet), precisely because the virus cannot be slotted into either category. “It confuses and levels the difference between Life and Nonlife while carefully taking advantage of the minutest aspects of their differentiation,” she writes,

We catch a glimpse of the Virus whenever someone suggests that the size of the human population must be addressed in the wake of climate change; that a glacial granite mountain welcomes the effects of air conditioning on life; that humans are kudzu; or that human extinction is desirable and should be accelerated. The Virus is also Ebola and the waste dump, the drug-resistant bacterial infection stewed with massive salmon and poultry farms, and nuclear power; the person who looks just like “we” do as she plants a bomb. Perhaps most spectacularly the Virus is the popular cultural figure of the zombie—Life turned to Nonlife and transformed into a new kind of species war—the aggressive rotting

undead against the last redoubt of Life (2016: 19).

I can see this. One of the artifacts I came across during my research was *Preparedness 101: Zombie Pandemic* (2011), a graphic novella published by the CDC for educating the nation on disease epidemic preparedness (see Figure 5.1). The story centers on Todd, Julie, and their dog Max, who find themselves amidst a zombie virus “ravaging the nation.” After witnessing the kind old neighbor lady attack, with crazed eyes and gray skin, her cat Snowball, Todd assembles a disaster kit. The second part of the novella brings the reader to the Emerging Infectious Disease lab at CDC headquarters in Atlanta for a hero narrative of identifying the source of the virus, determining how it spreads, and developing a vaccine. Meanwhile, Todd, Julie, and Max struggle to get to Lee Elementary School, the town’s “safe zone”; the doors are guarded by men in military attire and the trio’s blood is screened for the virus. Just as Todd learns that the CDC had discovered a vaccine, he wakes up to find that it all had been a nightmare. The novella concludes with Todd and Julie assembling an emergency kit in their basement and speculating about the kind of disasters that could be encountered.

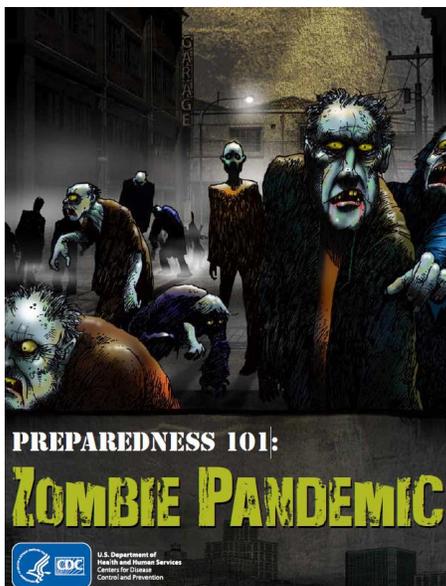


Figure 5.1: Excerpt from *Preparedness 101: Zombie Pandemic* (Source: CDC).

And yet while the emergence of a new and damaging strain of Zika invoked fears over mass death by pandemic, the virus's public culture was emphatically about pregnancy, birth, motherhood, and children. It was, in short, about *life*. Images of vulnerable babies and maternal love predominated.

The claim has been made that the focus on mothers and children in Zika coverage is what distinguished it from media coverage of other infectious disease outbreaks. For example, in 2017 a panel of public health experts agreed that the North American media had debunked several myths about Zika. Donald McNeil Jr. (2017) writes, "Three years ago, pictures from Africa showing men in spacesuits carrying dead bodies exaggerated the risk of Ebola to the United States, they said. By contrast, pictures of tiny-headed babies made Americans take Zika seriously," intimating that mainstream Ebola induced panic in the reader, while Zika coverage produced a sensible and sensitive reader. Close-up shots of babies with microcephaly dominated the visual fields; cries and screams were the soundtrack: Zika stories highlighted the difference of the child and the difficulty of the mother's caretaking routines. The vulnerability of babies drew viewers and readers in, logging identification between a coffeehouse in Brooklyn and a favela in Bahia, a small town in Minnesota and a neighborhood in Medellín. Zika's public culture was about the making and marking of new *life*, with the vulnerable baby at its center. This included both the biological vulnerability of babies *to* microcephaly, and the biological dependence *of* microcephalic babies on adult women.

Of all walks of human life, a vulnerable child is the easiest figure through which to bridge cultural and geographical chasm in forging ethical relations. This is the point Gerry Pratt (2012) (working with Judith Butler, who herself works with Emmanuel Levinas) makes in evaluating the promise and pitfalls of maternal discourse. Via Levinas, Butler roots the ethical relation to others in becoming conscious of the precariousness of *all* life, and is insistent that this not follow the track from recognition of *one's own* vulnerability to that of the another: the ethical relation must grounded in the vulnerability of the Other. Pratt contends that babies and young children seem to elicit this kind of ethical awakening to the Other by virtue of their biological dependence on adults, and indeed, there is a long history of women's activism that centers children's

vulnerability (see Loyd 2009). But while Zika's lexicon of maternal love and children's vulnerability may be more humanizing than the deadly lexicon of "the Virus," or the invocation of a posthuman future in which human life is susceptible to all manner of catastrophic biological twisting and turning, it reifies the temperate-tropical distinction that structures Zika's global geography, and may provide affective scaffolding for the public health infrastructures that position some people as subjects-to-be-protected and others as objects-to-be-managed.

One of the reasons why stories of aggrieved maternal love seem to elicit so much emotion is that the reader/viewer imagines the loss or enfeeblement of their own children. The idea again is that maternal love reaches across cultural and geographical boundaries, striking everyone in the heart. But as Pratt (2012) argues, the empathy evoked by envisioning someone else's tragedy as one's own only turns the story inward (as with elicitations of empathy that work through the imagination of war or disaster at home [Butler 2006]). In asking herself, "How would it feel to have this happen to me," the reading or viewing subject changes the geographical frame of the Zika problem—it is no longer about the threat Zika poses to pregnant women or mothers everywhere, but about *my* telos as a mother, *here*. Two points must be made. First, the public empathy for "Zika babies" and their mothers that North American coverage of the virus elicited—and, crucially, for which it has been celebrated—slides easily into self-affirmation that hardens hierarchy, even if it at first glance it seems to work across social difference and geography. Pratt argues that this kind of imaginative identification brings people to feel good about themselves for having the proper emotional response to the hardship of the Other, elsewhere. In short, the self-congratulation that comes with the conviction that one has empathized with the Other is that which *blocks* an ethical relation to the Other, especially if the story, testimony, or image does not ask much of the reader/viewer. Recall how, in one of the dissertation's opening scenes, Miami-based Sloane narrated her pregnancy in conversation with the barrage of photos and stories of "Zika babies" in Brazil: "When I saw the first picture of a baby with microcephaly, I burst into tears. It seemed so far away in the jungle, and then it was in my backyard." Notwithstanding the erroneous assumption that Zika is a jungle disease, in this statement, identification with the Other mother moves briskly to the threat Zika poses to her own unborn child. Her humanist appeal to the idea of procreative rights—which turns on the idea that

the Earthly purpose of humans is reproduction, more humans (Lewis 2019)—is actually geographically specific.

Second, representations of reproduction also run high risk of laying blame for children’s vulnerability on young mothers from urban Latin America. (If Zika is sexist, locking pregnant and could-be-pregnant women in the home, this is a sexism structured heavily by class and race: middle class and elite women in Brazil and Colombia have air-conditioned homes with screens on doors and windows, while working class women are used to intermingling with *Aedes aegypti*.) I have been struck by the extent to which documentaries and nightly news specials on Zika asked girls with “Zika babies” to explain themselves in the form of the confession, which is what Foucault (1978: 59) famously argued was “one of the West’s most highly valued techniques for producing truth.” For example, in a short film on Zika in Recife, Brazil, reporter Amos Roberts introduced the viewer to Leticia, age sixteen, by way of her reminiscing of a time before the baby in her arms. “Me and my girlfriends would go out at night. Always partying.” The viewer’s eyes are made to track between Leticia’s despondent expression and the small head of her child Heitor, as Roberts announces, “There’s no escape now. Young mothers have little time for adolescent dreams.” Leticia’s mother Lourdes joins for an interview in Portuguese, dubbed over in English:

Roberts: Leticia, did you plan to get pregnant last year?

Leticia: No.

Roberts: Was it a surprise then?

Leticia: Yes.

Lourdes: She says it was a surprise—it was no surprise. If you have sex you know you risk being knocked up if you don’t take precautions.

Leticia: His father is not involved at all. He doesn’t care.

[VOICE OVER: Lourdes had high hopes for her daughter. They’ve been shattered - and she has trouble containing her disappointment.]

Lourdes: While he's tiny, she has to dedicate herself to him. I don't have the conditions to do it. If you want children, you have to raise your child. I raised mine. Now she has to raise hers.

Roberts: What upsets you the most?

Lourdes: Her rebellion. She used to be a rebel and go out. Now she's at home all the time. She's not going anywhere (Roberts and Parrish 2016).

Sex is the cardinal subject of the confession, Foucault tells us, and Leticia's confession is of the flesh: reckless sexual activity, unplanned pregnancy. The confession also hinges on the presence of an authority figure, who not only draws said confession out but also provides some sort of resolution through judgment. The most explicit interlocutors here are the journalist, who leads the interview, and Lourdes, a maternal authority through whom both questions and answers wind. In fact, the scene is reminiscent of the confessions most women are required to make to a healthcare professional in order to be able to terminate a pregnancy or ingest a morning-after pill. On the changing regulatory apparatus of abortion in late-twentieth-century France, Dominique Memmi (translated by Deutscher 2017: 162) writes,

What will the health professional ask of you? Seemingly, almost nothing. You will be asked to take a seat, and to talk about your condition, what you are asking for, and often, the reasons. In short, what has brought you there. The authority of Church and State have retreated in favor of a regulation reduced to "almost nothing": government by means of one's words [*par parole*].

Memmi makes clear that these interviews may be required by law, but often are not. They involve the woman detailing to a healthcare profession (oftentimes a man) a confession of sex, age, general health, relationship status, and a desire to impede the chain of reproductive events that could be unfolding inside her. But in this storying of *Zika*, in this *public* confession, the viewers are also a faraway source of authority: they are invited to assess Leticia's confession and ultimately forgive her for her sins of the flesh because of her love for Heitor. Maternal love may redeem and purify Leticia, but what are we to make of the recurrent positioning of the viewer as the arbiter of judgement, as the figure of authority in the confession scene? I see the confession

joining in the logic of “responsibilization” of women for introducing the chance of Zika-associated microcephaly and its aggregate costs across the lifespan I documented in the preceding chapters.

Some North American feminists have looked to Zika as an opportunity to open access to abortion for women in Latin America by turning to the latent political potential of the threat of disability and disfigurement in microcephaly. For example, in the wake of the WHO naming Zika a Public Health Emergency of International Concern, Sarah Seltzer (2016) at *Jezebel* wrote

the urgency with which it’s being addressed has tempted me to imagine that this crisis will force the right flank of the abortion debate from insanity to sanity, from callousness to empathy. It’s within reasonable hope that the circumstances around Zika could at least prompt the following question in future presidential debates: “Are you prepared to look at a woman who has been bitten by the wrong mosquito and tell her she has no option but to carry a micro-encephalic fetus to term” (see also Cauterucci, 2016; Gordeljevic, 2016)?

I have always been curious about the large part of the pro-life movement that seeks a categorical ban on abortions except in cases of rape. To me, that exception means an anti-abortion politics is not, at its roots, about the inviolability of fetal life—for if it were, a fetus conceived of rape would be required to be carried to full-term—but about punishing sexually active women who do not want to have children. I raise this curiosity here because I see something similar at play in suggestions that Zika could jolt forward the pro-choice movement in Latin America: a pro-abortion politics under the tyranny of Zika is much more about the aversion of microcephaly’s biological difference and societal costs than about women freely choosing whether to reproduce or not. This is not to say that microcephaly is a human invention, to suggest that the evasion of mosquito bites and the seeking of serial sonograms by pregnant women in the time of Zika is an inherently anti-disability position. (Indeed, if I myself were pregnant or planning to become pregnant, I wouldn’t have structured my doctoral studies around place-based research on the Zika virus.) But there is something to be said about the way the figure of the child with

microcephaly opened public forums that seemed to be closed, and closed public forums that seemed to be open. That Zika directed discussions of abortion through the added societal value of averting biological difference should be cause for contemplation, not celebration.

In the end, though Zika provoked many public discussions of abortion (and, as we saw in the previous chapter, was the impetus for governments, pharmaceutical corporations, and NGOs to administer contraceptives to large groups of women), it is crucial to note that in many areas of active Zika transmission, women's access to abortion remained as tightly restricted as before the damaging variant of Zika emerged onto the scene. Consider the position of nurse Julia Pineda in rural El Salvador. In 2016 Pineda came down with a fever, her eyes grew red with irritation, and a rash blossomed on her skin, leading another nurse to unofficially diagnose her with Zika. Ten weeks pregnant, she feared the imprint Zika could make on her third child's skull, brain, and eyes. (One day, her nine-year old son brought a Zika information brochure home from school, disconsolate; it featured a drawing of a two-headed fetus enveloped by a pregnant belly.) But it wasn't only this: she also feared the possibility of miscarrying as a result of Zika, and thereby being charged for having had an abortion. In El Salvador, having abortions can carry a prison sentence of up to fifty years, and Pineda wouldn't have been the first to be charged with this crime after miscarrying. The plight of a group of women known as "Las 17" loomed large in Pineda's fears. "Las 17" are currently serving prison sentences for abortions, though they say they merely suffered late-term miscarriages. In many of their cases, a "float test"—which assesses the buoyancy of a fetus's lung in order to establish whether it was alive at delivery—was marshaled as evidence. (The scientific validity of this test has been widely rejected.) In many of the "Las 17" cases, "maternal instinct" was evaluated (Strochlic 2016). The possibility of Zika-induced microcephaly and miscarriages did not loosen up El Salvador's twinned criminalization of abortion and obstetric emergencies—it raised their stakes, as one effect of contracting Zika during pregnancy is *increased chance of miscarriage*. Likewise, under the U.S. Supreme Court decision *Roe v. Wade*, abortion is technically legal in Puerto Rico, but in practice, the choice for a woman to terminate a pregnancy cannot be abstracted from the patriarchal social norms in which she is enveloped. "Such norms are imbricated transversally," Rodríguez-Díaz et al. (2017: 145) offer, "from the individual decision-making level, to the health

services delivery arena, and all the way to the design and enforcement of state policies.” A distinction must be marked between *du jure* and *de facto* option of abortion.

With all of this in mind, it is fair to say that Zika has heightened the surveillance and regulation of women’s bodies more than it has expanded reproductive autonomy. The politics of female respectability and responsibility are never far away when women are positioned as the single hinge between the dense, errant, and dangerous agency of *Aedes aegypti* and the Zika virus (made denser, more errant, and more dangerous by global climate change) and the future of the population.

Finally, the twinned focus on child vulnerability and maternal love in Zika coverage hinged on conventional notions of reproduction—namely, that the genealogical relationship between mother and child is love and kinship in its purest, highest form. This is an example of what Anne McClintock (1995: 4) calls the “reproductive order of *patriarchal* monogamy,” the “Family of Man” that at the end of the day, despite being reproduced through images of maternalism, “admits no mother.” Sophie Lewis (2019: 116) argues that one of feminist history’s key contributions has been to document the *violence* of the family: the “custom of living in private households together with naturalized relatives,” she argues, has left a trail of “discomfort, coercion, molestation, abuse, humiliation, depression, battery, murder, mutilation, loneliness, blackmail, exhaustion, psychosis, gender-straitjacketing, racial programming, and embourgeoisement.” I don’t mean to suggest that the loving mother-child relationship is a political problem in and of itself, nor that maternal love is a mere social construction, but I do want to consider how this focus may invalidate forms of family-making and community-building that are not organized around heterosexual sex and a vertical genetic relation, that 1 gamete + 1 gamete = offspring formulation. Such a focus can have profound consequences for public health investment and infrastructure. Elizabeth Povinelli’s earlier work (2006), for example, discusses the coding of certain illnesses in Australia as the product of indigenous kinship forms (including sexuality) which do not abide by the heterosexual couple ideal. Shorter lifespans in indigenous territories were explained away by the Australian government through these forms of kinship—instead of, say, colonization or de-investment in community healthcare. In the previous chapter,

we saw how Puerto Rico was time and again indexed against the mainland in terms of sexual activity, teenage pregnancy, and birth control use. Drawing on longstanding anxiety on overpopulation, this vision of Puerto Rican reproduction as disordered helped legitimize targeted LARC provision as a Zika intervention technique while life-making infrastructures withered alongside.

One final example of how the mother-child dyad may exclude nonprocreative, non-biological social forms can be observed in Zika's tangled politics of blood. In the leadup to my research in Puerto Rico, I noted much distress in the U.S. news about Zika in the national blood supply; I also noted that the categorical ban on blood donations from gay men remained in place. Because the Zika virus often made a home of human blood, the undetected intrusion of Zika-infected blood into the national blood supply threatened to disorganize biological reproduction: a pregnant woman could unwittingly contract Zika through a blood transfusion, and her fetus could then be marked by the virus. Meanwhile, the blood of gay men continued to be culturally associated with HIV (Valentine 2005), imagined to have latent contaminating potential by virtue of coming from the bodies of men who have sex with and/or love other men. These two sexualized imaginaries of blood contamination commingled in the aftermath of the massacre at Pulse nightclub's Latin Night in Orlando in June 2016, in which forty-nine mostly Latino LGBTQ people were killed. The state of Florida was facing a blood shortage because of worries over Zika, while gay men in Orlando who wanted to donate blood as a means of both grieving and building a corporeal bond with the injured were prohibited from doing so. I think there is something to make of this conjuncture of consanguineal ties and other forms of kinship. At the final analysis, it seems that concern for the vulnerable child is just as able to erect borders across which ethical recognition cannot happen as it is able to transcend them. It may also more firmly lodge human kinship into a grid of heterosexuality and the "symbolic overdetermination of biology" (Butler 1994: 19; see also Tallbear 2018), against which all forms of kinship must be judged. I want these thoughts to hover as I turn to some of the nonhuman reproductive agents at play in the Zika phenomenon, for as I have been highlighting throughout, the non/reproductive politics of the virus are not confined to the human.

### 5.3 Reproduction-for-extinction

A wide range of techniques have been employed to interrupt the movement of Zika between human bodies via the mosquito, and thereby interrupt, or spatially confine, the replication of the virus itself. They range from the coating of one's skin with DEET-based insect repellent, to the community activism focused on clearing automobile tires and pools of stagnant water, to chemical fumigation of homes and neighborhoods. Two techniques which I have not yet broached break from these, taking mosquito reproduction itself as a point of intervention. Enter British biotech firm Oxitec's "population-replacing" mosquito, created to respond to dengue fever and enlisted in the fight against Zika. The population-replacing mosquito (also called the Friendly™ *Aedes*) is a *male* mosquito that has been genetically modified with a "self-limiting" gene. (Recall that only female *Aedes aegypti* pierce human flesh and transmit Zika and other mosquito-borne viruses.) When released, Friendly *Aedes* males mate with "wild" females and produce offspring that die before they can reach adulthood, and therefore before they can reproduce (see Figure 5.2). The premise is population-obliteration more than population-replacement: Friendly *Aedes* mosquitoes *are designed to reproduce for the extinction of the species, as opposed to its endurance*. As technologies of extinction, they are as old as they are new, drawing on an obsession in Western public health with the eradication of disease-bearing mosquitoes from the Earth (Stepan 2007).

Oxitec's realization of Friendly mosquito trials in the Cayman Islands, Brazil, and the Florida Keys have raised questions about government regulation. The insect's regulatory journey in the United States began before the Zika epidemic in 2011, under the assessment of the U.S. Food and Drug Administration (FDA), because their *raison d'être* was disease prevention. However, in October 2017 the burden of assessment—and ultimately, the approval decision—was turned over to the EPA. The rationale for the change was that the mosquitoes functioned more like a pesticide (unleashed in nature) than a drug (ingested and processed by a human body). On the back of this recategorization, Oxitec and various commentators, which ranged from enthusiastic to cautious but curious, have been able to make the argument that Oxitec mosquitoes could replace synthetic chemical pesticides and, it follows, render the measuring of different

environmental and health risks against each other null. This mosquito holds the obliterating capacity of the pesticides without the chance of chemical harm.

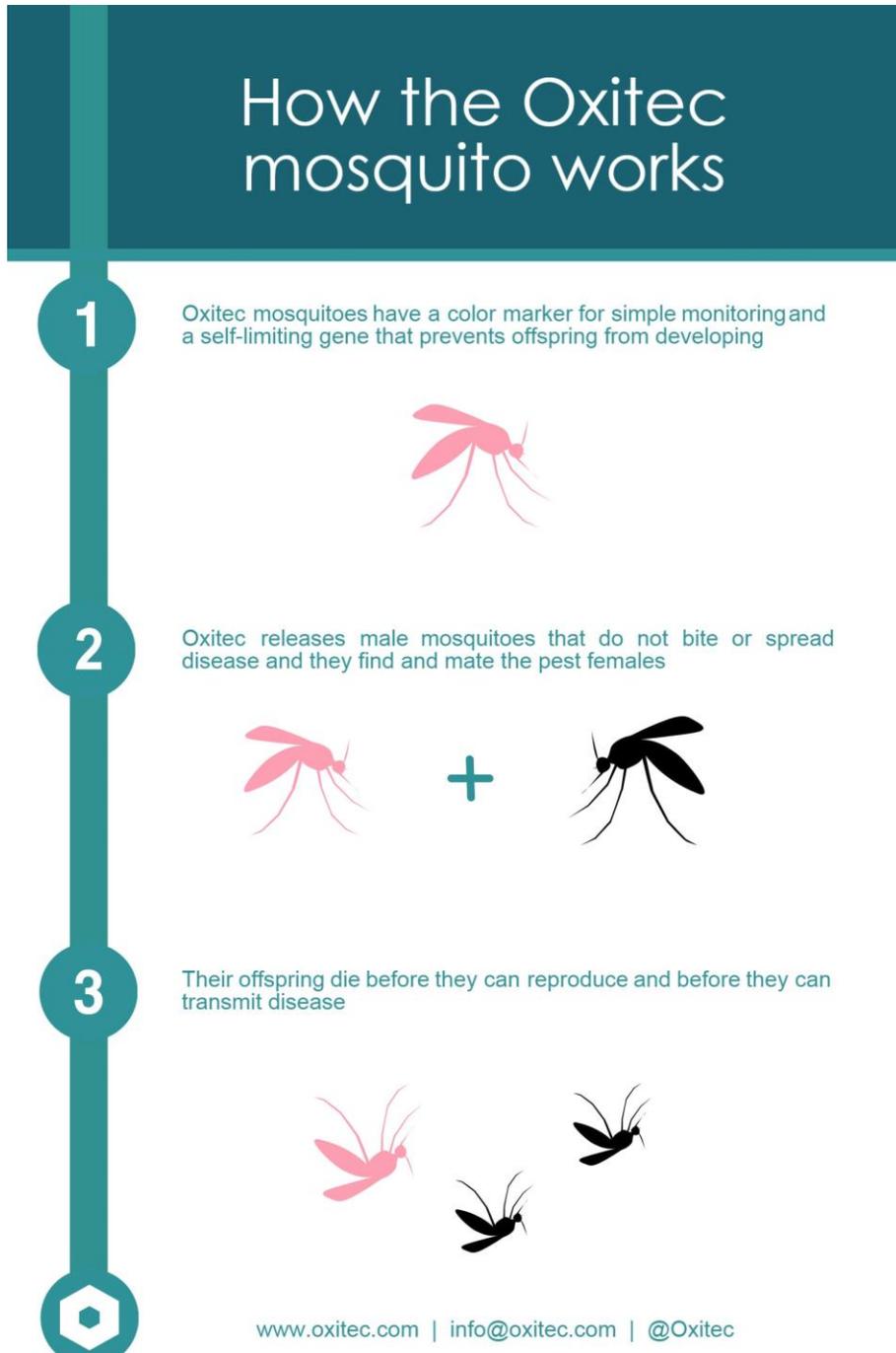


Figure 5.2: The manipulation of mosquito reproduction (Source: Oxitec).

Horizontal gene transfer is one concern raised by the use of genetically modified mosquitoes to intervene in the spread of Zika. This is the idea that the self-limiting genes of the Friendly mosquitoes could move laterally across species, instead of vertically from parent to offspring through sexual reproduction as intended by their human engineers; as LaFrance (2016) asked in *The Atlantic*, “What if the mosquitoes end up transferring their altered genes horizontally—to other non-target species, rather than just to their own offspring?” A brief pause is necessary here to grasp what horizontal gene transfer, even in terms of mere speculation, does to the reproductive paradigms that have been broadly accepted since Darwin. It is accepted in genetic science that lateral gene transfer has played a fundamental role in the evolution of single-celled organisms, but its role in the evolution of multi-celled organisms is yet unclear. Regardless, a growing body of work suggests that a significant portion of animal genomes has been acquired through lateral transfer from bacteria or fungi (Boschetti et al. 2015). In other words, a lot of what we know to be *of us* is *not* of us at all. Horizontal gene transfer makes genetic material that is not of either parent organism part of the genetic profile of the organism in question, and thus into the physical infrastructure of the body. Indeed, it may even incorporate genetic material *from a different species* into the organism’s genetic makeup and body. It is a queer, interspecies form of gene transfer unhinged from the two-parent model (see Kirksey 2018).

Unsurprisingly, Oxitec researchers have argued that the unfriendly lateral transfer of self-limiting genes from Friendly mosquitoes to other organisms is unlikely. However, horizontal gene transfer is central to another Zika management technique, the introduction of *Wolbachia* bacteria into male *Aedes aegypti* mosquitoes to reduce Zika transmission. Here, *Wolbachia*, “naturally” present in over 60 percent of insects, are made part of the genome of male *Aedes* mosquitos; the eggs of “wild” female *Aedes* who mate with these males will fail to hatch, thus suppressing the mosquito population at large.

Colombian feminist theorist Claudia Rivera Amarillo (2017: 201; my translation) has argued that these attempts to govern the future of the nation with genetically modified mosquitoes evoke an “old association between feminism and extinction.” Both the Friendly™ and *Wolbachia* mosquitoes are premised not on decoupling mosquito sex from reproduction, because they do

reproduce, but on decoupling mosquito reproduction from life. They are technologies of extinction that take males as their point of intervention. Reproduction becomes hinged to death (and by extension to extinction), promising the protection of the love-sex-baby chain of causality in humans that Zika threatened to destroy.

The engineering of reproduction-for-extinction, however, cannot be abstracted from the geographies that enfold them. Public health organizations articulated the promise of Oxitec mosquitoes through the language of global warming; that is, mosquito-borne diseases that were once understood as indelibly tropical were now, because of the expanded geographical reach of *Aedes aegypti* mosquitoes (and perhaps as well, the transformation by heat of *Aedes albopictus*), global. Making a measured call for the regulatory approval of the GM mosquitoes, for example, molecular entomologist Paul Eggleston reported to the WHO, “The problem [of mosquito-borne diseases] isn’t going to go away. Global warming is having a real impact, with the encroachment of mosquito-borne diseases on southern Europe” (WHO 2009). The choice of the word “encroachment” positions Europe as a region in which *Aedes does not belong*, rehabilitating longstanding fears over the porosity of temperate geographies to the tropical. Fears over tropical intrusion find regional expression too: in Colombia, for example, *Aedes aegypti* is imagined to “climb the mountain,” propelled by global warming from low-lying, tropical regions (racialized as Black), to mountainous Andean regions (racialized as white) (Rivera Amarillo 2017). Writing on the cultural fascination with “killer bees,” womanist theorist Zoe Samudzi (2019) describes images of “the swarm” as “demographic anxieties and economic anxieties come to [nonhuman animal] life” in “Fortress Europe, Fortress America.” Sliding in and out of racialized fear over migration and “overpopulation,” “the swarm” focuses on the distinct horror posed by the geographical and genetic origins of the bees, crowding out legitimate questions about the stakes of ecological experimentation. This, she notes, is not unlike scripting climate change through “gaps” in contraceptive use amongst poor women and girls in the Global South. Heat’s specific rewriting of given geographical distinctions between temperate and tropical appear to have prompted mosquito reproduction-engineering more than a broad humanist desire for the elimination of mosquito-borne illnesses.

Throughout my exploration of responses to “uncontrolled biological growth” in Zika, I have wondered if the increased vulnerability of people in the Global North to mosquito-borne diseases like Zika with climate change could prove fruitful for radical and global forms of human healthcare which take shared precarity as their base, just as Judith Butler (2006) hoped the post-9/11 fear and mourning could bring about thoughtful political reflection and reimagination. But I am not hopeful, for even in the forms of reproduction intervention that take mosquitoes as administrable objects instead of women and girls, the temperate-tropical distinction holds strong.

#### **5.4 Unwomen and unbabies**

We have already had occasion to note in the previous chapters that public health investment in the pregnant woman and future child involved various forms of dying (in terms of imperceptible chemical harm) or averting birth (in the case of mass IUD insertion) so as to fortify the population at large. Feminist philosopher Penelope Deutscher’s (2017: 4) contention that “the very association of reproduction with life and futurity (for nations, populations, peoples) has amounted to its associations with risk, threat, decline, the terminal” rings true here: internal to the question of *what kind of life* should be invested in is the proximity of reproduction to death.

The increasing centrality of zombies, plagues, and other new images of deadly forms of biological uncertainty habituate us to the idea that nature could finally prove beyond human control, that its wrath will have the final say. Rebekah Sheldon (2016: 149) argues that “the anxiety to which these fictions give voice is less about human extinction per se than about the exposure of a restive and agential nonhuman surround against which human security systems provide only temporary safety.” Simultaneously, however, these stories tend to plot human survival—and perhaps also redemption—through the hero narrative of Western scientific discovery (usually through locating a problem’s singular origin), the biosecurity surveillance and spatial containment strategies that had been useless in preventing the problem at the outset, and the gumption of ordinary people. *Preparedness 101* is a tongue-in-cheek example, published by the CDC to encourage people to assemble disaster kits for disease outbreaks, but it is no more pedagogical than the television shows, movies, and books that have emerged or been reinterpreted in the last decade for living under climate change.

I am thinking of the blossoming of anxieties over human reproduction amidst environmental crises on screen and in print (see Canavan 2012; 2013; 2016; Clark 2017). Those that have gotten mainstream attention include P.D. James's (1992) novel *Children of Men* and Alfonso Cuarón's (2006) film version (which presents a vision of reproductive utopia and dystopia much different from that of James), Margaret Atwood's *The Handmaid's Tale* (1985), and Cormac McCarthy's *The Road* (2006). It is likely, as Sheldon (2016) suggests, that the waning of certainty over human mastery over of nature (which is different from the waning of desire to master nature) in the contemporary efflorescence of nonhuman reproduction, aided and abetted by the fertility of nonhuman agents like the Virus, has paved the way for the production or reworking of dystopian stories of human sterility. Environmental apocalypse in popular culture is quite often tied to mass problems in human fertility, whether by pollution or emergent infectious disease. The human species figures doubly here: as agent of environmental catastrophe and, ultimately, as victim. Nature exacts its revenge, first by eliminating children from the world, and then eliminating humans altogether. The woman of childbearing age in these stories link individual stories of survival to the survival of the human species.

It is not for nothing that feminist writer Sarah Seltzer (2016) called the Zika public health emergency a "*Children of Men-meets-The Handmaid's Tale* dystopia where women, of course, have the most to lose," and not for nothing that TV writer Devindra Hardawar (2016) stated, "With all the worries about the Zika virus today, and what that means for the future of human reproduction, *The Handmaid's Tale* seems more fitting than ever." In this section, I want to examine Zika's public pedagogy in concert with the sterility apocalypse genre; my focus is Hulu's reworking of Atwood's *The Handmaid's Tale* into a television series. The first season reinterprets Atwood's original story in, the viewer assumes, a time near our own, given the references to Uber and smartphones in flashback scenes. The second season thickens the original world of the novel with new storylines in the toxic waste dumps to which infertile women are banished, for example. Ordered in April 2016 and released to critical acclaim in April 2017, the television series subtly nods to the Zika public health emergency throughout. It is framed by a scene, early in the first season, in which the main character asks during the labor of another handmaid, "What will she give birth to? A baby with a pinhead? Chances for a healthy birth are

one in five.” I take the novel and the series not as exemplary pieces of feminist art—its post-racial orientation plotting of eco-crisis and glowing depiction of Canadian border control get in the way of that—but rather as cultural objects suggestive of an emerging affective relation to the future of the human reproduction in what has come to be called the Anthropocene. As such they reveal the promises and pitfalls of the kinds of liberal feminism gathered around Zika that I have been tracking.

The novel is structured around three narrative tenses: a dystopian future, which is recounted as a first-person oral testimony of a handmaid named Offred, either discovered by a future society or kept for posterity; the Handmaid’s remembered past, which in the book mirrors North American society in the 1980s (when the book was written) and, briefly, a distant future looking back on the first two narratives presents. A brief summary of the world in which the narrator finds herself enveloped will serve the uninitiated reader. In what we know to be the northeastern United States, the nation-state of Gilead has rounded up fertile women and instantiated them in the homes of high-ranking male members of society. Once a month, the husband, his wife, and their handmaid together perform the Ceremony: timed with ovulation, the man rapes the Handmaid as she lies between the legs of the wife, who looks on and no doubt feels the rock and rhythm of the rape. The Ceremony serves to produce children while symbolically retaining the sanctity of the marital home and normative family structure. After breastfeeding new babies, the Handmaids are assigned to another household to produce another child for the nation. Queer people are executed and with them, queer forms of kinship. And it’s important to highlight just who the Handmaids are in the original novel: fertile white women. The establishment of Gilead hinged on the removal of dark-skinned people to a place called the National Homelands, excluding them from the nation’s reproductive futurism. In this sense, Offred’s present is the imagined dystopic future of white American women’s reproductive enslavement (“I am a national resource,” she says), which is the concrete history of African American women’s reproductive enslavement for the reproduction of the plantation economy. Shifting the terrain of debates on surrogacy, legal theorist Anita Allen (1991: 22) has made the key point that before the Civil War, almost all black mothers in the U.S. South were surrogate mothers, “knowingly [giving] birth to children with the

understanding that those children would be owned by others,” but the novel does not engage with this history.

Some readers of the *Handmaid's Tale* have taken mass infertility as the convenient excuse of the architects of the republic of Gilead to install a militarized patriarchy, the purpose of which is to divest women of personhood and to sort them according to the racialized biological value they offer to the population, and, inextricably, how far they had diverged from Gilead's religious and moral standards for women (see Sheldon 2016). (If the task is merely to repopulate the nation amidst environmental devastation, surely there would be more productive ways of doing so than a monthly rape by men who may or may not be infertile.) However, I want to suggest that the specter of mass infertility by ambient nature in *The Handmaid's Tale* is more than an alibi for the high-ranking men of Gilead, and further, that the novel's reimagination as a television series in 2017 gave narrative shape and affective weight to many of the social anxieties on reproduction whipped into a frenzy by the Zika virus. Joe Wilcox (2017) writes of the “sudden believability” of the future imagined by Atwood, a feeling I noted on many of the Reddit threads generated by the release of the series on Hulu:

Much as the original dystopian drama appealed to me, I discounted as hugely unlikely the majority of women becoming infertile. That was 1985. In 2017, when contracted by pregnant women, the Zika virus typically causes birth defects. Suddenly, from Zika to something else, the idea of a pandemic making women infertile or leading to mass miscarriages isn't inconceivable. Nor is, in the aftermath, the rise of something like the Republic of Gilead that seeks to purge so-called sinful behaviors that brought God's punishment.

The transformation of the novel into a television series exemplifies the thickening of our collective imaginary of an increasingly disobedient nature which, having been degraded and defiled by modern human life, will settle the score in human reproduction. Suddenly,

reproduction in the popular U.S. imagination is not only about abortion and birth control—always central features of U.S. political debate—but also about the possibility of the end of the human species. And the idea of human overpopulation looms large in this imaginary: human reproduction as the source of environmental devastation and the locus of nature striking back.

We can first observe in both the novel and the television series that human reproductive systems are always already enfolded in ecosystems and ecosystems as always already enfolded in reproduction: a “double-internality,” to riff on Moore (2015), of reproduction-in-nature/nature-in-reproduction. The boundaries of the human body can no longer withstand the onslaught of toxic waste and industrial chemicals; or perhaps, the wayward chemical agency of U.S. industrial production has revealed the idea of the sovereign human body to have been a farce all along. “Unbabies” are the children conceived and carried to full term in Gilead, but malformed by industrial chemicals, contaminated water, or radiation. The exact origin of the problem is not clear, but the causal relation between a noxious nonhuman agency and mutation is. Offred tells us that the chance of giving birth to an “Unbaby” is far greater than giving birth to a healthy baby, and even though it is acknowledged on the sly that a great many of the high-ranking Commanders in Gilead are infertile, it is the womb of the Handmaid that is the site onto which the problems of human reproduction are mapped. She is the threshold between wider ecological tumult and the future of the nation, blamed for the former—environmental catastrophe as God’s punishment for straying from the traditional family before the establishment of Gilead—and biologically accountable for the latter. Fertile women embroiled in both the contemporary Zika public health emergency and in the dystopic state of Gilead are testaments to the permeability of human skin to extracorporeal lively matter—whether biological (virus, mosquito) or, for lack of a better word, chemical (pesticides, toxic waste). Gilead is a theocratic rendition of the gendered biosecurity regime I analyzed in Chapter 3, in which the bodies of women and girls were spatialized as the fulcrum between an atmosphere of Zika and Zika-bearing mosquitoes, and in a final responsabilizing wound, environmental crisis serves as punishment for those unable to realize their reproductive telos: Handmaids that fail to produce viable children are deemed “Unwomen” and shipped to the “Colonies” to clean up a landscape of toxic waste.

The relationship between mass human infertility and the establishment of Gilead is never clearly outlined in the novel. Toxic waste, radiation, new strains of sexually transmitted diseases, and water contamination are hinted at throughout, while men in positions of power (and their wives) add birth control, abortion, and the general moral corruption of the traditional family to the explanatory mix, blaming women for environmental devastation. For the reader, though, causality is never established: were landscapes and bodies saturated with fertility-inhibiting chemicals as part of industrial life, or did radiation from the war out of which Gilead emerged as a nation-state provide a final blow to human reproduction? Was mass infertility a condition of possibility for the extreme militarization of the nuclear family unit and the womb, or a convenient ruse for family traditionalists? The television series connects some of these dots to environmental devastation and climate change: the viewer learns that Gilead is established by force in response to a crisis of human fertility produced by the excesses of modern life: the wayward agency of industrial chemicals, perhaps, or the chaotic mixtures of biological material in global trade, or new mutations and viruses emerging in hotter climates.

Because the broader context of the creation of the Handmaid social role and the Ceremony as monthly societal duty is that environmental factors have almost entirely obliterated human fertility, the Ceremony might be thought of as a reproductive technology for environmental crisis that aims to solidify the heteropatriarchal family and reinstate the Child as meaning of life. “Let the little children come to me,” goes the prayer chanted in unison by Handmaids and wives in Season 2, “for such is the kingdom of heaven.” If we think of reproduction not only as human or nonhuman animal genetic transfer through sex, but also through the making of more lively or dead matter (in the form of, say, a virus, or toxic waste or polluting chemicals), the Ceremony is a response to both human infertility and nonhuman hyperfertility.

Human infertility has a distinct geography here. It is everywhere because of industrial pollution (as evinced by Moira earning \$250,000 to be a surrogate for a couple in England before the establishment of Gilead), but it is more evident in tropical regions. The interruption of human reproduction by pollutants or disease is distributed unevenly across the globe, but concentrated in

warmer climates. The militarization of reproduction in the great metropolitan centers of Washington D.C. and Boston hinges on the fact that there are still some fertile women about.

At one point in the series, Offred comes into contact with a mixed-gender delegation from Mexico, which had made the trip to Gilead for trade negotiations. The episode is framed by three things: the acknowledgement by one of the Mexican officials that agriculture in Mexico is faltering due to “changing weather patterns,” the proud declaration that Gilead has reduced its carbon emissions by 78 percent in three years, and a flashback to the “here and now” tense in which Serena, the wife in Offred’s household, ponders writing a book about fertility as a national resource and reproduction as a moral imperative. As the episode unfolds the purpose of the delegation is unclear, but all is revealed at a state dinner to which a group of handmaids without any visible marks of abuse are invited. Serena addresses the room by stating how proud Gilead is to have cleaned up the environment and restored “a healthy and moral way of life” which would be left behind for future generations, a pastoral reminiscent of the Nazi understanding of nature and reproduction (Staudenmeier 1995). She decries human efforts to master nature, but on the basis that it perverts God’s order of nuclear family and human futurity. She highlights that a decontamination of the environment does not matter if the problem of human infertility could not be solved, then turns to the Handmaids to acknowledge their role in doing so as the multi-racial “children of Gilead” rush out in a burst of laughter and play.

In the end, the viewer becomes aware that trade negotiations between Gilead and Mexico concern fertile women, not oranges: rendered totally infertile by tropical virus, pollution, and other wounds of climate change, they want to buy Handmaids. The episode concludes with Offred privately narrating her monthly rapes to the female Mexican ambassador in an effort to counter the rosy veneer of community procreation Gilead officials had painted for the delegation. Ambassador Castillo explains, with a pained look in her eyes, that there hasn’t been a child born in her fictional hometown of Xipica for six years: “my country is dying.”

The future imagined in this episode flips the given script of the global distribution of fertility and reproductive control in two pivotal ways. First, it subverts the historical trend beginning in the

1970s of fertility rates in deindustrializing countries falling to near or below replacement levels, with fertility rates in many regions in the Global South persisting as comparatively high, which, as McIntyre and Nast (2011: 1466) have noted, aided in the making of surplus populations available for new forms of labor exploitation. Handmaids are not a surplus insofar as fertile women in the narrative universe of the Hulu series are a globally precious few, but it is the relative geography that interests me: the Northern nation-state of Gilead is comparatively fertile, and Mexico seeks to control and extract the reproductive labor of women who understand themselves to be U.S. American. In the margins is the fleshy reality of present-day work in the maquiladoras along the U.S.-Mexico border, where U.S. capital selectively utilizes the reproductivity of Mexican women to rationalize the deterioration of their bodies. Melissa Wright (2006) has shown that a turnover rate carefully modulated by factory supervisors is viewed as just long enough to extract value from the feminine qualities (both physical dexterity and cultural docility) that make working-class women an attractive labor force before the grind of the labor process or the inevitability of reproduction renders them unable to work. *The Handmaid's Tale* plots a sort of narrative underbelly to the lived reality of feminized labor exploitation along the U.S.-Mexico border.

Second, the episode overturns the well-worn script in North American feminism in which women's freedom flow from North to South, prising open access to reproductive technologies and healthcare for poor women elsewhere. Offred, schooled in the rhetoric of contemporary pop feminism and brought to "Take Back the Night" demonstrations as a child by her mother, must ask Ambassador Castillo, clad in a sleek pantsuit, for help. The puncturing of Offred's world by Ambassador Castillo looking to purchase fertile American women charts a tense connection with reproductive dystopic accounts of contemporary white nationalists, who fear that Latino birthrates will cause the number of people of color in the United States to outstrip the number of white people in coming years (Briggs 2018). Such fears were central to the work of "eugenic feminists" (Nadkarni 2014) in the nineteenth century, who tried to cultivate "a productive maternity among white elites...while simultaneously suppressing an imaginary hyperfecundity (that is, excess production of babies) among subaltern classes" (Lewis 2019: 11), and it is important to be clear that such imaginaries are not only recouped by white nationalists: "close

cousins of their xenophobic anxieties pop up often in mainstream discussions of the sacrifices (of liberalism) that might have to be made in order to curtail the crowding of Earth” (ibid.).

These points bring us into close proximity with the racial reproductive dystopia lurking in the environmental reproductive dystopia in the series: that environmental chaos could rewrite the global reproductive cartography by reducing U.S. American women to their reproductive capacity for the nation, aggregating them into an undifferentiated procreative mass, bringing them under authoritarian state control, and even selling them as reproductive slaves. The racialized anxiety of the series turns on the possibility of contemporary postracial U.S. American women being monitored, regulated, and restricted in ways akin to how the U.S. government has treated black women and indigenous women within the territorial boundaries of the United States, women around the globe whom have been subjected to U.S. war making or development projects, and the subjects of U.S government experiments in population control, such as those carried out in Puerto Rico.

When the new mutation of Zika emerged with its causal relation to miscarriage and disability and a geographical reach that was yet unclear, Zika raised the specter of a certain kind of death: mass human nonreproduction, a self-imposed human sterility made necessary by the multiplying reproductive agency of mosquito and viral life. Many women in many places were, after all, urged to delay pregnancy. Would the situation get so dire that humans would have to stop reproducing? For how long, and with what consequences? Would the virus mutate again, this time rendering men or women actually infertile? And for feminists, what new dystopias might widespread infertility usher in? *The Handmaid's Tale* joins a growing archive of public contemplation of the possibility of human extinction, a reproductive dystopia raised by Zika's ambulatory agency. It also demonstrates the oblique racializations of reproductive dystopias, made ever-more real by the persistent threat of Zika's social, economic, and biological consequences breaching the borders of the geopolitical powers in the Global North. Imperial distributions of health and well-being are turned on their head; so too is the international geography of reproductive autonomy. This is an iteration of the biological anxiety Elizabeth Povinelli (2006: 77-78) calls “ghoul health”:

Ghoul health refers to the global organization of the biomedical establishment, and its imaginary, around the idea that the big, scary bug, the new plague, is the real threat that haunts the contemporary global division, distribution, and circulation of health, that it will decisively render the *jus vitae ac necris*, and that this big scary bug will track empire back to its source in an end-game of geophysical bad faith. Ghoul health plays on the real fear that the material distribution of life and death arising from the structural impoverishment of postcolonial and settler colonial worlds may have accidentally or purposefully brewed an unstoppable biovirulence from the bad faith of liberal capital and its multiple geophysical tactics and partners.

Thus, it is not only an undifferentiated nature that will settle the score in the emergent reproductive dystopia genre, but the natures (humans included) that have been harmed by plantation, settler, and postcolonial systems of oppression—to such an extent that given geographies of reproductive control are reversed.

In fact, as a “latent affect of imperialism” (Chen 2012: 170), “ghoul health” infuses all of the technoscientific and cultural forms of sexuality, reproduction, and death that I have explored in this chapter. At first glance Zika and the creative management technologies that have been generated in its name hold the promise of engendering ethical recognition of women across difference, of cracking open of the choice of abortion for women everywhere, and of human mastery of mosquitoes for global public health. Running through these promises is the racialized fear that a tropical disease may geo-graph the world and its uneven distributions of reproductive control anew. The reproductive capacities of virus, mosquito, and *some* women are seen as *open to manipulation* in structurally homologous ways. Amidst concern about the threat the over-reproduction of nonhuman life and Nonlife may pose for prized forms of human reproduction, there is conceptual traffic between the inhuman that is viral or entomological and the inhuman as designated by race and nation.

## Chapter 6: Reproduction redux

When I first started this research, I didn't intend for it to be about climate change. I saw the heating up of the Earth as perhaps important background material for Zika's transformation from a generally innocuous virus to one that could shape fetal neurological and musculoskeletal matter, or for the expanded geographies of *Aedes aegypti* mosquitoes. But public fears of overpopulation amidst global environmental crisis circulated amongst public fears of Zika and microcephaly, and as I theorized the Z-CAN emergency contraceptive program in Puerto Rico, I began to note similarities in proposals to address climate change by providing condoms and other forms of contraception to women and girls in "developing countries." An editorial in the *Lancet* (Cost 2009), circulated in major Euro-American news media and emblematic of this logic, is worth quoting at length:

Earlier this year a *Lancet* Commission stated that "climate change is the biggest global health threat of the twenty-first century." Countries in the developing world least responsible for the growing emissions are likely to experience the heaviest impact of climate change, with women bearing the greatest toll. In tandem with other factors, rapid population growth in these regions increases the scale of vulnerability to the consequences of climate change, for example, food and water scarcity, environmental degradation, and human displacement.

Over 200 million women want, but currently lack, access to modern contraceptives. As a result, 76 million unintended pregnancies occur every year. Meeting this unmet need could slow high rates of population growth, thereby reducing demographic pressure on the environment. There is now an emerging debate and interest about the links between population dynamics, sexual and reproductive health and rights, and climate change.

This statement broaches the very real problem of unmet needs for contraceptive implements across the world, and correctly notes that while women in the Global South are among the least

responsible for increasing climatic volatility, they bear its greatest brunt in their everyday lives. However, it traffics in a longstanding racist representations of Global South peoples as a roiling, procreative mass. I also noted the thickening of emphasis in center-left Euro-American news media on having fewer children, or no children at all, as an individual strategy for confronting climate change. In *The Guardian*, for example, Damian Carrington (2017) asserted that “having one fewer child will save 58.6 tonnes of CO<sub>2</sub>-equivalent per year,” as compared to living car-free (2.4), avoiding one round-trip transatlantic flight per year (1.60) and eating a plant-based diet (0.82).” The curtailing of one’s reproductive capacities through personal choice is increasingly being put forth as a sensible response to global environmental devastation.

These examples evince movement toward a more expansive understanding of reproduction in popular discourse, which apprehends the matters of birth control, abortion, and reproductive choice as part of a broader environmental politics, and in which not only the fate of nonhuman flora and fauna are at stake, but also the survival of the human species. In Chapter 5 I detected resonance between popular cultures and science concerning the Zika problem and human sterility and extinction narratives. In the narratives discussed there and in this flourishing discourse of *non-reproduction* as an avenue for contemporary environmentalism, human reproduction is framed as an expansive and transhistorical procreative drive that threatens extra-human nature, but one that the individual can and should interrupt through careful planning.

As I wrote the dissertation, a scholarly debate over human population bloomed in full force; implicit stances taken in journal articles in the preceding years were made explicit in full-length book projects. There was Michelle Murphy’s (2017a) study of postcolonial and neoliberal forms of “family planning” between the United States and Bangladesh, *The Economization of Life*, with which I have worked heavily here, but also Jason Moore and Raj Patel’s (2018) *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet*, which builds on Moore’s earlier tome on “capitalist world-ecology” in *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (2015). The most famous book in the emergent genre on human population and ecological uncertainty, however, is the one I have not yet broached in this dissertation: Donna Haraway’s *Staying with the Trouble: Making Kin in the*

*Chthulucene* (2016). Because Haraway's work has been and continues to be a lightning rod in feminist debates about the uncertainty of the human body in and of more-than-human worlds, I can use it to enunciate some concluding remarks.

A precis: the book rejects the denomination of our historical present as the "Anthropocene" in favor of the "Chthulucene," where humans "become-with" nonhuman animals in "tentacular practices." Across experimental engagements with city pigeons, Black Mesa sheep, monarch butterflies, and the estrogen pills she acquires for her canine companion and research partner Cayenne, Haraway works in multi-species mess to advocate "sympoiesis" (making-with) over self-making, and her prose is as delicious as ever. Like much of Haraway's recent books, this one seeks to prompt more abundant futures on a dying planet. The "Make Kin, not Babies" chapter, a slim manifesto buried in the center, is a clarion-call for "intense commitment and collaborative work and play with other terrans, flourishing for rich multispecies assemblages with people" (2016: 101), and for the privileging of these assemblages over "the story of heteronormative reproduction" (2016: 137). The commitment of which she speaks has logics parallel to opposition to aerial fumigation in the name of the Child in Puerto Rico, which looked to bodies and ecosystems as coterminous systems that cannot be separated out. Long-term chemical accretions of empire brought Puerto Ricans to say no to Naled because they saw it as *reproductive*, as imbricated in the making-more of biological matter. The imbrication of the human body with lively "others" of all kinds, from mosquitoes and viruses to fish and bird, as well as of course the synthetic chemicals that persist long after their technocratic application, a multi-species assemblage that reflects one of Haraway's earlier prize declarations—"we have never been human" (2008)—and my movement toward an understanding of reproduction and health as a socio-environmental process.

However, while Haraway is one of my favorite theorists, I am troubled by much of what is said (and not said) in *Staying with the Trouble*, and what I learned here informs this stance. My concern begins with the extent to which *Staying with the Trouble* leaves behind Haraway's earlier writing on *uneven* geographies of reproduction. Her essay "The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others," in which she riffs on Zoe Sofia to argue that

“every technology is a reproductive technology,” in many ways framed the entire course of this dissertation. With that felicitous phrase she meant that “ways of life are at stake in the culture of science” (Haraway 1992: 299); it was in this essay that I learned to think of reproduction in terms of *generation*: “the generation of novel forms” which “need not be imagined in the stodgy terms of hominids” (ibid.). I am also thinking, of course, of the “Cyborg Manifesto” in *Simians, Cyborgs, and Women* (1991), which was my initiation into the rousing worlds of feminist science studies and socialist feminism as an undergraduate. I think its fundamental insights have been stripped from *Staying with the Trouble*. As Sophie Lewis (2017) has pointed out, the brilliance of the cyborg as a figure with which to think is not limited to its keen recognition that “we are many,” nor its invitation of “mutant, contaminated subjects to build a new world on the ruins of the present-day home, factory, or lab.” It is that it did these things so imaginatively, while remaining grounded in social reproduction theory and black and Latina feminisms. Lewis argues that the cyborg is a creature of global capitalism; she becomes-with borders and racializations.

Uneven distributions of life and labor are also at the forefront of “Teddy Bear Patriarchy,” one of *Primate Vision*’s (1989) iconic chapters. Here, Haraway brings the reader to the Akeley African Hall of the Museum of Natural History in New York City, where she analyzes taxidermy as a “politics of reproduction” (1989: 30), in which sexual specialization of function and social sexual divisions of labor were organized and displayed before a viewing public as biological fact (or, in other words, as “nature”). The chapter theorizes the museum as a “medical technology, a hygienic intervention” (1989: 55), in which race, sex, class, geography, nature, and power are all entwined in a politics of reproduction:

From the point of view of Teddy Bear Patriarchy, race suicide was a clinical manifestation whose differential reproductive rates of anglo saxon vs. “non-white” immigrant women. Class war, a pathological antagonism of functionally related groups in society, seemed imminent. And middle-class white women undertaking higher education might imperil their health and reproductive function (ibid.).

All in all Haraway conceives the museums as having a *eugenic* function; it sought to thwart the aforementioned “race suicide” in the face of monumental historical changes in class, sex, and race.

Compare this steadfast grounding in the ways reproductive bodies are arranged and hierarchized with *Staying with the Trouble*, which seeks to rethink reproduction and kinship anew in the face of mass extinction. If there is one political ambition set out in the book, it is to bring human population, *in a numerical sense*, into the purview of left feminism. It is an anti-natalism that is specific—Haraway’s hope is for “2 or 3 billion” people (2016:103)—but historically detached and prescriptively blank. The book concludes with a story, a “speculative fabulation” concocted in a writing workshop and developed in conversation with the politics of an anti-natalist community in rural West Virginia. The prompt for this story was to “fabulate a baby, and somehow to bring the infant through five human generations” (2016: 136). “Camille” is meant to “render present the cross-stitched generations of the not-yet-born and not-yet hatched of vulnerably, coevolving species” (ibid.). She is also meant to “be part of learning...to radically reduce the pressure of human numbers on earth, currently set on a course to climb to more than 11 billion by the end of the twenty-first century” (ibid.).

I am not lamenting that Haraway has begun to think differently about human reproduction, but I am lamenting her stripping of grounding in divisions of human life and labor that are both global and uneven. The ontology of *Staying with the Trouble* is flat and haunted by the specter of population control as a tool for the making and consolidation of imperial power. To her credit, Haraway acknowledges this specter; the introduction includes a long list of qualifications for her injunction to turn to the number of humans on the planet, which I will distill into a sentence: Feminists, especially those of antiracist and anticolonial persuasion, have powerfully insisted upon the right of women to choose not to reproduce, and, in the face of racist forms of population control, to choose to reproduce. “For excellent reasons, the feminists I know have resisted the language and politics of population control because they demonstrably often have the interests of biopolitical states more in view than the well-being of women and their people, old and young,” she writes (2016: 6). But what links the book’s disparate chapters is recourse to

population as a numerical abstraction: the projected “9 billion increase of human beings over 150 years,” she argues early on, is “not just a number” (ibid). I think broaching “overpopulation” would have required a more careful engagement with the stratification of human reproduction across time and space and the history of population control, as well as a more explicit acknowledgement of the uneven geographies of production and consumption that underpin mass biodiversity loss. As Jason Moore (2015: 17) puts it, humanity is not “an undifferentiated whole.”

Such a grounding would not be reductive or deterministic, but the necessary work of feminist writing in a globally stratified reproductive process. There is still so much work to be done on how *power* works, for how it works is changing as the Earth changes. Haraway is correct to note in *Staying with the Trouble* that mass extinction will not be addressed by simply “blaming Capitalism or any other word starting with a capital letter” (2016: 7). Quite so. In the preceding chapters I have tried to stay away from capital letters; while I showed how U.S. empire played a central conditioning role in the diffusion of Zika in Puerto Rico, I did so by analyzing the specific logics, relations, and effects of the public health interventions. Neither Capitalism nor Colonialism nor Biopolitics were grand theoretical templates in my study, but my analysis continued to come back to the myriad ways the biopolitical state marked distinctions between reproductive subjects to be protected and reproductive objects to be administered. I have been and remain interested in the specific institutions and interests involved in positioning the vulnerabilities, responsibilities, and inequalities of the body-coded-female within the twists and turns of more-than-human life, which invariably requires attention to power and geography.

And so, with these thoughts in mind, and by way of conclusion, I ask: what is reproduction and how is it changing as the Earth heats up? If human reproduction is inextricably bound to nonhuman animal, plant, and viral reproduction on a dynamic planet, that shared vulnerability is often made invisible by expertise and protocol that responsabilizes young women and girls outside of powerful Northern countries. Climate crisis is being scripted as young, female, and racialized sex panic. The open question of what reproduction is and what it includes or excludes from its ambit may be better phrased in two more pointed political questions: who should be

consulted in the remaking of the reproduction, and in the name of whose future should the remaking be carried out?

## **6.1 Reflections on methodology, positionality, and geography**

This dissertation broaches a series of political and theoretical questions that accrued around the problem of Zika, exceeded Zika, and were altered by Zika: the differential production of health risk across global space, the endurance and shape-shifting of colonial systems of power, scientific expertise on women's bodies and comportment, and the relationship between the present and the future on an Earth that is heating up. To be clear, then, the dissertation is not an ethnography of Zika in Puerto Rico, nor it is a history of the making of Zika into a public health emergency. I have been much less concerned with charting a full chronology of the virus, or painting the richest picture of competing cultural visions of Zika in Puerto Rico, and have oriented my explorations instead toward the operation of power between places and between institutions. These movements and connections between places and experts and government agencies, I think, offer fresh insight into the changing shape of reproductive governance, as all manner of healthcare is defined by cost relations, as feminist debates about population governance are invariably cast through the prism of eco-crisis and as popular culture speculates about the end of reproduction in human extinction. It also paves for a redux of the concept of reproduction altogether, specifically in rethinking the positioning of the gendered human body—its vulnerabilities, responsibilities, and inequalities—within more-than-human life.

My approach to the research and writing was not without its problems, though, and the preceding chapters, with their carefully packaged arguments, belie the many forms of discomfort that went into their composition. The shape the work has taken is due, at least in part, to how fast Zika was materializing around me. Once I had a fuller sense of how Zika intervention worked in San Juan, I set out to try and organize a participant observation role with the Z-CAN trainers, or at one of the community health centers in its network. Z-CAN wouldn't offer me access because, I think, I could not offer them any practical expertise. The practitioners were likely also skeptical of anyone "outside" of the project. Then I spoke with a woman I will call Julia, a gynecologist based in San Juan. (She had agreed to do so because an old friend of mine asked her well-

connected father if he knew of anyone who could orient me into the Puerto Rican medical apparatus, who turned to his cousin on the island, who, via one more friend, opened me up to Julia.) We had a friendly chat over hot, velvety lattes suited to the air-conditioned cafe, which felt especially arctic when set against a backdrop of hot sun and heavy humidity. But while the mixed Spanish-English conversation was friendly, Julia was clearly very busy: it was this chain of familial/friendly obligation that brought her to the chair opposite me, something we were both eminently aware of as the chatter flowed on. I asked about the possibility of partnering with a clinic to do some observation work and conduct formal interviews with women. She thought it wasn't a good idea for a whole series of reasons, but the primary came in the form of a question: "What good would it do to have you sitting at the front desk of a clinic all day?" The question worked on multiple levels for me, though whether Julia meant for it to do so is unclear. My immediate answer was: I don't know. I offered these words in English, and they hung heavy in that sterile air-conditioned cube. This question concretized some abstract questions of politics and research epistemologies that had been rattling around in my head for quite some time (for example, Elizabeth Dunn's [2007] pressing point that the methodological primacy of the interview in critical geography lends itself to an analytic primacy of formal procedures and official narratives). As the dissertation took shape, I saw it less and less as an investigation of the experience of Zika than of the Zika apparatus—in this appellation I include public health expertise and practice—as manifest in a particular place. And upon this realization, I realized that a more useful political contribution might mean historically contextualizing the relentless counting by outside organizations of sexually active Puerto Rican women and girls and resistance to chemical fumigation, as well as to theorize how both reproduction and public health in Zika in Puerto Rico are about much more than the virus. The conversation with Julia, as well as attending anti-PROMESA events, made me think hard about what kind of an analysis I could offer, especially as a U.S. mainland subject. Throughout I worked in the gap between official external reports on debt and disease and what ordinary people in San Juan were saying. For example, I arrived in San Juan just after the chemical controversies that would become the subject of Chapter 3. This was useful because people were still talking about it, so my first task was to reconstruct the controversies. What did people think about the use of synthetic chemicals Deltamethrin and Naled as a Zika intervention strategy on the island? I asked people and became

an active observer on Facebook and Instagram pages, for much of the controversy broke over social media. I knew nothing about the chemical controversies before I arrived, and this ignorance was useful; indeed, that they were scantily reported, if at all, in mainland and international news media was a testament to my rationale for examining Puerto Rican sovereignty anew.

The reader may wonder why I did not try to interview Z-CAN participants for a fuller sense of their experiences of IUD provision. There are several reasons why I did not. Without prior connections or experience on the island, I felt it would be disingenuous to burst in, unknown, and try to pry into women's personal reproductive decision-making processes—especially in the wake of Hurricane Maria. Few women find interacting with medical apparatuses a pleasant experience, and I did not want to heap on the discomfort with further questions. There would be ways to do this respectfully, I think, but they would require a longer-standing relationship with people on the island, and I feel like I have only just started. I also had found a preexisting digital archive of women's doubled-edge experiences of Z-CAN with which to work. This archive, in which women shared positive and negative experiences of the program with one another, posing and responding to queries about program stipulations and barriers to reproductive care, reflects the long history of women's DIY and community knowledge-making on contraception and abortion (Federici 2004; Murphy 2006), which today is most often constituted online (Calkin 2019). And finally, methodologically centralizing one-off interviews at the point of Z-CAN consultation or soon after having an IUD fitted would miss the point entirely: I have been concerned with expanding the temporal bounds of LARC analysis; the objective of Chapter 4 was to outline the lives of contraceptive implants beyond the moment of “choice.”

Three concerns run through my reflections on the composition of this dissertation. First, in identifying a biopolitical logic that located Puerto Rican women and girls as the hinge between the Zika virus and the future of the U.S. population, I have run the risk of reducing women to victims of that logic. Indeed, one of my primary objectives in focusing on Zika intervention by U.S. government agencies was to show the ways intervention was *damaging* to women's health and women's lives. In *Health Rights are Civil Rights*, Jenna Loyd (2014 :14) draws out the

expansive understanding of health of various Los Angeles-based social movements, understandings which frame healthcare “proper” as only one element in a broad philosophy for “individual and collective bodily self-determination.” I like this definition, and I do believe that chemical vector control and LARC provision each in their own way threatened Puerto Rican individual and collective bodily self-determination. And yet, as I have also taken care to show, expert logics were countered by Puerto Rico’s own scientists, who, along with many ordinary people, seized on the island’s contradictory geography as a site of struggle. Just as there was a geography to the extension of state power in the name of U.S. biosecurity and future financial stability, so too was there a geography through which this extension was contested, and a biological and social reproductive force that exceeded it.

Second, in analytically foregrounding the ways in which Puerto Rican women have been apprehended by demographers, ethnographers, health economists, and public health officials, I have participated in flattening Puerto Rican women into another kind of “undifferentiated whole.” My arguments across the chapters must be nuanced by Yarimar Bonilla’s (2018) recurrent reminder in her public writing that Puerto Rico is one of the most unequal societies in the world. Most women in Puerto Rico are working class, and under recent austerity measures and then in the shadow of Hurricane Maria, they become much more economically precarious. A very small slice of the population, however, is very, very rich, and benefits from the island’s position as a U.S. tax shelter and connections to opportunities on the mainland. Elite white women in Puerto Rico, among whom I count both women of Puerto Rican heritage and the new Puertopian generation, were not subject to the covert house fumigations carried out by a WIC-CDC partnership, nor was their access to reproductive health services constricted by austerity in the same way as was that of working-class women. Aerial fumigation did not happen, yet I speculate that had it happened, Naled would not have been released over the elite neighborhood of Condado, where a fruit smoothie made with local bananas and mainland berries will cost USD \$9. The lived complexity of the binary of U.S. citizenship (or U.S. government) and Puerto Rican sub-citizenship demonstrates the need for further analysis of the racial and class character of non/reproduction that is analytically and politically open to the ways in which the

reproductive capacities of some women in some places are measured, modeled, and meddled in as a means of improving the future lives of others, far away or next door.

Third, I have been concerned about the distance I myself may appear to be from the analysis, when in fact much of my labor of research and writing was bound up with reflection on the ways in which my reproductive body was coded differently than the women targeted by domestic chemical fumigation or birth-control intervention. My social location as white, U.S. mainland, mobile, (and, I might venture to add, in a visibly heteronormative partnership) meant that my reproductive capacities were not freighted with significance in the same way as those of working-class Puerto Rican women. How I modulated my body vis-à-vis mosquitoes was not cause for the coerced chemical fumigation of my home. My body was not split into two parts by U.S. government agencies, one the reproductive capacity that was the central site of public health analysis and intervention, with another part, the part that eats and sleeps and works and cares for others—the socially reproductive body—abandoned by the state. (Another way of phrasing this is that like most white U.S. American women, I have worried about access to birth control and abortion across all of my adult life, but I have never worried about those things being *forced* on me.) My interest in Zika broadly, and Zika in Puerto Rico specifically, stemmed from my desire to understand feminism better, to *write feminism better*, and as I near the end of this project, I continue to struggle with the foregoing concerns, as well as the question of how much information about my own fraught navigation of state and para-state reproductive healthcare infrastructures in the time of Zika I should have included.

Having composed an argument on the positioning of women's reproductivity amidst evermore turbulent more-than-human life in the realm of expertise and intervention, one avenue through which I could develop this project in postdoctoral work would be to delve headlong into women's ruminations on the dynamics of "responsibilization." Methodologically, this would entail deep, reflective interviews with a small number of women, perhaps from La Colectiva Feminista en Construcción, with the objective of thickening, testing, and tinkering with this argument. I envision oral histories bookended by the declaration of a local public health emergency and Hurricane Maria's landfall, perhaps, that would hopefully spiral out into the

broader ruminations on the changing politics of reproduction—and I would include more of my own experience in this potential strand of future research and writing.

The aim that infused the narrative in full was political—to contest the subsumption of women by experts into a “geography of blame” (Farmer 1990) and to think carefully and critically about new framings of reproduction. I wrote a story about Zika and Zika intervention that spiraled out of the normative spaces associated with healthcare, reproductive or otherwise. I took public health expertise on, slowing down to show how it was constructed and the effects of its construction. I took the geography of Puerto Rico and its imbrication with U.S. law seriously. If at times I sacrificed the granularity of everyday life on the island, I did so in favor of granularity of analysis of how both science and sovereignty worked to produce a geography of gendered blame enfolded in more-than-human worlds in flux. Let me restate the coordinates of this geography.

## **6.2 Paradoxes in closing**

The emergence of a new form of the Zika virus raised the stakes of human vulnerability to volatile twenty-first century nature with its capacity to shape the human fetus. Not only did the Zika public health emergency strike at longstanding fears over limited healthcare funds and the permeability of nation-state borders to infectious disease, but also emergent fears over what is imagined to be an ever-unrulier nonhuman world. While at first glance the Zika public health emergency promised to foster ethical recognition of women across borders, the expansion of access to birth control and abortion, and of the mastery of disease-bearing mosquitoes, Zika was racialized as a problem of tropical bodies and environments. The calling of international, national, and philanthropic public health infrastructures into action was driven by fear of the non-sovereignty of human bodies and the non-sovereignty of states—especially powerful states in the Global North like the United States, which straddles temperate and tropical climates in consequential ways.

The recognition of non-sovereignty, however, was tied to attempts at reinscribing corporeal and state sovereignty through the anticipatory governance of environmental and sexual circulations.

The management of Zika's biological uncertainty in Puerto Rico was conditioned by U.S. sovereignty. U.S. political discourse and public health expertise mapped the island as both inside and outside the United States. Because of dual position as inside the territorial border of the United States and a tropical island with active local Zika transmission, Puerto Rico was inside the United States in the "public feeling of risk circulat[ing] between experts and broader publics" (Ahuja 2016: 5), and in chemical vector control and birth control provision, women and girls on the island were spatialized as the threshold between the agency of the Zika virus and its mosquito carriers and the future of the U.S. population. I mean this future in both embodied and disembodied senses. Microcephaly exemplifies the capacity of extra-human nature to shape and mold the human form and carries with it unknown but impending debits to the national economy, in terms of body cost of care and lost productivity. The island was thus *incorporated* into the U.S. nation through an imaginary of biological vulnerability—despite its official status of "unincorporated territory." This contradictory, inclusionary-through-exclusion production of the island has had profound consequences for ordinary people on the island, women especially. This is how Puerto Rico was mapped as *outside* the United States in an ethical sense: public health interventions were planned and sometimes realized without the consent of Puerto Rican authorities, much less the working-class majority on the island.

The clearest expression of the reduction of Puerto Rico to a public health and economic risk to the mainland was coercive and deceptive forms of vector control as the central Zika management technique of the CDC. Women and girls were the focus of chemical vector control, targeted especially through U.S. government food assistance. When they were perceived to fail in regulating their bodies and homes in relation to *Aedes aegypti* mosquitoes, the CDC engineered a plan to aerielly fumigate the island with Naled without the consent of the local government, with unknown health and environmental consequences.

In exploring how chemical vector control worked, I reformulate the "laboratory" image for describing and understanding the relationship between the United States and Puerto Rico, employed by mainland scholars, Puerto Rican scholars, and ordinary people in Puerto Rico alike. I encountered the characterization (and condemnation) of the island as a U.S. government

laboratory first through conversations about the movement against Naled, where proclamations that the island should not be a laboratory – and its people should not be used as guinea pigs – were a common refrain. Later I would link this up with the scholarly use of the concept (Lapp 1995; Berman Santana, 1996; Briggs 2002; Beal 2008) and read Puerto Rican medical anthropologist's Adriana Garriga-López's (2016) impassioned public statement on Zika. Here is an excerpt:

...we, as a group of experts on the region call on the U.S. federal government and the CDC to do more than just conduct experiments and issue recommendations with regards to Zika virus in Puerto Rico. The United States has responsibilities to Puerto Rico beyond using the island as a live laboratory. Zika in Puerto Rico is more than just a threat to U.S. public health on the continent. Puerto Rican lives matter.

In the end, though, while chemical intervention was both coercive and potentially dangerous, and while both chemical and birth control intervention was structured by historical legacies of experimentation on Puerto Rican women's bodies and Puerto Rican ecologies, I have also posited the relationship between the political/physical geography of the island and mainland vitality in the Zika public health emergency to be more complex than that of a laboratory. A laboratory implies conscious and perhaps cruel *experimentation* on "test subjects." In the case of chemical fumigation I found a more subtle logic of "responsibilization" at play, which had much more to do with disciplining people's conduct than with testing this or that synthetic chemical, and in Z-CAN I found a historically conscious program attuned to the logistical difficulties Puerto Rican women face in acquiring LARCS on the island. My reticence to make "laboratory" a central analytic for U.S. government Zika intervention in Puerto Rico, however, must not be confused with a suggestion that everything was well and good with public health. Instead, I have considered the health problems posed by systems of interventions that are not involved in active experimentation. The point, as Foucault argued, is not that "everything is bad," but rather that "everything is dangerous" (quoted in Rabinow and Dreyfus 1983: 343).

The story of chemical vector control in Puerto Rico bridges infectious disease control through biosecurity, reproductive health, and chemical geographies, the politics of which are often held apart. Their convergence offers new insights on the way some women in some places are turned into intervenable objects in contemporary biosecurity knowledge, allowing richer theorizations of the long-term health consequences of biosecurity practice. It also points to some uncomfortable ethical ground that I left unglossed here but would like to explore in my future work: resistance to chemical fumigation on health and environmental grounds, was in my view, tightly and anxiously linked to fantasies about “normal” bodies and “pure” human reproduction (Shotwell 2016; Agard-Jones 2013; Murphy 2017b).

The reduction of Puerto Rican women public health and economic risk was also evident in the rapid distribution of LARCs as a Zika management technique, in which the obvious physical and emotional benefits of expanded access to birth control options may have been wrapped up in eugenic effects. These effects cannot be separated from the lived experience of U.S. government abandonment through austerity and in the wake of Hurricane Maria. The expert discourse of debt restructurers is disembodied, with the basic building blocks of everyday life-making—food, transportation, electricity—compressed into credit and debt columns; the expert knowledge buttressing birth control-based Zika intervention, by contrast, was heavily populated with bodies. What are we to make of this?

Broaching this question extends feminist work on reproductive interventionism in three ways. First, it signals the profound role the politics of global heating and environmental change can play in generating public health and other expert recommendations about cost-effective interventions in reproduction “elsewhere,” all the while eclipsing North-South political and economic inequalities. If, as Kalpana Wilson [2015: 809] argues, the “hyperindustrious entrepreneurial ‘girl’ from a low-income household in the global South” is “a central trope of twenty-first century neoliberalism,” this same ‘girl’ is a central trope of twenty-first century climate change. Second, it suggests—though this suggestion is, I concede, very much tentative—that we are witnessing a turn back to a more explicit rhetoric of eugenics in the discourse of these experts, and that this turn is related to the above ecological politics. This mutual invigoration of

eugenicism and environmentalism warrants further feminist scrutiny. Finally, it links the lived experience of austerity and the “economization of life” for those women made into objects by experts. None of this is to say that the intentions of public health and other experts were nefarious, but I think the logic of Z-CAN—especially its relentless focus on the number of sexually active women and girls on the island—evinced the cleaving off of the reproductive body from the social reproductive body. The latter was deserted by austerity as the former was focalized as a site of national public health concern.

Both of the Zika management tactics I examined here sited the bodies of young women and teenage girls as the threshold between the dense agency of the Zika virus and the future of the population. It is this siting that sets up the blaming of Zika’s social problems on women and girls and the reduction of their personhood to reproductive bodies to be measured, managed, and intervened in. I want to postulate that this siting of women and girls in tropical locations as the transfer point between intractable extrahuman natures and the future of the human population is not limited to the Zika virus. Becky Mansfield (2012) has already named and theorized this dynamic at work in managing the problems of contaminated water systems in the United States: pregnant women, positioned as the threshold between a wider polluted environment and the health of the population, are urged to carefully modulate fish consumption to protect the fetus. Such a biosecurity regime reduces the problem of contamination—a problem with surefire connections to industrial practices—to one of women’s conduct. With Zika, I showed it at play in a wider imperial geography, in which women were not only urged to behave in certain ways but were chemically threatened by U.S. sovereign power for not doing so.

And it is at work in suggestions to address climate change by providing condoms and other forms of contraception to women and girls in the Global South. On the basis of the story I have unraveled here, another avenue along which I would like to extend my work is in these emergent discourses on climate, scarcity, and reproduction. I can think, for a start, of tracing a genealogy of the biopolitical logic I have identified here back through “Girl Effect” development discourses (e.g. Wilson 2015); mid-twentieth century expertise on reproduction, food, and global space as related to U.S. security (e.g. Bashford 2014); the eugenics movement; calculated interventions in

women's bodies related to the plantation slave economy, including rape; and the use of Malthus, Darwin, and other scientists of human reproduction/development and "nature." Such research would be politically expedient because both climate and human reproduction are fractured along racial and geographical lines. While environmentalist expressions of this logic have multiplied in recent years, my intuition says that the making of women into "thresholds" between extra-human nature and the human population, framed variously in terms of national biological fitness or national economic vitality, both expressed through the logic of averting disability or the future of the human as species, is not strictly "new."

The perceptive reader will note a paradox running through this dissertation. On the one hand, I have insisted upon the bodily autonomy of women: to be free to have sex, to be free from coerced sex or rape, to have full access to the range of contraceptive technologies, to be free from coerced contraception or chemical fumigation. I have insisted upon, in other words, a bounded and sovereign female subject, whose behavior must not be blamed for the problems of the Zika virus, whose body must not be made intervenable in the name of the Child's corporeal normalcy, or the economic vitality of Northern nations. On the other hand, I have insisted on the embedment of the politics of reproductive health in broader political ecologies and economies. One of the things I have sought to do in this dissertation is to unyoke the concept of reproduction from "the two-by-two of the Biblical flood, a sanctification of a conjugal couplet rather than, say, a group" (Povinelli 2006: 181). Instead of accepting the cast of characters and plotlines bequeathed to me by global media coverage of the of public health emergency—heterosexual sex, pregnant women, and babies with microcephaly—I worked with a more expansive vision of reproduction. Mosquito reproduction, viral replication, the reproduction of ecological systems, and social reproduction joined vertical gene transfer and human pregnancy in my story, but perhaps more importantly, I attended to the ways Zika management was imbricated in processes that were at once biochemical, social, and geopolitical.

Note the tension! I am demanding women's autonomy in reproduction, positing reproduction as a collective socio-ecological process, and rejecting the reduction of women to this process. In the end, I have learned that there is no way out of this tension. But I have also learned that it is a

tension unevenly distributed across space and amongst lives, as are its consequences. Embedded in a vast, dense, and dynamic web of biological interdependencies on the dynamic geological formation that is Earth, reproduction is cast as a matter of choice and self-actualization to women in privileged social locations, while for others it is aggregated and redirected into questions about economic and ecological futures. It is vital that feminists work through these two readings of reproduction in the years to come, for it is my sense that these are not opposed, but that they are related to each other in complex and consequential ways.

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