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“Pandemias Políticas: The Effects of Political and Social Instability on Infectious Disease Epidemiology in Latin America”

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**“PANDEMIAS POLÍTICAS: THE EFFECTS OF POLITICAL AND SOCIAL
INSTABILITY ON INFECTIOUS DISEASE EPIDEMIOLOGY IN LATIN AMERICA”**

By:

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of the Requirements for
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ABSTRACT:

This paper seeks to analyze the relationship between political and social unrest and conflict and infectious disease epidemiology in Latin America. An analysis of published literature regarding epidemiological, biomedical, political, and historical content was conducted to highlight potential connections between infectious disease epidemics and sociopolitical conflict in the region. Specific analyses of Smallpox, Venezuelan Equine Encephalitis, Chagas disease, Cholera, Dengue, and COVID-19 were conducted, in an effort to uncover the sociopolitical context of epidemics of these infectious diseases. Results of this analysis depict a necessity for further research into public health and disease control mechanisms during times of conflict and can provide valuable insight into the effects of political and social unrest on infectious disease epidemiology for further prevention and mitigation strategies. In summary, the negative effects of sociopolitical violence and unrest are well accounted for, yet do not take into account the economic and medical impacts had on human lives, citing the need for further research and prevention strategies.

INTRODUCTION:

Latin America, in its definition, refers to “the part of the American continents south of the United States in which Spanish, Portuguese, or French is officially spoken,” however, the region is more commonly referred to as Central and South America and the Caribbean islands. In the pre-colonial era, societies such as the Inka, Aztec, and Mayan people, among many others, existed in an intricate political and social order. While these societies were not entirely harmonious, political and social conflict in the region as it is known today ultimately came to fruition in the

Columbian and post-colonial time era. With the onset of European colonialism, the destruction of political, social, and cultural order ensued. This colonialism also established cultural and linguistic connections, many of which are still in place today. Coupled with the arrival of European colonizers, the spread of infectious diseases in Latin America ran rampant, serving to decimate large portions of indigenous populations (Pimenoff, Houldcroft, 2021). From colonialism to modern-day dictators, social and political unrest have water colored the background of Latin American history. The economic, social, and political impacts of this violence are plentiful, yet the impacts of this violence on human health, specifically regarding infectious diseases, are not well understood.

Infectious diseases refer to “disorders caused by organisms — such as bacteria, viruses, fungi or parasites... Some infectious diseases can be passed from person to person. Some are transmitted by insects or other animals” (Mayo Clinic, 2021). Many of the most common infectious conditions in Latin America can be defined as neglected tropical diseases, affecting some of the world’s poorest populations and causing significant morbidity and mortality, yet overwhelmingly under-researched and underfunded in the global health sector. While not all diseases to be described in this paper are neglected tropical diseases, there still exists a wide gap in the analysis of sociopolitical influences on infectious disease epidemiology in the region. To effectively analyze infectious disease epidemics, one must effectively analyze the biotic and abiotic conditions of a region in which an epidemic occurs. These conditions include the political and social contexts, culture, and healthcare systems, among others.

This paper seeks to understand the intricate relationship between infectious diseases, including Smallpox, Venezuelan Equine Encephalitis, Chagas disease, Dengue, Cholera, and COVID-19, and the effects of political and social unrest, in the region. Social determinants of

health are known to contribute to infectious disease epidemiology; however, the larger forces of these determinants has not been elucidated. Sociopolitical unrest and conflict can have impacts on more commonly thought of social determinants of health, such as socioeconomic status, education access, healthcare funding, housing and food security, and more. This relationship is especially intricate in Latin America, where infectious disease distribution and impact can be linked to social, political, and economic stability, as will be discussed further. To effectively analyze this relationship, a historical context for infectious disease outbreaks and social instability must be provided. This historical context can be traced back to the conquest and colonization of Latin America, with the outbreak of smallpox extending to the present day, in the wake of the COVID-19 pandemic. Analyzing infectious diseases through a historical and epidemiological lens will allow for a better understanding of the roles in which social and political structures play on human health, and allow for the creation and implementation of effective prevention and intervention strategies.

SMALLPOX:

The impact of social and political unrest on infectious disease in Latin America cannot effectively be analyzed without beginning in the colonial period. It can be argued that the inception of political and social unrest in Latin America was through European conquest and colonization, inciting further destruction through infectious disease epidemics. In the pre-Columbian period, the region was no stranger to infectious diseases, such as gastrointestinal infections and tuberculosis (Darling & Donoghue, 2014). However, it was through the introduction of foreign infections, through foreign conquistadors and the colonizers who followed, that political unrest drove epidemic infections.

Of the many epidemics during this time period, smallpox was the most destructive and deadly (Alden & Miller, 1987). Caused by infection of an Orthopoxvirus, a variola virus, smallpox is one of the deadliest infectious diseases known to man and has impacted populations globally (Ellner, 1998). Smallpox is spread through the respiratory tract, with most infections resulting from inhalation of viral particles from an infected individual (Ellner, 1998). Symptoms of smallpox begin after a 7-14-day incubation period, after which fever, malaise, vomiting, and body-wide epidermal pustular rash and edema can occur, and in rare cases, hemorrhaging (Cleveland Clinic, n.d.).

While an exact figure of the pre-Columbian Aztec population cannot be determined, a large-scale depopulation occurred in the Aztec region, known today as Mexico, in the decades following Spanish conquest and colonization, much of which is thought to be attributed to smallpox infections among non-immune populations (Brooks, 1993). Unlike previous epidemics in the region, the smallpox epidemic was extremely deadly, “sweeping over the land like fire over the prairies, smiting down prince and peasant...leaving its path strewn with the dead bodies of natives...[who] perished in heaps...” (Brooks, 1993). In modern epidemiological terms, the smallpox epidemic in Latin America, and the ensuing fatalities the infection caused, were a result of infection of a “virgin soil population,” or a population that has had no contact with a disease and is “immunologically defenseless” (Brooks, 1993). As Brooks notes, the specificities of this thesis are not entirely without flaws, however, there is strong reason to believe that the smallpox epidemic in Latin America was a result of political unrest through colonization.

The widely accepted theory is that smallpox was brought to the New World in the early 1500s, by European conquistadors, and later through the West African slave trade, resulting in epidemics in modern-day Mexico, Guatemala, Brazil, and Peru (Ellner, 1998). A similar

hypothesis of the spread of smallpox exists by way of the West African slave trade, specifically through in Brazil. Introduction of Smallpox in West Africa by European colonization, and later the forced transport of enslaved peoples is thought to have contributed to the initial Smallpox epidemic in Brazil (Alden & Miller, 1987). The conditions subjected to those forced into the slave trade, such as close quarters, malnourishment, and general inhumane treatment would have provided ample opportunity for the smallpox virus to spread rapidly among enslaved people being brought to Brazil, and in Brazil, once interactions with indigenous peoples in the colonial slave system were enacted (Alden & Miller, 1987). In addition to the obvious ethical and humanitarian issues of colonialism and slavery, it is of particular interest to analyze the effects of these institutions, and their effects on social and political structures, on epidemiological trends.

The effects of smallpox were two-fold, affecting both political order and epidemiology: political unrest, in the form of social upheaval and conquest, exacerbated the effects of the disease and allowed for less resistance to the conquest and colonization by Iberian conquistadors. Throughout the Colombian and colonial period, social, political, and economic violence were subjected to indigenous Latin American societies, including physical violence by way of infectious disease and slaughter. In 1542, Dominican Friar Bartolomé de Las Casas cited “the establishment of colonial rule as an uninterrupted chain of massacres, torture and atrocities of all kinds leading to depopulation and annihilation of indigenous cultures” (Gabbert, 2012). These atrocities and depopulations are not only in reference to acts of warfare but must also take into consideration the profound mortality of smallpox and its epidemiology. The effects of colonialism on not only Latin American societies, but also those in West Africa and the subsequent slave trade between the regions illustrate the epidemiological impacts political and social upheaval has had on Latin America, that has persisted throughout the modern-day.

VENEZUELAN EQUINE ENCEPHALITIS:

Venezuelan equine encephalitis [VEE] is a mosquito-borne disease of the arbovirus Venezuelan Equine Encephalitis Virus, which is endemic in Latin America, affecting both zoonotic and human populations (Crosby & Crespo, 2021). The literature shows that “spillover” from zoonotic infections of rodents and mosquitoes can lead to human epidemics of VEE, with similar clinical manifestations presenting in humans as in animals (Crosby & Crespo, 2021). For the purposes of this paper, the impacts of VEE on human populations will be analyzed, however, zoonotic monitoring is essential in the prediction and control of human outbreaks. The pathology of the disease can be characterized by depletion of lymphocytes, interstitial pneumonia, and symptomologies such as inflammation of muscles and the upper respiratory tract, with general flu-like symptoms such as headache and malaise (Crosby & Crespo, 2021). Infected children are more likely for severe infections and long-term effects of VEE infections (Crosby & Crespo, 2021).

As can be deduced from its moniker, the disease was first isolated from the brain of a deceased horse, in Venezuela, in 1938, however, it is thought that the disease had been reported throughout South America, under the name “peste loca” through the 1920s (Aguilar et al., 2011). Disease outbreaks in equine species have been reported from 1935-1946 in Venezuela, Trinidad, and Colombia, however, the disease was isolated from humans in Colombia, in 1950 (Crosby & Crespo, 2021). From 1950-1971, VEE outbreaks were reported in Colombia, Ecuador, El Salvador, Guatemala, Mexico, and in Southern Texas (Aguilar et al., 2011). The disease re-emerged in Venezuela in 1992, with subsequent equine outbreaks in Mexico and Colombia from

1993-1996 (Aguilar et al., 2011). While these equine outbreaks are of concern for human transmission, as stated previously, this analysis will focus on human outbreaks of VEE. The most recent suspected outbreak of VEE took place in Colombia, in 2008 (Guzmán-Terán et al., 2020). Despite its name attribution to Venezuela, a large constituent of VEE outbreaks have occurred in Colombia, Guatemala, El Salvador, and Mexico. As such, the social and political contexts of these nations preceding and during these outbreaks may shed light on epidemiological causation and VEE reemergence throughout Latin America.

In 1952, the first reported human outbreak of Venezuelan Equine Encephalitis occurred in Espinal, Colombia (Sanmartin-Barberi et al., 1954). The outbreak occurred in the Magdalena valley region, a rural area with a horse and cattle breeding economy (Sanmartin-Barberi et al., 1954). In the initial report, published in 1954, it was stated that the true incidence of the disease was difficult to measure as a result of underreporting and lack of access to high-quality health care (Sanmartin-Barberi et al., 1954). Prior to this study, it was not believed that VEE could result in human infections due to a lack of epizootic transmission. In their report, however, Sanmartin-Barberi et al., describe that “VEE virus is capable of originating human epidemics under natural conditions.” This was the first confirmation of VEE occurring in the human species and displayed the need for further examination of febrile diseases in tropical and subtropical climates for potential viral (later defined as vector-borne) transmission. This outbreak was important for two reasons: as the first human VEE epidemic, it served as a baseline for comparison in future epidemiological studies and also provided the possibility of epizootic transmission to humans. In the historical context, this epidemic was in the thrush of the beginning of sociopolitical violence in Colombia. In the wake of independence movements in the 1840s, the formation of the Liberal and Conservative parties in Colombia incited a deep-rooted

animosity between parties' supporters (LeGrand, 2003). Moving into the 1930s and 1940s, unlike many neighboring nations, Colombia did not see an ascent of a populist party, however in 1946, the period of social and political violence, known as "La Violencia," began (LeGrand, 2003). Often attributed to the murder of Liberal populist Jorge Eliécer Gaitán in Bogotá in 1948, violent urban riots and rural warfare began (LeGrand, 2003). Throughout this time period, paramilitary groups in rural areas, representing their political parties fought in guerrilla warfare, resulting in a complete breakdown of the Colombian state (LeGrand, 2003). The period known as La Violencia is marked by sociopolitical conflict, warfare, and fatalities. Fought largely in rural areas by paramilitary guerrilla groups, this war was of the people, who ultimately suffered as a result. The impacts of La Violencia on human life are profound. Cited to be one of the leading public health problems in the nation, violence in Colombia has taken an immense toll. The impacts of this violence on human life through the study of infectious diseases have not been made clear. It is logical to assume that during La Violencia, vector monitoring and public health initiatives were not a priority. However, ignorance of public health measures may have contributed to further loss of life, and been a causative agent in the breakdown of the Colombian healthcare system. It is not unlikely that social conflict in rural areas and unrest in urban areas contributed to a breakdown of sanitation and health systems in Colombia, thus allowing for opportunistic transmission of vector-borne diseases such as VEE, through the epidemic seen in 1952.

Following the first known human infection of VEE in Mexico in 1962, there was a major VEE outbreak in Central America, namely, Guatemala and El Salvador, which spread to Southern Mexico, infecting tens of thousands of humans throughout the region from 1969-1972 (Estrada-Franco et al., 2004). Analysis of the historical context of Central America in the late

1960s and early 1970s presents the creation of an environment in which infectious disease transmission was ideal. In 1960, the Guatemalan civil war began- marking the beginning of a violent, 36-year-long conflict in the nation (Public Broadcasting Service [PBS], 2011). In November 1960 a military coup took place against the Guatemalan government led by General Miguel Ydígoras Fuentes, thus creating the Guatemalan revolutionary movement and counterinsurgency state (Ball et al., 1999). Later, in 1966, the election of Julio César Méndez Montenegro further propelled the nation into military rule and instigation of violence through mass disappearances and arrests, and indiscriminate attacks on civilians and military members alike (Ball et al., 1999). These obvious crimes against humanity and human rights violations caused thousands of deaths, however, their impact on infectious disease control and general health policy is not well understood. Throughout the civil war, little to no healthcare systems were in place in the nation, therefore, no monitoring of vector-borne diseases (such as VEE) was taking place. This lack of monitoring and control in Guatemala, due to the political and civil unrest taking place creates ideal conditions for infectious disease outbreaks in the region. In the late 1970s, a mass exodus of Guatemalan refugees began toward the neighboring nation of Mexico (Jonas, 2022). It cannot, however, be assumed that there was not a refugee crisis occurring the years prior, potentially contributing to VEE outbreaks in Mexico in the early 1970s. While definitive contexts of these outbreaks have yet to be determined, a very likely suspect exists in the unrest caused by the Guatemalan Civil War. According to the Center for Justice and Accountability [CJA], an estimated 200,000 deaths and disappearances occurred during the Guatemalan Civil War (CJA, n.d.). This figure, however, fails to account for the potential epidemiological impacts on infectious disease-related deaths associated with the conflict, and immeasurable damages socially and politically.

CHAGAS:

Chagas disease, also known as American trypanosomiasis, is caused by a parasitic infection by the protozoan *Trypanosoma cruzi*, most commonly found in Latin America (Rassi et al., 2010). Thought to have been endemic in Latin America, a condition similar to Chagas disease was described under the name “Bicho,” in 1707, in a book authored by Miguel Diaz Pimenta, a Portuguese physician (Steverding, 2014). The first case of the disease in humans was officially discovered in 1909, by the Brazilian bacteriologist, and namesake, Carlos Chagas, and has remained endemic throughout Latin America as a result of vector transmission (Dias et al., 2002). Vector-borne transmission is most prominent in rural areas, many of which lack infrastructure, and serve as ideal environments for vector reproduction, however, in more recent years there has been substantial evidence of infections through blood, organ, or tissue donation, from infected, asymptomatic individuals (Monteiro da Costa et al., 2021). Affecting millions throughout Latin America, Chagas disease has no known preventative vaccine and is only curable by chemotherapy, which has varied efficacy based on infection stage, patient age, and specific parasite strain (Monteiro da Costa et al., 2021). The World Health Organization [WHO], cites symptomatology of acute Chagas infection as skin lesions, swelling of the eyelid, enlargement of lymphatic glands, chest pain, muscle pain, fever, and others, lasting for approximately two months following initial infection (WHO, 2021). The second phase of infection, the chronic phase, has been associated with a high parasitic load in cardiac and digestive muscles, resulting in chronic cardiac, digestive, and neurologic disorders (WHO, 2021).

Prior literature has demonstrated strong associations between Chagas disease and socioeconomic status, however, the impacts of social and political conflict on Chagas disease transmission have not been fully elucidated. In the years following the disease's discovery by Chagas, research stopped as a result of conflict between Brazilian scientists and politicians (Steverding, 2014). However, in the 1930s, an outbreak of Chagas disease in the Argentine Chaco reinstalled an interest in researching the condition and attempting control strategies (Steverding, 2014). Some political and public health interventions have attempted, and somewhat succeeded, to reduce the morbidity and mortality of Chagas disease in Latin America. Beginning in the 1940s, housing improvement and vector control initiatives via insecticide spraying proved successful in Brazil, Argentina, Venezuela, and Chile (Dias et al., 2002). Following 1970, nationally funded Chagas control initiatives grew in popularity, with the social effects of Chagas and its control serving as campaign points, among political campaigns in Brazil and other nations (Dias et al., 2002). While these initiatives have reduced the disease burden, the impacts of political and social conflicts on Chagas disease transmission must be better understood in order to most effectively control disease transmission. Political interest in Chagas has served as effective motivation for control programs in the past, and further analysis of this relationship will enlighten additional effects (Dias et al., 2002).

In Argentina, specifically in the Argentine Chaco, Chagas disease has especially burdened impoverished and indigenous communities, who are of low socioeconomic status (Fernández et al., 2019). This outbreak was first reported by Salvador Mazza, an Argentine physician and epidemiologist, who reported more than 1000 cases of Chagas disease in the region, in the early 1930s (Steverding, 2014). The social and economic conditions in the region at the time are of particular interest in the analysis of disease epidemiology. Under the influence

of Spanish colonization, the Chaco region was largely subject to the labor and religious influences of the Spanish monarchy, through *encomienda* and missionaries, respectively, with especially strong missionary influences in the region throughout the 18th and 19th centuries, until the eventual success of the Argentine independence movement in the mid 19th century (Gordillo & Hirsch, 2008). Through decades of civil war between the newly autonomous Argentine government and “barbaric” indigenous tribes in Chaco, indigenous groups were continually losing power, lives, territory, and influence in Argentine society and government until the large-scale expansion of the Argentine government in the early 20th century (Gordillo & Hirsch, 2008). In the years following the liberation of the Argentine state, large-scale installation of a national and international capitalist economy, with influences from European and United States governments took place, specifically in the agricultural and forestry sectors (Girbal-Blacha, 1993). In the 1930s, when a Chagas outbreak was first noted in the region, a capitalist economy had been installed. This economy, in the Chaco region, required a large influx of indigenous laborers, many of whom migrated seasonally until eventually becoming residents of the Chaco region in the 1930s (Gordillo & Hirsch, 2008). In the early 20th century, the passage of the Sáenz Peña Law, which allowed for redistribution of property rights and largely destroyed the middle class, as well as the 1914 election of populist leader, Hipólito Yrigoyen, of which shifted to a largely democratic governmental structure (Spruk, 2019). With the military coup and overthrow of Yrigoyen, in 1930, however, a period of exploitative and colonialist policies ensued, largely affecting indigenous populations such as those in the Chaco region, and beginning a long period of political corruption in Argentina (Spruk, 2019). This political and economic shift is of particular interest in its influence on Chagas disease epidemiology. Literature has shown that deforestation and other modern-day shifts in climate change have a large impact on vector-borne

diseases, such as Chagas disease (Burkett-Cadena & Vittor, 2018). With this shift to a capitalist economy, which was largely based on deforestation and agricultural sectors in the Chaco region, vector-borne diseases, such as Chagas disease, became more prevalent. Likewise, this period of transition and subsequent coup can be inferred to be a large part of the reason for a lack of public health infrastructure, and Chagas disease control and programming in Argentina, which persisted until the 1940s. Beginning in the 1940s, in the Argentine Chaco, and other Southern Cone nations in the region, there began large-scale insecticide programs, in an effort to prevent Chagas disease (Gaspé et al., 2018). The aforementioned fluctuating political interest in Chagas and public health programs in Argentina and Latin America as a whole contributed to the fluctuations in the success of these programs.

In 1991, the Southern Cone Initiative was launched- in an international effort to reduce Chagas disease and the economic and social impacts it has on the Southern Cone countries- Argentina, Bolivia, Paraguay, Uruguay, Brazil, and Chile, respectively (Schofield & Dias, 1999). This initiative has been, at large, successful in eliminating and reducing the economic, social, and medical burden of Chagas disease (Schofield & Dias, 1999). It is clear that the ever-changing politics in Argentina and the vested economic interests of Argentinian politicians has contributed to Chagas disease epidemiology in the region. However, through international interventions and collaborative public health initiatives, the disease burden can be mitigated, while in turn, supporting economic growth in the region.

Another important feature to note of Chagas' modern epidemiological history is the shift from primarily rural epidemics to epidemics occurring in urban areas. This shift was especially prominent in Venezuela, in the capital city of Caracas. As of the early 2000s, Venezuela had an effective, centralized, Chagas disease control program, however, in 2007, a case of Chagas

disease was confirmed in a 9-year-old boy living in Caracas (Alarcón de Noya et al., 2010). Through serological testing and continued monitoring of 1000 exposed individuals, 103 cases of Chagas disease were confirmed in the outbreak (Alarcón de Noya et al., 2010). It was later hypothesized and supported that the infection was transmitted orally, through contaminated guava juice served at the children's school, symptoms of which presented differently than vector transmitted infections (Alarcón de Noya et al., 2010).

This Chagas disease outbreak, and subsequent outbreaks in the years following provide necessity for an analysis of sociopolitical context in Venezuela to determine potential causation. As previously mentioned, Chagas disease was controlled in Venezuela- as a result of both centralized disease control programs, and intergovernmental collaboration between various Andean and Southern Cone nations through the World Health Organization's Chagas disease elimination initiatives (Moncayo, 1999). Preceding the election of Hugo Chávez in 1998, Venezuela had been making strides toward democracy, and despite corruption among political elites through the 1958 *Punto Fijo Pact*, "huge increases in education, health, and other social services constituted the hallmark of Venezuela's subsidized democracy" (Sylvia & Danopoulos, 2003). However, following a failed military coup in 1992, and later, Chávez's 1998 election, authoritarian rule, and economic instability began in the nation, despite false promises of wealth redistribution, the opposition of colonialist economic exploitation, and uplifting of the poor (Sylvia & Danopoulos, 2003). Despite being temporarily removed from office in 2002 for allegations of his regime attacking opposition protests, Chávez remained popular among the middle-class and working classes in Venezuela, with promises of increased stability of the oil-based economy, thus providing greater social stability (Sylvia & Danopoulos, 2003). Promises such as free healthcare and wealth redistribution, which were part of Chávez's charismatic,

populist platform, were ultimately empty promises in light of economic downfall and further social instability (Hellinger & Spanankos, 2017). Following the oil crash of 2008, healthcare began to deteriorate rapidly through sanctions on food, medication, and medical equipment in the nation (Hellinger & Spanankos, 2017).

In the years following, this deterioration has sped up exponentially, with vector-borne virus transmission increasing exponentially (Ulmer, 2017). In a 2019 study, the high risk of Chagas disease resurgence in Venezuela (due to the ecological conditions favoring the vector lifecycle), in addition to the impacts of economic crises in the nation were shown to have contributed to the outbreaks taking place from 2007-2018 (Grillet et al., 2019). Following the oil crash of 2008, in 2012, the final year of Chávez's rule in Venezuela, Chagas disease surveillance and control programs had halted (Grillet et al., 2019). This study describes 16 outbreaks of Chagas disease in 2007-2018 alone, during the economic downturn and abandonment of public health monitoring programs (Grillet et al., 2019). While Venezuela continues to be in economic distress under authoritarian rule, epidemiological data from the last 20 years depicts the impact of sociopolitical instability and infectious disease. There is a logical connection between the authoritarian rule of Chávez and the subsequent ascent of successor Maduro, and increased Chagas disease transmission, after decades of control. As aforementioned, Chagas disease control programs have been successful in driving economic growth in Latin America (Schofield & Dias, 1999). There are a myriad of causes for the resurgence of Chagas disease in Venezuela, however, political instability, economic crises, and subsequent abandonment of successful control programs are certainly valuable environmental factors for further research to be published in the literature. The impacts of authoritarian rule on humanitarian and public health issues such as Chagas are essential in the study of emerging and re-emerging infectious diseases.

DENGUE:

Dengue, another vector-borne illness, spread by *Aedes aegypti* mosquitoes, is among the most common modern-day infectious diseases in the global south, including in various Latin American nations (WHO, 2022, a.). Dengue infections constitute a wide range of clinical symptoms and severity (WHO, 2022, a.). Symptomology of severe dengue is similar to flu-like symptoms, with severe dengue complications being potentially fatal (WHO, 2022, a.). In Latin America today, severe Dengue complications are among the leading causes of hospitalizations and death for adults and children alike (WHO, 2022, a.). With such a high incidence of disease and continued impact on global populations, Dengue monitoring and epidemiology remain important subjects of analysis. Thus, the impacts of social, political, and economic influences on Dengue transmission and epidemiology must be better understood.

Thought to have been brought to Latin America in the colonial period, dengue was well controlled from the early 1940s-1970s (Salles et al., 2018). Earlier methods of Dengue control (prior to the disease's laboratory isolation) were similar to yellow fever control methods, such as mosquito fumigation and destruction of mosquito foci (Braithwaite Dick et al., 2012). In the 1940s collaboration between the Pan American Health Organization [PAHO] and the Brazilian government began with the goal of mosquito prevention and control, in an effort to reduce yellow fever and Dengue disease burden (Braithwaite Dick et al., 2012). In 1947, Pan American Sanitary Bureau [PASB] began eradication programming in affected Latin American nations- which proved successful with large-scale eradication of Dengue in South America and some

Caribbean islands, and the creation of a vaccine based on the DENV-2 genotype (Braithwaite Dick et al., 2012).

Despite the large success of PAHO initiatives, further eradication occurred in only 3 countries from 1962-1972, and lack of political interest from nations that had achieved eradication (Braithwaite Dick et al., 2012). Through minimization of surveillance programs and rapid urbanization in the region, in addition to the lack of support politically, the PAHO initiative eventually concluded due to a lack of support (Braithwaite Dick et al., 2012). During the 1970s and lasting until the modern day, however, the re-emergence of the disease has proved to be a serious public health threat (Salles et al., 2018). A series of outbreaks took place in the years following 1972-2000, however, a 1980s outbreak in Cuba is thought to be the most severe of the time period (Braithwaite Dick et al., 2012). From 2000-2010, two major outbreaks occurred across the region, with the Pan American outbreak of 2002 largely taking place in Brazil, and a 2010 Pan American outbreak largely affecting Colombia, Venezuela, and Brazil (Braithwaite Dick et al., 2012). As recently as 2016, Dengue has continued to be endemic and causes high infection rates, with an outbreak taking place in Córdoba, Argentina (Rotela et. al., 2017). The continued presence of these outbreaks and the endemic status of Dengue necessitates further research into the intricacies of the relationships between political and social influences on disease transmission and control.

To effectively analyze the resurgence of Dengue, the breakdown of the PAHO initiative at the nationwide level must be examined. The first severe outbreak following the PAHO initiative breakdown was in Cuba, in the 1980s. Prior to the 1981 epidemic, there was a low circulation of the DENV-2 genotype in South America and the Caribbean, however, early in 1981 Dengue cases of the DENV-4 genotype were reported (Gúzman, 2012). From May-October

1981, upwards of 340,000 Dengue cases were confirmed in Cuba, resulting in 158 fatalities- the majority of which were among children (Gúzman, 2012). In the years following the Cuban Revolution and the installation of the United States embargo, severe trade sanctions prevented the import of U.S. produced medications and medical devices (Drain & Barry, 2010). However, by 1983, Cuban production of medical supplies and pharmaceuticals alleviated the medication shortages in the nation (Drain & Barry, 2010). The effects of foreign sanctions and the Castro dictatorship are potential sociopolitical influences on the 1980s Dengue outbreak. Under the Castro dictatorship, healthcare was well funded, with a large focus being placed on rural healthcare, and consolidation of healthcare resources under the Ministry of Public Health [MINSAP] (Sixto, 2002). While no healthcare system is perfect, that of Cuba has been largely successful in the elimination, control, and prevention of both infectious and chronic diseases. From its creation following the 1959 Cuban Revolution, Cuba's health system was designed with accessibility, cost efficacy, and reduction of health disparities in mind (Keck, 2021). These goals were accomplished- in the reduction of infant mortality, infectious disease mortality, and increased life expectancy (Keck, 2021). In 1960, the Cuban government had begun the process of universal healthcare coverage, and by 1970, further consolidation of healthcare in the nation took place through the creation of the Community Health Program (Sixto, 2002). Throughout the 1970s, leading up to the 1981 Dengue outbreak, policlínicos were established, transforming the model of care from emergency room utilization, to primary care (Sixto, 2002). This system of primary care created more long-lasting, community-based health services, better able to serve community members (Sixto, 2002). In addition to creating widely successful rural and urban primary care clinics, medical education in Cuba is highly lauded. Beginning in 1999, Cuba and Venezuela began a partnership to improve healthcare access in Venezuela through the

employment of more than 30,000 Cuban providers in the nation (Westhoff et.al., 2010). Interestingly, this partnership, and subsequent partnerships with other Latin American nations have been immensely beneficial in the prevention and control of infectious disease in the region. The impacts of this socialized healthcare system in Cuba on infectious disease and public health monitoring is seemingly counterintuitive- depicting that there were likely larger forces at play in the 1981 Dengue outbreak. Despite the success of this health system, in the latter years of the 1970s and early 1980s, the Cuban economy grew largely stagnant, and pleas for political asylum from the Castro regime were growing (El Gallo, 1980). In 1980, the Cuban government allowed non-revolutionaries to leave the country, inciting large scale emigration to the United States- the Mariel Boatlift. It can be inferred that despite successful and well-funded healthcare and health monitoring systems, economic downturn contributed to this Dengue epidemic. It must be noted, however, that following the initial outbreak in 1981, Cuban health officials responded swiftly and effectively, through the installation of an eradication campaign based largely on community participation (Gúzman, 2012). This epidemic triggered greater funding for medical and public health research, radically shifting the focus of Cuban healthcare to infectious disease control, from chronic disease control, until the later economic downturn (Gorry, 2019). Comparatively, the sociopolitical landscape of Cuba in the years preceding the 1981 epidemic, specifically in the healthcare sector, was well managed. However, this economic downturn subsequent social instability may have created an environment conducive to an infectious disease outbreak.

More recent Dengue outbreaks can be traced back to Pan-American outbreaks in 2002 and 2010, with mass infections occurring primarily in Brazil in 2002, and in Brazil, Colombia, and Venezuela in 2010. In the years between 2010-2017, 4.7 million dengue cases were reported, primarily occurring in Brazil (Salles et. al., 2018). As previously described, the breakdown of the

PAHO Dengue control initiatives can be assumed to be a contributing factor to these epidemics, however, the causes of this program's cessation are not well described. Healthcare reform in Brazil began in 1988, following the adoption of a new constitution that year, which codified health as a human right in the nation (PAHO, 2008). Following the adoption of this constitution, economic restructuring began in 1991, with free trade agreements between neighboring nations, and the introduction of a new currency in 1994- in an attempt to end hyperinflation (Ferderer, 1997). While this restructuring provided large-scale stability to the economy in Brazil, its impact on the health sector was profound. The rise of liberalization and democratic principles in Brazil was designed to help alleviate poverty and assist in stabilizing the nation's economy and political structure. This restructuring, however, served to be detrimental to the health sector, when in 1993, Brazilian social security ceased funding healthcare, leaving the sector to rely on the Brazilian national budget (Elias & Cohn, 2003). This transition in financial benefactors harmed healthcare funding- adjustment policies promoted and installed by the International Monetary Fund [IMF] resulted in a chronic lack of healthcare funding, with a drop from 77.7% of federal spending in 1980, to 53.7% in 1996 (Elias & Cohn, 2003). Likewise, while decentralization of healthcare services had provided more universal access to healthcare in the nation, financial instability and a lack of consistent funding served as obstacles to achieving universal health coverage. IMF structural readjustment, in theory, serves to increase access to social services, and alleviate poverty. However, in practice, these readjustments can often cause greater instability, and further, perpetuate the cyclical nature of poverty. In regard to the 2002 Brazilian Dengue outbreak, economic restructuring through IMF recommendations served to destabilize public health ventures, and thus, vector control programs.

The 2010 Dengue outbreak, which spread more widely to affect Colombia, Brazil, and Venezuela also had sociopolitical influences. In Colombia, specifically, the highest number of Dengue cases for the 2001-2010 time period were reported during this epidemic (Villar et al., 2015). This outbreak has been thought to have been linked to climate and weather patterns, such as heavy rain and higher temperatures as a result of the El Niño oscillation (Villar et al., 2015). The importance of these ecological changes on Dengue disease transmission cannot be discounted, however, the various sociopolitical factors at play during the time period must also be discussed. As previously mentioned, Colombia has been marked by civil unrest since the 1940s, which has primarily affected rural, impoverished populations (LeGrand, 2003). In 1993, the Colombian healthcare system underwent massive structural changes with dramatic increases in insurance status and public health expenditures (Escobar et al., 2016). With these reforms, all citizens became eligible to receive the Plan Básico de Salud, which covers public health interventions, financed separately through health care funding (Escobar et al., 2016). Despite these public health advances, however, the 2010 Dengue outbreak still occurred- likely as a result of the abandonment of collective national surveillance systems. In the 1980s, the Colombia National Epidemiological Surveillance System [SIVIGILA] began monitoring dengue disease control and transmission, through compulsory case reporting (Villar et al., 2015). However, between 2006-2008 transitions from collective to individual notifications took place, resulting in discrepancies between national and local case data (Villar et al., 2015). This system has been largely successful in Dengue disease monitoring; however, it is possible that this transition period resulted in an oversight of disease monitoring leading up to the 2010 epidemic. During this time, Colombia was also undergoing political and social transitions, through the demobilization of guerilla warfare groups (World Atlas of Global Issues, 2018). Decades of civil

unrest have resulted in political instability, and thus inconsistent disease monitoring, contributing to epidemics such as that in 2010.

CHOLERA:

An infectious disease with severe public health consequences, Cholera is one of the most common epidemic diseases in Latin America and, more generally, in the underdeveloped world. Unlike other diseases discussed in this analysis, Cholera is not vector-borne and is spread via the oral-fecal route via the *Vibrio cholerae* bacterium (WHO, 2022, b.). Cholera is thought to have originated in Asia, and spread globally through a series of pandemics from 1817-1923 (Harris et al., 2012). Interestingly, cholera is the disease upon which the field of epidemiology was founded- it was epidemiologist John Snow's work with London's Broad Street pump, that the surveillance of communicable diseases began (Harris et al., 2012). Beginning in 1961, the seventh cholera pandemic began, spreading to Asia, Europe, Africa, and for the purposes of this paper, Latin America (Harris et al., 2012). The pathophysiology of cholera contributes to its virulence- diarrheal symptomology is common among infected individuals, which can serve to further contaminate water sources (WHO, 2022, b.). Symptoms of cholera infection include massive amounts of liquidy diarrhea, which can escalate to hypotensive shock, severe dehydration, and death if left untreated (Harris et al., 2012). A disease afflicting the world's poorest populations, Cholera outbreaks serve as a serious threat to global public health.

Several epidemic Cholera outbreaks have occurred in Latin America within the past 30 years, the first of which occurred in 1991 (Periago, 2012). The 1991 epidemic began in January, in rural areas of Peru, and spread to 15 South American nations by December of the same year (Periago, 2012). This epidemic remained active from 1991-2003, during which time the disease

spread to, and impacted Mexico and many other Central American nations (Periago, 2012). The epidemic began in the coastal region of Peru, resulting in more than 300,000 cases in the nation by the end of 1991 (Tickner & Gouveia-Vigeant, 2005). Regionally, there were more than 1 million cases of cholera throughout Ecuador, Colombia, Guatemala, Panama, and Mexico, throughout the years 1991-1995 (Tickner & Gouveia-Vigeant, 2005). The initial epidemic outbreak in Peru was linked to a cessation of water chlorination, as a result of United States reports on potential health risks of disinfection byproducts (Tickner & Gouveia-Vigeant, 2005). The literature cites, however, that cessation of water chlorination was not entirely a result of the U.S. EPA warnings, but that larger sociopolitical factors were at play. The cholera epidemic was most prevalent in Trujillo and Iquitos, both coastal cities which suffer from high levels of poverty (Tickner & Gouveia-Vigeant, 2005).

The sociopolitical impacts of this epidemic and its outbreak must be better understood in order to adequately measure prevention and control strategies' efficacies. In the late 1970s, Peru's government returned to civilian rule, establishing a new constitution, of which was expected to be perpetuated with the reelection of incumbent president Haya de la Torre, in 1980 (Britannica, n.d., a.). However, with the premature death of Haya de la Torre before the 1980 election, Fernando Belaúnde (who had previously served as President, before being removed from office during a 1968 military coup) was re-elected, installing free-market policies that proved to be disastrous for the Peruvian economy (Britannica, n.d., a.). Exacerbated by sociopolitical violence from guerilla movements such as Sendero Luminoso and the Túpac Amaru Revolutionary Movement, government funding and resources became ever more focused on the social conflicts at hand (Britannica, n.d., a.). Throughout the late 1980s, massive inflation and the guerrilla war continued to cause social and political unrest in Peru, until the 1990

election in which Alberto Fujimori became president (Britannica, n.d., a.). Fujimori's presidency continued the period of financial instability, and social unrest, during which inflation reversal programs proved devastating in their effects on the poor (Britannica, n.d., a.). Culminating in an autogolpe, or auto-coup, Fujimori utilized military powers to dissolve the Peruvian congress in 1992 (Britannica, n.d., a.). Clearly, this time period preceding and during the 1991 Cholera epidemic was a time of political and social unrest. The perversion of governmental funding and resources toward ending guerilla warfare, preventing illicit drug trade, and economic stabilization undoubtedly detracted from public health expenditures. Likewise, destruction and displacement caused due to guerrilla warfare and the breakdown of infrastructure may have contributed to a decline in sanitation systems and water quality management, which are two important factors in Cholera prevention and surveillance. It can be assumed that infection was spread rapidly through asymptomatic, displaced individuals and even war participants themselves, leading to the explosive outbreak in Peru, and later Latin America as a whole.

In 2010, another Cholera outbreak occurred, this time in Haiti. Cited as the worst outbreak in history, and the first Cholera outbreak having taken place in the Caribbean nation, nearly 10,000 deaths resulted from this epidemic (CDC, 2021, a.). Just six months after a devastating earthquake, which decimated much of the island's already limited infrastructure, the cholera epidemic began on the banks of the Artibonite River (Moulin, 2019). The riverbanks were incredibly close to the designated restroom areas of the United Nations relief workers, who had recently arrived from Nepal, which after years of bureaucratic red tape, were confirmed to be the source of the epidemic (Moulin, 2019). The cholera epidemic in Haiti was a devastating result of political and social infrastructure failures. Prior to the 2010 earthquake and Cholera epidemic, health systems in Haiti had not been sufficient for public health. As of 2003, the health

system in Haiti consisted of a public sector, which had faced significant challenges following the ongoing 1991 political crisis, a private nonprofit sector, and a mixed nonprofit sector (PAHO, 2003). The largest of these being the public sector, which due to lack of funding was composed of public institutions with 80% defective or broken equipment (PAHO, 2003). The political climate leading up to Haiti's 2010 outbreak can be characterized as unstable and in conflict. Throughout much of the latter half of the 20th century, political and social conflict in the region, unstable governments, and corrupt elections characterized the nation's politics, and Haiti was receiving a large amount of funding from foreign nations, including the United States (Haitian Support Group, 2021). In 1991 a military coup, President Jean-Bertrand Aristide was removed from power, marking the beginning of military and police rule in the nation and mass killings, displacement, and fleeing from Haiti (Haitian Support Group, 1991). Support from the United Nations [UN], World Bank [WB], and International Monetary Fund [IMF] restored Aristide to power and attempted to disband the Haitian military, which incited a series of armed rebellion conflicts from 1994-2004 when the rebel army commander Phillipe retook control of the Haitian Army (Haitian Support Group, 2021). From 2004-2010, economic instability, due to stabilization and restructuring policies of the UN and others, took place, inciting riots and calls for the removal of UN forces (Haitian Support Group, 2021). These riots and social unrest were primarily motivated by skyrocketing prices of food and failed attempts at health infrastructure improvements as a result of political conflicts (Chatterjee, 2008). Immediately before the earthquake, the Haitian economy appeared to have been making improvements, and most civil unrest was marred (Haitian Support Group, 2021). The health system at the time though had fallen into disrepair. The turmoil caused by political and social unrest that took place in 1991 had largely cut healthcare spending, despite massive influxes of foreign healthcare financial support

(PAHO, 2003). The political turmoil and effects it had on the impoverished community served to push healthcare spending aside, thus allowing for a lack of health infrastructure leading up to the 2010 earthquake. This reliance on foreign aid created a dependence upon outside support, thus detracting from local providers and local economic stability (Haar et al., 2015). The impacts of sociopolitical contexts on the 2010 Cholera outbreak must be analyzed through the opportunity of Cholera introduction in the nation. This reliance on foreign aid, due to lack of political stability, provided an opportunity for an increased presence of humanitarian groups (such as the UN group that introduced the Cholera epidemic) in Haiti. The literature has shown that long-term reliance on foreign aid serves to not only detract from local economic stability, but also create ineffective health systems that are not culturally appropriate, and compete with local healthcare providers (Haar et al., 2015). Political and social conflicts in Haiti created opportunities for both the destruction of healthcare systems and reliance on foreign aid, which was exacerbated by the 2010 earthquake. Through the introduction of the Cholera epidemic by UN aid workers, the impacts of these conflicts and their downstream effects can be observed.

COVID-19:

The impacts of political and social conflicts on infectious disease cannot be discussed without reference to the most recent global pandemic, COVID-19. A disease caused by the SARS-CoV-2 virus, this disease was discovered in Wuhan, China, in 2019 and spread rapidly across the globe (CDC, 2021, b.). Coronaviruses are a class of viruses that cause a variety of diseases, ranging in severity from a common cold to severe acute respiratory syndrome [SARS], which was exhibited through this most recent, and ongoing, pandemic (CDC, 2021, b.). The origins of the SARS-CoV-2 virus are suspected to be zoonotic and transmitted via a wildlife reservoir in the bat species (Umakathan et al., 2020). The SARS-CoV-2 virus is spread through

direct contact with viral particles, which can occur via coughing, sneezing, droplet inhalation, or contact through mucous membranes such as those in the eyes, oral or nasal cavities (Umakathan et al., 2020). There is a wide variety of symptomatology associated with COVID-19 and the severity of illness, however, the most common symptomatology includes fever, cough, shortness of breath, muscle and body aches, novel loss of taste or smell, and GI symptoms such as vomiting and diarrhea (CDC, 2022). Severe COVID-19 symptoms can occur -in which there is a decrease in a patient's blood oxygen level, resulting in respiratory distress syndrome, septic shock, exaggerated inflammatory response, cardiac disease, and hepatic, renal, nervous, and thrombotic diseases (NIH, 2021). "Long COVID" refers to ongoing symptoms after the COVID infection has passed, with symptoms such as decreases in cardiopulmonary function, long-term fatigue, and neurological abnormalities (NIH, 2021). Epidemiologically, the COVID-19 pandemic spread rapidly following a local outbreak in Wuhan, China. The epidemiology of COVID-19 in relation to the sociopolitical conflict must be better understood to effectively analyze disease progression, transmission, and control.

COVID-19 was declared a pandemic by the WHO in March 2020, and in May 2020 Latin America and the Caribbean became epicenters of the disease (Anaya-Covarrubias et al., 2022). During this time period, the region accounted for 27% of global deaths due to COVID-19 (Anaya-Covarrubias et al., 2022). The nations most affected included Brazil, Mexico, Colombia, Argentina, and Peru, which had the highest numbers of COVID-19 related deaths in the region (Anaya-Covarrubias et al., 2022). Variances in reporting, testing, and monitoring contributed to the underestimation of the actual number of COVID-19 cases and deaths in Latin America (Anaya-Covarrubias et al., 2022). There were wide variations in COVID-19 symptoms across the region, however, fever and diarrheal symptoms were consistent, which potentially

exacerbated the prevalence of diarrheal diseases existing in the region before the pandemic (Anaya-Covarrubias et al., 2022). The spread of COVID-19 in Latin America, disease control mechanisms, and now, vaccine rollout programs, have been impacted by ongoing political and social unrest, and economic instability in the region.

Perhaps the most well-known political failures in the case of COVID-19 occurred in Brazil. As of March 2021, Brazil had the third-highest number of COVID-19 cases globally and was ranked 25th globally for COVID-19 deaths, however, it is estimated that a lack of adequate testing mechanisms has contributed to an underreporting of COVID-19 cases (Boschiero et al., 2021). Analysis of COVID-19 data in Brazil suggests that the State of Roraima suffered from the highest number of cases, despite being among the most sparsely populated states in the nation (Boschiero et al., 2021). Likewise, the Amazonas state healthcare system was the first to collapse in the first wave of the pandemic, despite the Brazilian government having had months to prepare for widespread infections (Boschiero et al., 2021). The impacts of political and social conflict on COVID-19 transmission in Brazil can be seen from two separate sectors: the inadequate response of the Brazilian government, and the ongoing migrant crisis in Brazil due to social unrest in Venezuela. Brazilian President Jair Bolsonaro was elected in 2018, after a long tenure in the Brazilian congress, running on far-right values (Britannica, n.d., b.).

During the onset of the COVID-19 pandemic, Bolsonaro consistently downplayed the severity of the disease and prevented public health measures from being put into place, undermining preventative efforts put into place by local and state governments (Britannica, n.d., b.) In April 2021, the Brazilian Parliamentary Commission of Inquiry charged President Bolosnaro with crimes against humanity regarding the mismanagement of the COVID-19 pandemic and COVID-related deaths (Pujadas, 2021). The crimes included “commission of

epidemic crime resulting in death, violation of preventive health measures, quackery, prevarication (the failure to carry out or delay of public duties for reasons of personal interest), irregular use of public funds, incitement to crime, forgery of private documents, crime of responsibility and crimes against humanity” (Pujadas, 2021). The political conflict incited by Bolsonaro’s mismanagement of the pandemic is alleged to be responsible for the massive numbers of deaths in Brazil, as well as the collapse of Brazil’s healthcare system. Social unrest caused by these corrupt policies had further hindered public health efforts put into place, due to a lack of trust in government (The Lancet, 2021).

Conflicts between local and federal governments in Brazil contributed to inadequate and inconsistent COVID-19 control and prevention measures, exacerbating the effects of COVID-19 not only on Brazil but South America as a whole. Similarly, a second sociopolitical conflict is a likely culprit in the rapid spread and high mortality of COVID-19 in Brazil: the Venezuelan migrant crisis and mass migration into Brazil. This crisis, which is ongoing, is a result of political and social instability in Venezuela. Specifics of this turmoil include hyperinflation, economic distress, and shortages of food and medical supplies (BBC, 2021). In January 2019, opposition leader Juan Guaidó became a self-declared acting president, in a challenge to socialist President Maduro (BBC, 2021). Policies enacted by Maduro and the aforementioned Chávez have contributed to a massive economic downturn and decay of infrastructure in Venezuela. Violence between the opposing political groups has served to hinder economic growth and promote social unrest in the nation. This economic crisis and political violence has resulted in more than 6 million Venezuelans fleeing the country, traveling along dangerous routes in the face of gang and cartel violence, and potential legal troubles (UNHCR, n.d.). This humanitarian crisis was exacerbated by the COVID-19 pandemic, due to closures of humanitarian facilities,

such as shelters, and international borders as a result of COVID-19 mitigation efforts (Rudea, 2020). Widespread migration into Brazil, specifically into the Northern region of Roraima. This region struggled with weak healthcare infrastructure and poverty before the pandemic, and as such, has become further burned with the onset of the migrant crisis (Boschiero et al., 2021). The lack of COVID-19 control policies and its resulting political and social unrest in Brazil, paired with an ongoing migration crisis and exasperation of healthcare systems have had disastrous results, in the hundreds of thousands of COVID-19 cases and deaths in Brazil. As an ongoing situation, a retroactive analysis of the impacts of these and other political and social conflicts in the nation will reveal further intricacies and likely serve as a cautionary tale in future infectious disease management protocols.

Another Latin American nation burdened with COVID-19 in the face of political and social unrest is Peru. According to the WHO, Peru has had more than 3.5 million COVID-19 cases, and more than 210,000 COVID-19 related deaths since the first case in January, 2020 (WHO, 2020). As of May 2021, Peru had the sixth-highest COVID-19 related mortality in the world and the second highest fatality rate among confirmed cases (Lainez et al., 2021). Despite proactive preventative measures being implemented, social structures and political conflicts negatively impacted COVID-19 disease epidemiology in the nation (Lainez et al., 2021). Early control methods included flight bans from areas of high transmission, information campaigns, and social distancing measures (Lossio, 2021). Despite a seemingly organized response to the onset of the pandemic, it is likely that mitigation strategies were hindered by political unrest in Peru. Since the 2016 election, political divisiveness and conflict have resulted in a consistent power struggle between then-elected President Pablo Kuczynski and Congressional opponent Keiko Fujimori, which was further exacerbated by the effects of the pandemic (Medina Rivas

Plata, 2021). In the years following this election and preceding the COVID-19 pandemic, there was an increase in political stability in Peru, and a downturn in social unrest (Medina Rivas Plata, 2021). However, strict public health measures impacting the informal economy that represents the majority of Peruvian citizens has led to unrest and resistance against disease control measures (Lainez et al., 2021). The social unrest throughout the late 1900s and early 2000s influenced family structures and economic growth in the region, with large scale movement from cities such as Lima, to smaller, rural towns and communities, of which do not have public health infrastructure to support the COVID-19 pandemic (Lainez et al., 2021). Consistent political conflict through a series of leadership changes has resulted in the disrepair of the Peruvian healthcare system prior to the COVID-19 pandemic when hospitals and health clinics were already overwhelmed (Lainez et al., 2021). The ever-present political unrest was exacerbated through the impeachment of President Martin Vizcarra in November 2020, further hindering disease control efforts, and inciting further social conflicts. The effects of an economic influx and ever-changing national leadership has led to inconsistency in the prevention methods of COVID-19 in Peru, as well as the lack of resources available in healthcare systems. As such, rural and impoverished communities face intense disease burden and have little access to healthcare resources and facilities. Similarly, political conflict and unrest has led to a significant distrust of political authorities, resulting in a lack of trust in public health interventions, which can prove to be harmful in infectious disease epidemiology.

Unlike some of the other diseases discussed in this paper, COVID-19 prevention can be accomplished via vaccination- a result of the development and large-scale rollout of mRNA COVID-19 vaccines. Despite the presence of new variants, COVID-19 vaccines have proven to be efficacious in mitigating the spread of COVID-19 and the SARS-CoV-2 virus (Katella, 2022).

As of July 2021, only 11% of the population of Latin America as a whole had been vaccinated against COVID-19, and there were gaping disparities in vaccination rates within the region as a whole (The Lancet, 2021). An influential and limiting factor in vaccination rates in Latin America is cost, in the face of vaccine shortages and high prices (The Lancet, 2021). In nations facing socioeconomic distress (of which, was likely worsened by the pandemic) and political conflict, there is little motivation for vaccination campaigns. In order to most effectively control and prevent further COVID-19 outbreaks in the region, massive vaccine uptake must occur, however, overcome sociopolitical boundaries proves to be a challenge in these efforts.

CONCLUSIONS:

Throughout this analysis, a common theme has stuck out: the harmful effects of sociopolitical conflicts on human health. The conflicts described here often were incited by political elites, however, the negative repercussions are most commonly felt by the masses, many of whom are impoverished, underserved, and subject to the social and political wills of the few. The conditions described here have all had devastating effects on human health, and many are ongoing problems in Latin America and globally. It begs the question, how in a time with so many epidemiological, biomedical, and public health advances, can so many people remain in the cycle of poverty and disease?

Societal instability has obvious impacts- economic downturns, wars, and poverty, to name a few. However, the impacts of this instability on human health as a whole are so often overlooked. The global health sector is so often playing a game of “catch up,” in an effort to respond to, rather than prevent public health crises. And the impacts of these instabilities, as described above, on governmental disease control should serve as a cautionary tale. A pattern present in many of the cases described above, and many of the global health concerns of today, is

that of colonialism and neocolonialism. Colonialism and neocolonialism can disrupt societies and harm human health by inciting, or worsening social and political conflict and instability. This has been witnessed in Latin America as described above—from the installation of colonialism and spread of Smallpox, to the Cholera outbreak in Haiti. Foreign and humanitarian aid is often well-intentioned, however political corruption and social instability can often cause more sinister effects, worsening conditions for those most in need. When well-intentioned funding is not used for its intended purpose, as a result of corruption or other factors, sociopolitical violence, and its impacts on infectious disease epidemiology, are exacerbated. In the case of Latin America, an estimated \$195 billion (adjusted for inflation) has been sent to Latin American governments from the United States, in the period between 1946 and 2019 (Congressional Research Service, 2021). While well-meaning, reliance on foreign aid often allows for further corruption and usurpation of governments, thus entrapping the masses in the cyclical nature of poverty and disease. As such, direct investment in social projects, as well as providing culturally appropriate aid focused on the needs of the recipient, rather than the donor, must be provided. So often, foreign aid and poverty uplifting projects serve to benefit the psyche of the donor, while further harming the recipient. As has shown through decades of time, and billions of dollars, investment without action often leads to further corruption and is performative in nature. When not culturally appropriate, this indirect investment can have neocolonial effects, and is ultimately, a waste. Forced application of funding can cause gentrification of communities, and result in the implementation of fleeting social improvements, further installing neocolonial values. Efficacy, in the installation of social and healthcare projects relevant to the communities in which they will serve, rather than being based on Western ideals, is necessary to effectively utilize foreign aid. Installation of these projects is more likely to be replicated, and to

have improved long-term effects- if done so appropriately and with the users in mind. To better understand the impacts of infectious disease, the entire climate of social and political factors must be examined. This thesis has served to examine some of the effects of this instability on infectious diseases, however, to best understand the impact of these factors, further work must be undertaken. The novel *Mountains Beyond Mountains* details the life and work of Dr. Paul Farmer, whose work made profound impacts in the global health sector, and especially among the impoverished communities of Haiti, is based on a Haitian proverb, “Beyond mountains, there are mountains.” Applying this ideology to global health and infectious disease proves just that: in order to understand how infectious diseases impact health and society, one must understand the society itself. By gaining a better understanding of the ways in which public health, specifically in Latin America, is impacted by sociopolitical factors, more effective, culturally relevant, and productive prevention and control mechanisms can be better implemented, thus improving public health. The undertaking of solving public health crises is not realistic for a single person, organization, or even career field. Working with communities impacted by infectious disease, and other public health crises, as well as cross-disciplinary leaders, will allow for better communication, understanding, and respect in the effort to uplift global health.

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