

HIV in Brazil, Mexico, and Peru:
The Utilization of a Health Equity Perspective and Statistical Analysis
to Guide Future Intervention Efforts

By

Isaac Schlotterbeck

Thesis

Submitted to the Faculty of the
Graduate School of Vanderbilt University
in partial fulfillment of the requirements

for the degree of

MASTER OF ARTS

in

Latin American Studies

May 13, 2022

Nashville, TN

Approved:

Celso Castilho, Ph.D.

Marie Martin, Ph.D., M.E

Table of Contents

| | | |
|------|---------------------------------------------------------------------------|----|
| I. | Chapter 1: Introduction and Overview of Health Equity..... | 1 |
| | a. HIV as a Global and Public Health Issue..... | 1 |
| | b. Social Medicine, Economic Inequality, and Health Equity..... | 2 |
| | c. Registry Linkage Project Implications..... | 5 |
| | d. Outline..... | 7 |
| II. | Chapter 2: HIV: the Disease and its Impacts on Latin America..... | 9 |
| | a. The Global Burden of HIV..... | 9 |
| | b. HIV Virology and Disease Progression..... | 11 |
| | c. Treatment and Prevention..... | 13 |
| | d. Modes of Transmission..... | 16 |
| | e. HIV in Latin America: Regional Trends and Challenges..... | 16 |
| | f. Challenges to Treatment and Prevention..... | 22 |
| | g. Conclusion..... | 26 |
| III. | Chapter 3: The HIV Epidemics of Brazil, Mexico, and Peru..... | 27 |
| | a. Brazil..... | 27 |
| | i. Social Context..... | 27 |
| | ii. Political Context..... | 30 |
| | iii. Treatment and Prevention Efforts, Outcomes, and 2020 Statistics..... | 34 |
| | iv. Health Equity in Brazil’s HIV Epidemic..... | 38 |
| | v. Brazil Conclusion..... | 41 |
| | b. Mexico..... | 41 |
| | i. Social Context..... | 41 |
| | ii. Political Context..... | 43 |
| | iii. Treatment and Prevention Efforts, Outcomes, and 2020 Statistics..... | 47 |
| | iv. Health Equity in Mexico’s HIV Epidemic..... | 48 |
| | v. Mexico Conclusion..... | 51 |
| | c. Peru..... | 52 |
| | i. Social Context..... | 52 |
| | ii. Political Context..... | 54 |
| | iii. Treatment and Prevention Efforts, Outcomes, and 2020 Statistics..... | 57 |
| | iv. Health Equity in Peru’s HIV Epidemic..... | 60 |
| | v. Peru Conclusion..... | 62 |
| | d. Conclusion..... | 63 |
| IV. | Chapter 4: Registry Linkage Project in Brazil, Mexico, and Peru..... | 65 |
| | a. Introduction..... | 65 |
| | b. Methods..... | 66 |
| | c. Results..... | 67 |
| | d. Discussion..... | 71 |
| | e. Conclusion..... | 73 |
| V. | Chapter 5: Conclusion..... | 75 |
| VI. | Bibliography..... | 77 |

CHAPTER 1: Introduction and Overview of Health Equity

HIV as a Global and Public Health Issue

The human immunodeficiency virus (HIV), alongside its most severe stage acquired immunodeficiency syndrome (AIDS), constitutes one of the greatest challenges to global and public health in the last forty years. World Health Organization (WHO) data shows that since 1981 roughly 79 million people have contracted HIV and 36 million individuals have died due to the virus.¹ Furthermore, the HIV epidemic disproportionately affects lower- and middle-income countries (LMIC):

| Region | % of Adults Living with HIV (Adult Prevalence) | # of People Living with HIV (% of Global Total) | # of People Newly Infected with HIV | # of AIDS-Related Deaths |
|----------------------------------------------|------------------------------------------------|-------------------------------------------------|-------------------------------------|--------------------------|
| Global, Total | 0.7% | 38.0 million (100%) | 1.7 million | 690,000 |
| Eastern and Southern Africa | 6.7% | 20.7 million (54%) | 730,000 | 300,000 |
| Western and Central Africa | 1.4% | 4.9 million (13%) | 240,000 | 140,000 |
| Asia and the Pacific | 0.2% | 5.8 million (15%) | 300,000 | 160,000 |
| Western and Central Europe and North America | 0.2% | 2.2 million (6%) | 65,000 | 12,000 |
| Latin America | 0.4% | 2.1 million (6%) | 120,000 | 37,000 |
| Eastern Europe and Central Asia | 0.9% | 1.7 million (4%) | 170,000 | 35,000 |
| The Caribbean | 1.1% | 330,000 (<1%) | 13,000 | 6,900 |
| Middle East and North Africa | <0.1% | 240,000 (<1%) | 20,000 | 8,000 |

NOTES: Reflects 2019 data.
SOURCES: UNAIDS. *AIDSinfo* website; accessed July 2020. UNAIDS. *Core Epidemiology Slides*; July 2020.

2

Thus, the HIV epidemic and its unequal impacts provide an interesting case study for examine a global and public health issue from a health equity perspective. The WHO defines health equity as “the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation)...

¹ <https://www.who.int/data/gho/data/themes/hiv-aids>

² <https://www.kff.org/global-health-policy/fact-sheet/the-global-hiv-aids-epidemic/>

Health equity is achieved when everyone can attain their full potential for health and well-being.”³ A 2018 press release from the United Nations (UN) titled “Countries Most Affected By HIV/AIDS Are Least Able To Pay For Prevention and Treatment” encapsulates why the usage of a health equity perspective is important.⁴ This thesis utilizes a health equity perspective to examine the strides made in HIV prevention and treatment in Latin America and ascertain if there are sub-populations that would benefit from additional and targeted interventions.

Social Medicine, Economic Inequality, and Health Equity

As a region Latin America possesses a rich history of considering the effects of social and economic factors on health. In the mid-20th century, the Latin American social medicine (LASM) movement began to highlight the effects of inequality on health.⁵ At its core, LASM “conceptualize[d] health as socially determined and as a social right”.⁶ In other words, the LASM movement argued that “social, political, economic, and environmental factors” determine one’s health, a perspective that provides a stark contrast to the mainstream biomedical approach to health.⁷ Over the years, this perspective has gained traction throughout the world as public health researchers have studied and understood the effects of our lived environments on our health. The below graphic, created by the Bay Area Regional Health Inequities Initiative (BAHRII), serves as a conceptual framework to understand connections between social and structural inequities and their impact on health:

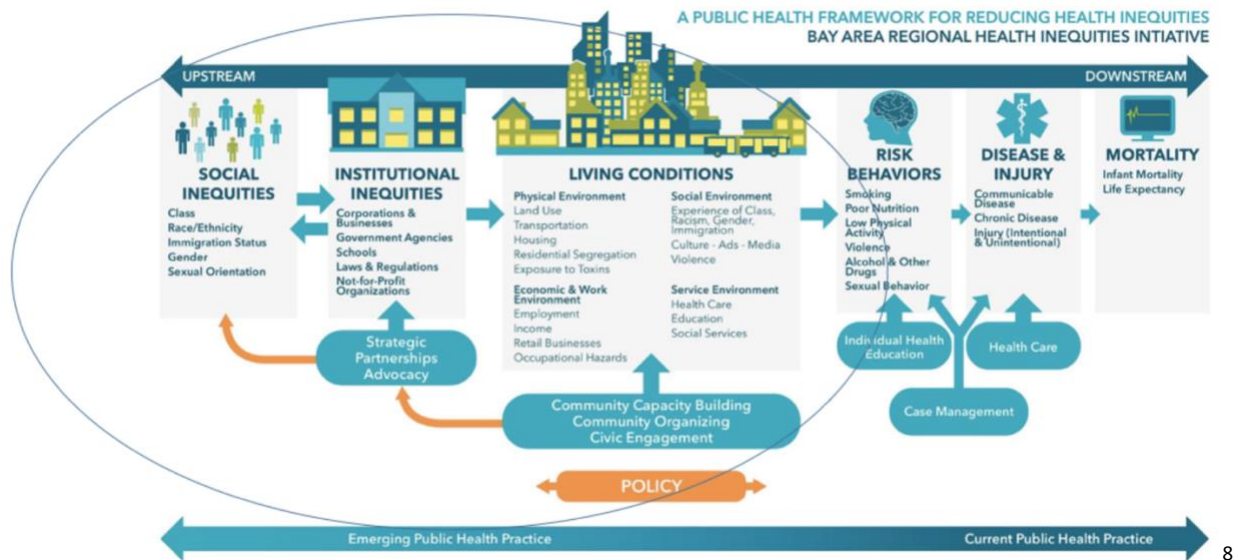
³ https://www.who.int/health-topics/health-equity#tab=tab_1

⁴ <https://www.un.org/press/en/2001/aids18.doc.htm>

⁵ Hartmann (2016) p.2145

⁶ Hartmann (2016) p.2145

⁷ Hartmann (2016) p.2146



8

The graphic shows how social and institutional inequities influence living conditions and the environments around us, which impact an individual’s risk behaviors and likelihood of poor health outcomes. While an entity in Concord, California published this graphic in 2015, there are clear connections between this framework and the ideas put forth by the LASM movement.

The LASM movement and health equity proponents continue to advocate for and call attention to the myriad of factors that influence health. LASM activists argue that Latin America poses a unique challenge in terms of achieving health equity due to structural and historical factors. Yamin et al write: “First, both overall and within many individual countries high degrees of socio-economic inequality are refracted along racial, gender and ethnic lines, according to distinct demographic configurations. Health is an acute reflection of overall patterns of inequality and discrimination and, as elsewhere, social determinants contribute more to patterns and burdens of disease than medical care in the region”.⁹ The utilization of a health

⁸ <https://www.barhii.org/enlarged-framework>
⁹ Yamin et al (2019) p.1

equity approach to study HIV is appropriate within Latin America due to the factors listed above. By employing a health equity perspective, we can focus on examining these factors and how they contribute to different health outcomes among different demographic and social groups. It is important to note that sub-national discrepancies also play a role in the region. This is especially pertinent to discussions around access to high-quality medical care.¹⁰ We have established that a myriad of factors influences one's health and that societal and structural inequities contribute to health inequity. Now I will briefly explain why Latin America is a particularly unequal region and interesting area to study from a health equity perspective.

Economists note the inequality that afflicts Latin America. It is important to note that the legacy of Spanish and Portuguese colonialism continues to impact the region's economic inequality and health inequity. Even though inequality in the region dates to the colonial period, recent economic movements have exacerbated this reality. Hoffman and Centeno's landmark article on inequality in Latin America refers to the region as the "lopsided continent".¹¹ Their analysis centers on the incredible inequality of goods, services, and basic opportunities in the region, which is defined as a "radically asymmetrical distribution".¹² Latin America is home to an inordinate amount of inequality when compared to other regions. According to their analysis: "The top 5% of the Latin American income ladder receives twice the comparable share of their OECD (Organization for Economic Cooperation and Development) counterparts while the bottom receives half of what they would in those same countries".¹³ As

¹⁰ Villar Uribe et al (2021) p.1

¹¹ Hoffman and Centeno (2003) p.363

¹² Hoffman and Centeno (2003) p.366

¹³ Hoffman and Centeno (2003) p.365

aforementioned and demonstrated by the conceptual framework on health inequities, structural inequalities, particularly in the economic sphere, have immense effects on health. Applying the BAHRII framework and notions of health equity in Latin America is particularly interesting due to the severe levels of inequality seen in the region.

Matthew Flynn, a professor of International Studies and Sociology at Georgia Southern University, recently published an article that argues that: “global capitalism is one such prominent societal determinant influencing the unjust distribution of health across the world”.¹⁴ Flynn postulates that the expansion of trans-national corporations and austerity have exacerbated and worsened the impacts of the social determinants of health by increasing levels of inequality in Latin America.¹⁵ Specifically, Flynn writes: “neoliberal trade policies augment social inequalities that affect health equity, restrict governments’ abilities to address public health and environmental health challenges...”.¹⁶ The expansion and implementation of neoliberal trade policies and austerity related to social policy have worsened inequality in the region, which directly affects the health and intensifies issues related to health equity.

Registry Linkage Project and Implications

Chapter 4 of this paper involves the usage of data from a registry linkage project to improve outcome ascertainment related to HIV+ patients that receive antiretroviral therapy. Large clinical cohorts help public health researchers understand and measure the quality of care; however, significant absences of patients from care tend to occur, creating a loss to follow-up (LTFU) group within the clinical cohort. This impacts public health research by

¹⁴ Flynn (2021) p.1

¹⁵ Flynn (2021) p.3

¹⁶ Flynn (2021) p.6

creating a form of selection bias, as the population that is LTFU may differ substantially from those that remain in care.¹⁷ Studies have shown the significant scale of LTFU populations in HIV+ clinical cohorts in Latin America.¹⁸ If certain populations are at a higher risk of belonging to a LTFU population, this becomes a health equity issue as these populations face barriers to remaining in care.

For this project, I am working with Dr. Peter Rebeiro and many of his colleagues from the Caribbean, Central and South America network for HIV epidemiology (CCASAnet). CCASAnet serves as the network for the Latin American region in the International epidemiology Databases to Evaluate AIDS (IeDEA) and is the largest observational HIV cohort collaboration in Latin America. While the Data Coordinating Center for CCASAnet is housed at Vanderbilt University Medical Center (VUMC), the network is a collaboration of researchers from seven Latin American countries with a goal to better understand the HIV epidemic in the region via top-tier research. My specific project includes data from the following sites: the Instituto Nacional de Infectologia Evandro Chagas at Fundação Oswaldo Cruz in Rio de Janeiro, Brazil (INI-Brazil); the Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán in Mexico City, Mexico (INCMNSZ-Mexico); and the Instituto de Medicina Tropical Alexander von Humboldt in Lima, Peru (IMTAvH-Peru).

Researchers have examined the multitude of reasons that patients may disengage from their HIV care. Many of the reasons have connections to health equity issues. For example: “travel distance to clinic sites and associated costs, stigma and fear of disclosure, competing

¹⁷ Hernán et al (2004)

¹⁸ Carriquiry et al (2015)

demands for scarce resources, religious and cultural beliefs, and unanticipated obligations and events (e.g., attending a family funeral) are key adherence barriers identified”.¹⁹ Additionally, researches argue that “absences are revealed to be less the simple result of one or another “reason” taken individually, and more the product of complex chains of events”.²⁰ In order to improve public health interventions and achieve health equity for PLWHA, it is necessary to understand which populations are more likely to be part of the LTFU population so that interventions and policies can be tailored or created to better address their needs.

Outline:

This introduction, or Chapter 1, provides a brief overview of the importance of HIV as a global health issue, defines health equity, shows how Latin America as a region is home to massive degrees of inequality, and briefly explains the importance of registry linkage of LTFU populations to better address health equity issues. The rest of this thesis will continue in the following manner. Chapter 2 provides a high-level overview of HIV as a disease and information about HIV in Latin America. In doing so, Chapter 2 helps readers better understand HIV prevention and treatment efforts, key challenges to successful treatment programs, and HIV in the region. Chapter 3 dives deeper into the three countries that are used in the registry linkage project: Brazil, Mexico, and Peru. The goal of Chapter 3 is to contextualize the HIV epidemics in each of these three countries. This is done by examining the historical, social, and political context in which HIV has existed, the efforts made by each country around treatment and prevention of the virus, and considering ongoing health equity concerns. Chapter 4 focuses on

¹⁹ Ware et al (2013) p.2

²⁰ Ware et al (2013) p.5

the registry linkage project and takes the form of a traditional scientific paper, meaning it includes the following sections: Introduction, Methods, Results, Discussion, and Conclusion. Through the statistical analyses carried out in this chapter, we will be able to understand if certain populations among PLWHA are more likely to be LTFU. This has health equity implications as additional interventions and/or policies should be created to address these findings.

A brief caveat, the discussions around gender and masculinity in Chapter 3 only scratch the surface of the literature on the topic. This was intentionally done as the focus of this thesis is HIV and health equity concerns, not conceptions of gender norms and expressions of masculinity. For detailed research on gender and masculinity please consult the following texts: *Beneath the Equator: Cultures of Desire, Male Homosexuality, and Emerging Gay Communities in Brazil* by Richard Parker, *The Meanings of Macho: Being a Man in Mexico City* by Matthew C. Gutmann, and “Gender, Masculinities and HIV/AIDS: Perspectives from Peru” by Salazar et al in *Gender and HIV/AIDS: Critical Perspectives from the Developing World*.

In summation, this paper will examine the realities and trends of HIV in three Latin American countries, Brazil, Mexico, and Peru; and then include statistical analyses of LTFU populations to determine which sub-populations would benefit from additional interventions and/or policies. In doing so, I will be utilizing a health equity lens. In 2016, the World Health Organization published a Treat All recommendation for the HIV epidemic, meaning that countries would now provide antiretroviral medication to all PLWHA. Prior to this recommendation, it was common for countries to have additional criteria to determine who to treat. This recommendation was promptly adopted throughout Latin America. Since the

countries in this paper adopted the Treat All recommendation, the utilization of a health equity perspective helps us to consider social and institutional inequities as barriers to engaging with and remaining in care. By examining these inequities, we can better understand which sub-populations may benefit from additional interventions efforts to ensure that they are engaged and retained in HIV care. Importantly, These LTFU populations are much less likely to achieve viral suppression of HIV, meaning that they can more easily spread the virus and are more likely to have poor health outcomes.²¹ In this light, addressing disparities in retention to HIV care is a key step in the process of ending the HIV epidemic and achieving health equity.

²¹ Luz et al (2019) p.368

CHAPTER 2: HIV: the Disease and its Impacts on Latin America

The Global Burden of HIV:

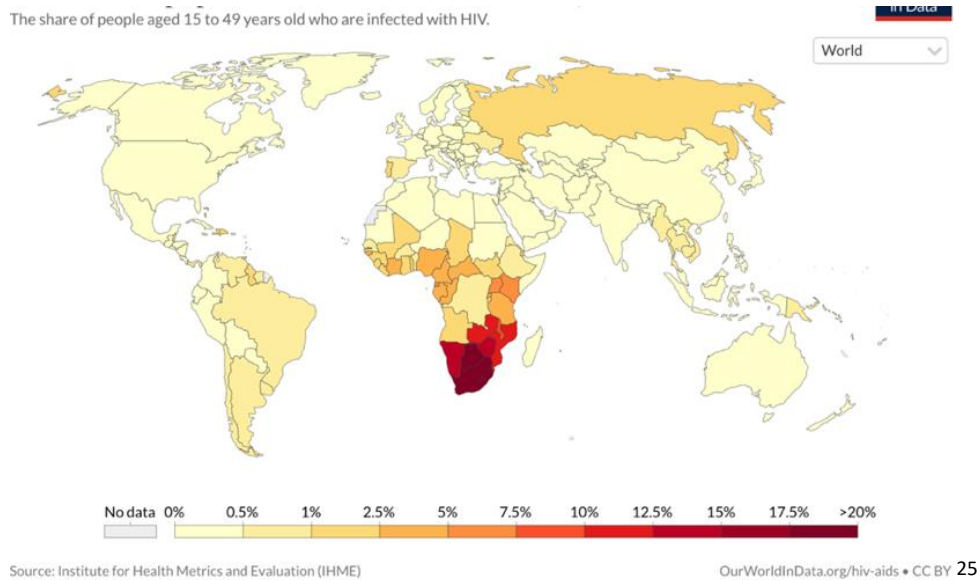
HIV/AIDS constitutes one of the largest public health problems of the 20th century. This section will focus on the global burden of HIV, virology, disease progression, treatment/prevention, and modes of transmission, and risk groups of to provide a basic understanding of the virus.

The scale and burden of HIV on the global scale is enormous. Data from the Joint United Nations Programme on HIV/AIDS (UNAIDS) shows that in 2020 roughly 37.7 million people globally lived with HIV, 1.5 million people became newly infected with HIV, and 680,000 people died from AIDS-related illnesses.²² While these staggering numbers show the present realities of HIV, the virus was most virulent in the late 1990s and early 2000s. Since the start of the HIV epidemic, approximately 79.3 million people have become infected with HIV and 36.3 million people have died from AIDS-related illnesses.²³ Importantly, the number of new HIV infections and AIDS-related deaths have decreased drastically since their peaks, of 3.0 million in 1997 and 1.9 million in 2004, respectively.²⁴ Like most diseases, the burden of HIV varies greatly. The below map shows the share of the population infected with HIV, using data from 2017:

²² <https://www.unaids.org/en/resources/fact-sheet>

²³ <https://www.unaids.org/en/resources/fact-sheet>

²⁴ <https://www.unaids.org/en/resources/fact-sheet>



As seen in the map, Southern Africa is the current hotspot of HIV, with most of the countries in this region having prevalence levels of over 10%. The disparities between HIV’s burden in Africa versus the rest of the world is truly staggering. Roser and Ritchie found that “most countries [worldwide] have a rate of less than 10 deaths per 100,000 – often much lower, below 5 per 100,000. Across Europe the death rate is less than one per 100,000. Across Sub-Saharan Africa the rates are much higher. Most countries in the South of the region had rates greater than 100 per 100,000. In South Africa and Mozambique, it was over 200 per 100,000”.²⁶ These researchers also noted: “More than 1-in-4 deaths (285) in South Africa and Botswana were caused by HIV/AIDS in 2017. The share was also very high across Mozambique (24%); Namibia (23%); Zambia (18%); Kenya (17%); and Congo (15%)”.²⁷ These striking disparities highlight the severity of the burden of HIV.

²⁵ <https://ourworldindata.org/hiv-aids#death-rates-are-highest-for-younger-adults-and-children-under-five-years-old>

²⁶ <https://ourworldindata.org/hiv-aids#death-rates-are-highest-for-younger-adults-and-children-under-five-years-old>

²⁷ <https://ourworldindata.org/hiv-aids#death-rates-are-highest-for-younger-adults-and-children-under-five-years-old>

HIV Virology and Disease Progression:

The first documented cases of HIV were discovered in Los Angeles in 1981. The German National Advisory Committee Blood, part of the German Ministry of Health, provides the following overview on the origins of HIV:

"According to present knowledge, the spread of HIV started at the beginning of the 20th century [4, 86]. Zoonotic transmission of SIVcpz from chimpanzees (*Pan troglodytes troglodytes*) occurred for HIV-1 group M and group O around 1920 and for HIV-1 group N around 1960 [23, 33] in West Central Africa. HIV-2 was transmitted zoonotically from sooty mangabey (*Cercocebus atys*) to human in West Africa around 1940 [87]. Molecular genetic analyses suggest that HIV-1 was exported to Haiti probably in 1966 and arrived in North America approximately 2 years later [4, 88]. Since the mid-1980s the different HIV-1 M subtypes have been spreading, leading to a global pandemic. In contrast to HIV-1, HIV-2 initially remained restricted to West Africa because of its significantly lower infectivity. After HIV-2 was exported to Portugal and France probably during the mid-1960s, the spreading of HIV-2 with a low prevalence especially in Europe, South America and Asia is documented."²⁸

On a biological level, "HIV belongs to a class of viruses called retroviruses and a subgroup of retroviruses known as lentiviruses or "slow" viruses (22). The course of infection with these viruses is characterized by a long interval between initial infection and the onset of serious symptoms".²⁹ Plainly stated, an individual may be infected with HIV and not show any symptoms for years. This long interval between infection and displays of symptoms poses a serious challenge to public health interventions, by complicating testing, prevention, and treatment interventions.

Kilmas et al offer a comprehensive summary of HIV's disease progression: "During the first few weeks of infection, the patient often suffers from a flu-like illness and a rash, an illness termed acute HIV-1 infection syndrome (6). This initial phase of HIV infection is followed by a gradual deterioration of the immune function. HIV has the ability to infect CD4 lymphocytes

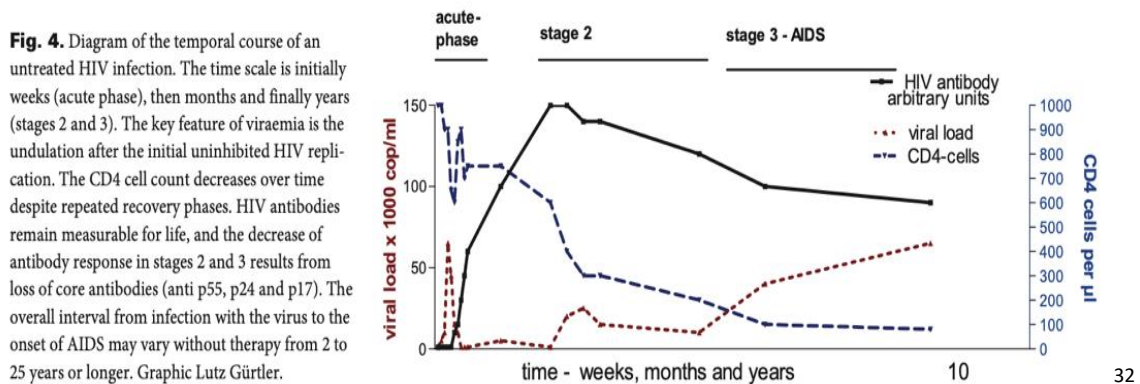
²⁸ German Advisory Committee Blood (2016) p.209

²⁹ Kilmas et al. (2008) p.524

and a variety of other cells in the body, including monocytes and thymocytes (5,7)".³⁰ The role CD4 cells and how HIV interacts with these cells is crucial to understanding the virus, its progression, and public health interventions. Again, Kilmas et al furnish an outstanding recap on their importance:

"CD4 cells, also called "T-helper cells," play a central role in the immune response, signaling other cells such as the cytotoxic T cell and the B cells to perform their functions (9). Normally, a healthy person has a CD4 count of 800 to 1200 CD4 T cells per cubic millimeter (mm³) of blood. As CD4 cells are destroyed by HIV and as these cells decrease in number, holes develop in the immune repertoire (5). Once the CD4 count falls 500 mm³, half of the immune reserve has been destroyed and minor infections including cold sores (herpes simplex), condyloma (warts) and fungal infections, thrush and vaginal candidiasis, may occur (Table 1, Category B). These infections are troublesome but not life threatening. However, as the CD4 count falls 200 cells/mm³, the patient becomes particularly vulnerable to the serious opportunistic infections and cancers that typify AIDS, the end stage of HIV disease."³¹

The German National Advisory Committee Blood published a graph that demonstrates the relationship between time, viral load, and CD4 count for HIV patients.



As this graph shows, there is an important correlation between the viral load and CD4 cells as time progresses. From a public health perspective, by measuring a patient's CD4 count medical practitioners can determine the level of severity of a patient's HIV infection. Historically, an

³⁰ Kilmas et al (2008) p.523

³¹ Kilmas et al (2008) p.523

³² German Advisory Committee Blood (2016) p.209

individual's CD4 count has had important effects on HIV treatment options, however this changed in 2016 with the World Health Organization's Treat All recommendation. With this baseline knowledge it is possible to discuss the therapeutic advancements that can turn HIV into a chronic, manageable disease.

Treatment and Prevention:

In 1987 the U.S. Food and Drug Administration granted approval to the drug azidothymidine (AZT) as a therapeutic to treat HIV; making AZT the first drug to be authorized for treatment against HIV. In human trials, AZT was found to delay the "onset of AIDS in asymptomatic people with HIV".³³ Several other therapeutic achievements have been made since 1987. Ghosn et al argue that three major breakthroughs in the treatment of HIV deserve special attention:

"The first revolution was the introduction of protease inhibitors in 1996, which, in combination with two nucleoside-analogue reverse-transcriptase inhibitors, produced highly active antiretroviral therapy (HAART) and greatly improved the prognosis of an otherwise uniformly lethal disease.¹ The second revolution, the use of treatment as prevention, was built on the promising results from observational studies,²⁻⁵ and culminated with the HPTN 052 study.^{6,7} This landmark randomised clinical trial supported the benefits of combination antiretroviral therapy (cART) in serodiscordant couples (ie, one HIV seronegative and one HIV seropositive partner) with a substantial reduction (96%) in the risk of sexual transmission of HIV when the seropositive partner had undetectable plasma HIV RNA...The third revolution occurred with the first studies to show the significant individual clinical benefit of early cART, even with a CD4 count greater than 500 cells per μ L."³⁴

Each of these three therapeutic breakthroughs had tremendous impacts on public health and the morbidity and mortality rate of HIV/AIDS. By taking and sustaining antiretroviral therapy HIV positive individuals can virally suppress the virus. This minimizes the risk of transmission

³³ <https://www.niaid.nih.gov/diseases-conditions/antiretroviral-drug-development>

³⁴ Ghosn et al (2018) p.685

and greatly improves their medical prognosis, in essence making HIV a chronic, but manageable disease.³⁵

The second breakthrough mentioned by Ghosn et al led to the idea of treatment as prevention. On this, the CDC states: “People living with HIV who take HIV medication daily as prescribed and get and keep an undetectable viral load have effectively no risk of sexually transmitting HIV to their HIV-negative partners”.³⁶ Key to the idea of treatment as prevention is viral suppression of the virus. Furthermore, Treatment as prevention plays a crucial role in curbing the spread of the virus in serodiscordant couples.³⁷ The third breakthrough provided the scientific evidence to support a treat all initiative. Prior to this breakthrough, countries set guidelines related to CD4 count to determine who was eligible to receive ART medication. However, in 2016 the World Health Organization “recommended that all people diagnosed with HIV should start ART at any CD4+ T-cell count... Since then, at least 84 percent of low- and middle-income countries have formally adopted this “Treat All” policy”.³⁸ Positive effects were immediately seen. Hoenigl et al found that “ART initiated within 30 days of diagnosis led to rapid and reliable viral suppression in acute, early and chronic HIV infection, in particular when INSTI-based regimens were used. A quarter of the study population initiated ART at their first clinic intake, and 79% of those individuals achieved viral suppression as early as week 12”.³⁹ Again, this 2016 Treat All recommendation was successful as viral suppression can be quickly achieved if ART is taken at an early stage of HIV.

³⁵ Simon et al (2006) p.7

³⁶ <https://www.hiv.gov/tasp>

³⁷ Hull and Montaner (2013) p.S95-S101

³⁸ <https://www.niaid.nih.gov/news-events/treat-all-hiv-policy>

³⁹ Hoenigl et al (2015) p. 3

One of the most successful public health interventions to curb HIV transmission has been the efforts in the field of mother-to-child (vertical transmission) prevention. This success is in large part due to the widespread availability of ART. Researchers found that “In 2016, 76% of pregnant women with HIV had access to cART, and mother-to-child transmission rates globally fell below 5%, although a few countries continued to lag behind”.⁴⁰ This incredible improvement provides an example of how effective widespread ART usage can be in preventing the transmission of HIV.

A second notable advancement that has significantly lowered HIV transmission rates is pre-exposure prophylaxis (PrEP). Studies showed the efficacy of PrEP “in preventing HIV infection in MSM, heterosexual serodiscordant couples, and heterosexual individuals with multiple partners, when given on a continuous daily basis”.⁴¹ Adherence to PrEP is crucial. The U.S. Center for Disease Control and Prevention states that “PrEP reduces the risk of getting HIV from sex by about 99% when taken as prescribed”.⁴² Unfortunately, adherence to PrEP is an issue. In a landmark study that focused on PrEP adherence among sub-Saharan African women, Marrazzo et al found that “None of the drug regimens we evaluated reduced the rates of HIV-1 acquisition in an intention-to-treat analysis. Adherence to study drugs was low”.⁴³

In summary, there are two different types of medications that have played a significant role in curbing the transmission of HIV. ART is used to lower morbidity and mortality of HIV positive individuals and as treatment as prevention. This is done by achieving viral suppression

⁴⁰ Ghosn et al (2018) p.688-689

⁴¹ Ghosn et al (2018) p.689

⁴² <https://www.cdc.gov/hiv/basics/prep/prep-effectiveness.html#:~:text=PrEP%20is%20highly%20effective%20for,74%25%20when%20taken%20as%20prescribed.>

⁴³ Marrazzo et al (2015) p.509

of HIV. PrEP, on the other hand, is taken by individuals in high-risk situations and prevents HIV from spreading from a seropositive individual to a seronegative individual. When taken as prescribed, PrEP has an efficacy rate of 99%. It is crucial to note the importance of adherence for both medications.

Modes of Transmission:

HIV is typically transmitted via sexual contact or through blood. Due to this, groups considered at-risk for HIV typically include men who have sex with men (MSM), intravenous drug users (IDU), commercial sex workers (CSWs), and transgender people.⁴⁴ Structural factors also play a role in the spread of HIV. Ghosn et al write, “the role of psychosocial determinants of health, such as poverty, food insecurity, stigma, discrimination, poor social support, gender-based violence, and mental health (eg, depression, alcohol dependence, and neurocognitive disorders), in the HIV epidemic has become increasingly apparent, particularly for women”.⁴⁵ These factors indicate the importance of social and economic influences in the HIV epidemic, with clear connections to health equity issues.

HIV in Latin America: Regional Trends and Challenges

The purpose of this section is to provide an overview of HIV in Latin America with a look at regional trends and challenges in the prevention and treatment of the disease. Latin America is a large and diverse region. This is reflected in the varying degrees of impact HIV has had on the region’s various sub-regions and countries. Related to this variability in HIV burden, Shawn Smallman writes, “throughout the region the disease has fractured into a series of sub-

⁴⁴ Ghosn et al (2018) p.686

⁴⁵ Ghosn et al (2018) p.685

epidemics, each driven by different factors”.⁴⁶ Smallman’s book, *The AIDS Pandemic in Latin America* attempts to explain the different factors that contribute to these sub-epidemics. However, prior to diving into this, it is important to contextualize HIV within the sociocultural structures of Latin America. Smallman writes the following on the cultural and social factors contributing to HIV’s spread throughout the region: “the large number of men having sex with men, the inability of many wives to negotiate condom use, a significant population injecting drugs, efforts by the Catholic Church to block sex education, and prejudice” present unique challenges. Discrepancies in HIV risk by sex are important to note, especially when using a health equity lens. The Pan-American Health Organization notes that: “women are more vulnerable to infection, both biologically and socially, while men tend to be at a greater risk due to ‘pro-active’ behavior”.⁴⁷ This has important health equity ramifications as women are typically exposed to HIV due to the activities of their male partners and gender roles in the region hinder women’s ability to negotiate condom usage. Thus, women face unjust levels of risk due to social constructions.

Now, I will briefly summarize Smallman’s findings on the factors that contributed to the unique sub-epidemics in the following sub-regions: the Caribbean, Mesoamerica, and Spanish South America. On the Caribbean, Smallman argues that international factors have played the primary role in the HIV sub-epidemic, specifically citing the role of sex tourism, labor migration and developmental issues.⁴⁸ The Caribbean is the sub-region in Latin America most burdened by HIV. According to Joint United Nations Programme on HIV/AIDS (UNAIDS) data, prevalence

⁴⁶ Smallman (2007) p.3

⁴⁷ Bautista-Arredondo (2015) p.1

⁴⁸ Smallman (2007) p.204

among individuals between 15-49 in the Caribbean ranges from 0.4% in Cuba to 1.9% in Haiti.⁴⁹ While the 1.9% prevalence in Haiti is low compared to areas in Southern Africa, it is noteworthy as it is the highest in Latin America and the Caribbean. The second sub-region considered by Smallman is Mesoamerica, which includes Mexico and the countries of Central America. There is a lower level of HIV in Mexico compared to the countries of Central America, which Smallman attributes to the history of war and internal displacement in these Central American countries.⁵⁰ The last sub-region in Smallman's analysis is Spanish South America. Smallman argues that three overarching trends exist in this subregion: 1) "in drug producing states, such as Peru, Bolivia, Ecuador, and Colombia, the HIV epidemic has continued to be dominated by men having sex with men", 2) whereas in Argentina and Brazil the usage of injected drugs has played a larger role, and 3) countries like Chile and Uruguay "the virus is following a separate, and so far slower, path".⁵¹ All in all, Smallman provides a broad overview to help ground our understanding of HIV in Latin America, with an important emphasis on the various factors that have shaped the region's various sub-epidemics.

UNAIDS data from 2020 shows that approximately 2.4 million people in Latin America (0.4% prevalence ages 15-49) and the Caribbean (1.1% prevalence ages 15-49) live with HIV and that approximately 44,000 AIDS-related deaths occurred in 2019.⁵² Adult HIV prevalence in the region varies greatly. Broadly speaking, the Caribbean countries (Cuba the Dominican Republic, Haiti, Belize, Guyana, and Suriname) have the highest prevalence, followed by Central America,

⁴⁹ UNAIDS HIV Prevalence Data

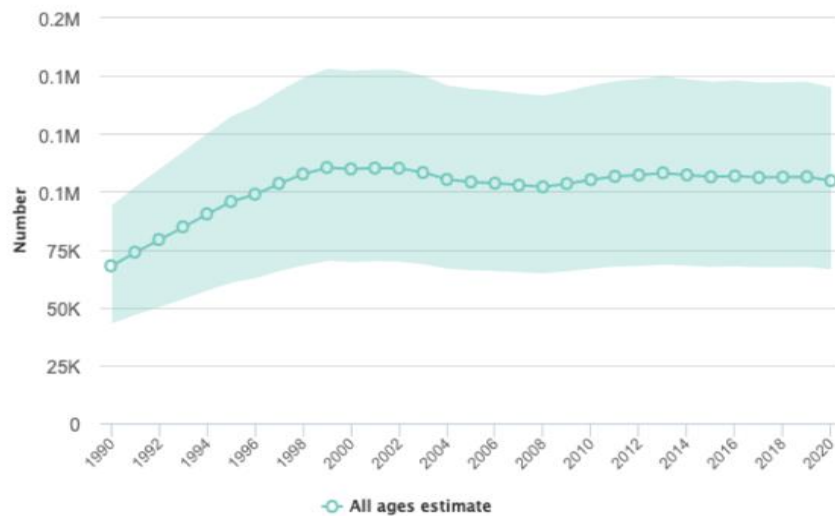
⁵⁰ Smallman (2007) p.205

⁵¹ Smallman (2007) p.205-206

⁵² <https://www.avert.org/professionals/hiv-around-world/latin-america/overview>

and then Spanish South America.⁵³ However, once broken down by risk group, extreme disparities become evident. For example, HIV prevalence among men who have sex with men is 25.4% in Bolivia and 8.5% in Uruguay.⁵⁴ Similarly, Argentina, Bolivia, and Brazil see higher prevalence among sex workers, all over 4%, whereas less than 1.5% of sex workers are HIV positive in Colombia, Costa Rica, Guatemala, Mexico, Panama, and Uruguay.⁵⁵ In terms of injection drug users Brazil has the highest prevalence by far.⁵⁶ This data supports Smallman’s central idea that the HIV sub-epidemics in the region are unique.

On a macro-level, the number of new HIV infections in Latin America, not including the Caribbean, has remained constant since 1997 and the change in new HIV infections since 2010 is 0%:



57

This graph shows that the number of new HIV infections has plateaued between 100,000-110,000 per year since 1997. One of the reasons behind this leveling off includes the more

⁵³ <https://www.avert.org/professionals/hiv-around-world/latin-america/overview>

⁵⁴ <https://aidsinfo.unaids.org/>

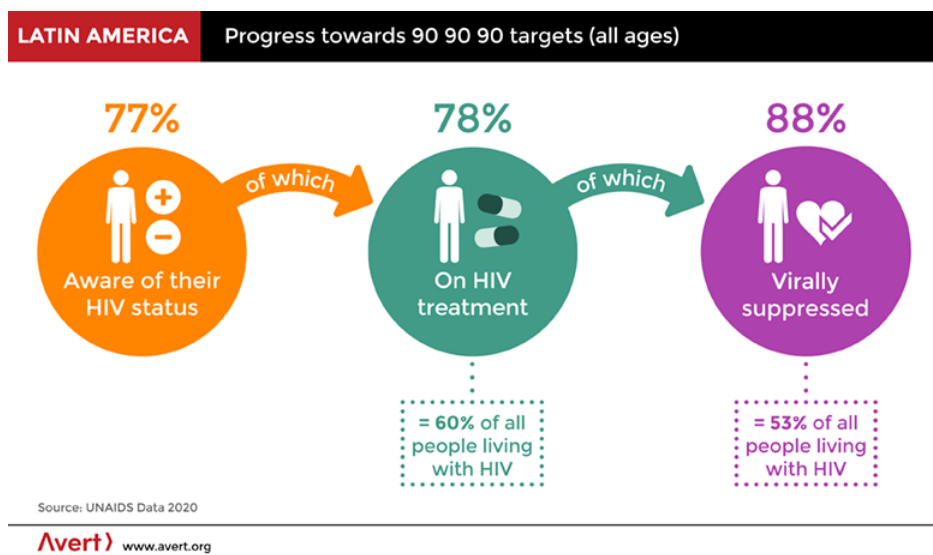
⁵⁵ <https://aidsinfo.unaids.org/>

⁵⁶ <https://aidsinfo.unaids.org/>

⁵⁷ <https://aidsinfo.unaids.org/>

widespread availability of ART and the use of ART for treatment as prevention, however I will discuss all the factors later in this chapter. A second positive macro-level data point is that the change in AIDS-related deaths since 2010 has decreased by 21% in Latin America, not including the Caribbean.⁵⁸ Again, the primary reason behind this substantial decline in AIDS-related deaths has been the expansion of ART coverage in the region.

In 2014, UNAIDS launched the 90-90-90 targets to stop the spread of HIV and end the AIDS epidemic, with the goal of reaching these targets by 2020. The 90-90-90 targets call for: 1) 90% of all people living with HIV/AIDS knowing their status, 2) 90% of all people with diagnosed HIV infection receiving sustained antiretroviral therapy, 3) 90% of all people receiving antiretroviral therapy achieving viral suppression. The following graphs show Latin America's progress towards these targets, not including the Caribbean:



59

While the region has undoubtedly seen improvements in the prevention and treatment of HIV/AIDS, there is clearly still work to be done. While not considered as part of the 90-90-90

⁵⁸ <https://aidsinfo.unaids.org/>

⁵⁹ <https://www.avert.org/professionals/hiv-around-world/latin-america/overview>

targets, only 60% of all people living with HIV are on ART treatment and 53% of all people living with HIV have virally suppressed the disease. Furthermore, widespread discrepancies exist within the region. For example, 81% of PLWH receive ART in Uruguay while only 50% of this population in Nicaragua receives treatment.⁶⁰ South American countries see the highest levels of ART coverage for PLWH, particularly the Southern Cone and Andean regions, whereas the countries of Central America typically see percentages close to 50%.⁶¹

It is interesting to note that this widespread expansion of ART availability coincides with a period that saw widespread adoption of neoliberal economic policies throughout Latin America. Even though many social programs and services suffered due to austerity in this span, the fight against HIV/AIDS instead benefited from increased funding. The main reason for this is that the fight against HIV/AIDS gained widespread support from international actors, which supplied massive levels of funding. Data from the Institute for Health Metrics and Evaluation shows that globally the amount of money spent to combat HIV/AIDS has grown from \$1.5 billion in 2000 to a peak of \$12 billion in 2012.⁶² This \$12 billion in 2012 is an unprecedented amount of money to be spent on a single public health focus area. For example, in 2000, the total amount of money spent on global health was \$12.7 billion, whereas efforts against HIV/AIDS received almost that entire amount, \$12 billion, in each of 2011 and 2012.⁶³ These numbers show the scale of the massive investment made to combat HIV/AIDS and help explain

⁶⁰ <https://aidsinfo.unaids.org/>

⁶¹ <https://aidsinfo.unaids.org/>

⁶² <https://www.healthdata.org/policy-report/financing-global-health-2020-impact-covid-19>

⁶³ <https://www.healthdata.org/policy-report/financing-global-health-2020-impact-covid-19>

how countries in Latin America were able to greatly expand ART availability during a period of neo-liberal economic dominance.

Challenges to Treatment and Prevention:

Now that we understand the social and cultural context underscoring the various sub-epidemics of the region and the macro-level trends we can dive into a brief overview of the advances and challenges of HIV prevention and treatment. This section discusses the ramifications of the WHO Treat All guideline, importance of ART adherence and the accompanying roadblocks, advances made in curtailing vertical transmission, and regional life-expectancy trends.

In 2016 the WHO created guidelines that encouraged countries to provide ART drugs to all persons with HIV, regardless of their CD4 cell count. Starting treatment earlier can curtail the progression of the disease and drastically reduce the risk of transmission by achieving viral suppression.⁶⁴ This can turn HIV into a chronic, but manageable, condition and decreases the level HIV/AIDS-related morbidity and mortality.⁶⁵ Most Latin American countries quickly implemented these guidelines and by mid-2018 only 4 countries “continued to apply immunologic criteria for ART treatment initiation (Guatemala, El Salvador, Nicaragua, and Colombia)”, though Guatemala and El Salvador were making plans to meet the Treat All guidelines.⁶⁶ Despite this monumental advancement in providing ART to all PLWH, two persistent challenges exist: late ART treatment initiation and ART treatment adherence.⁶⁷

⁶⁴ Luz et al (2019) 367

⁶⁵ Luz et al (2019) 367

⁶⁶ Luz et al (2019) 367

⁶⁷ Luz et al (2019) 367

The first challenge, late treatment initiation, “is a function of multiple, layered determinants with individual, interpersonal, social and structural factors... ART initiation is a critical indicator in measuring how well programs are responding to the HIV epidemic”.⁶⁸ Even though ART is widely available to PLWH in most Latin American countries, many factors influence when an individual may be tested for HIV or begin receiving ART. This negatively impacts the treatment of HIV, as people who could have started ART treatment earlier may instead initiate treatment at the later stages of HIV. This decreases their odds achieving viral suppression. This is a clear example of social and/or structural inequities negatively influencing health outcomes. Along these lines, researchers in Brazil using CCASAnet data found that between 2013-2017 “people with HIV who initiated ART with CD4 counts of 200 cells per μ or greater had life expectancy that was similar to that of the general population, which highlights the value of initiating ART before immunosuppression”.⁶⁹ These same authors conjecture that “late ART initiation is still the main modifiable risk factor for mortality in Latin America and the Caribbean”.⁷⁰ In other words, treatment initiation before reaching AIDs greatly improves outcomes for people living with HIV.

The second challenge is treatment adherence. The importance of treatment adherence cannot be understated. On the topic, Luz et al write, “ART adherence is the best predictor of virologic suppression and as such a basic requirement for improving HIV clinical outcomes, reducing morbidity and mortality of PLWH, and halting HIV transmission”.⁷¹ Studies undertaken

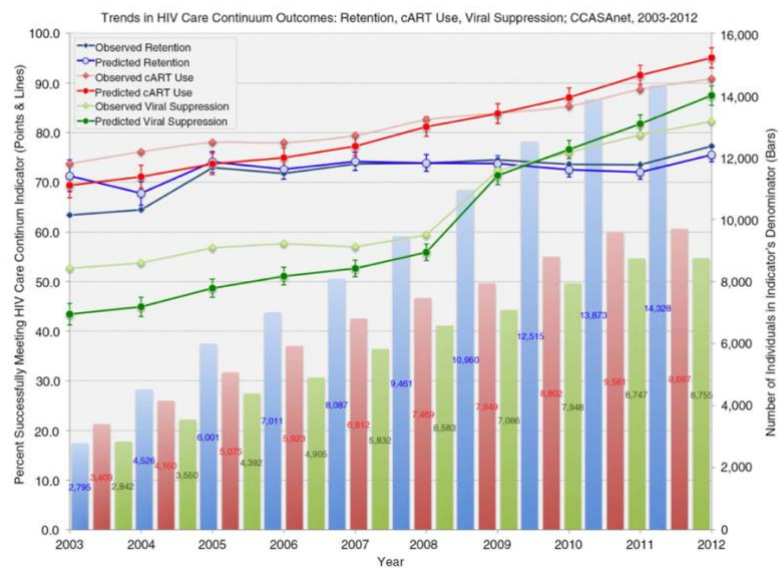
⁶⁸ Luz et al (2019) 367

⁶⁹ Luz et al (2019) 367

⁷⁰ Coelho and Luz (2021) e247

⁷¹ Luz et al (2019) 368

to better understand ART use/retention and viral suppression in the region underscore the importance to focusing on adherence, and help highlight risk groups for lack of treatment adherence. A study conducted with CCASAnet data from 2003 to 2012 shows that ART usage and viral suppression increased from 74 to 91% and 53 to 82%, respectively.⁷² The below table summarizes the findings from the CCASAnet analyses related to retention, ART use, and viral suppression:



73

The table shows how all the measured variables, retention, ART use, and viral suppression, improved over time for the CCASAnet network of sites and supports the notion that the region has made strides in addressing the HIV crisis across the last two decades. Importantly, this article also identifies specific risk groups that adhere to ART. The authors found that older age “was associated with increased probability of cART use... [and that] other/unknown HIV transmission category was associated with a higher probability of cART use versus MSM”.⁷⁴ This

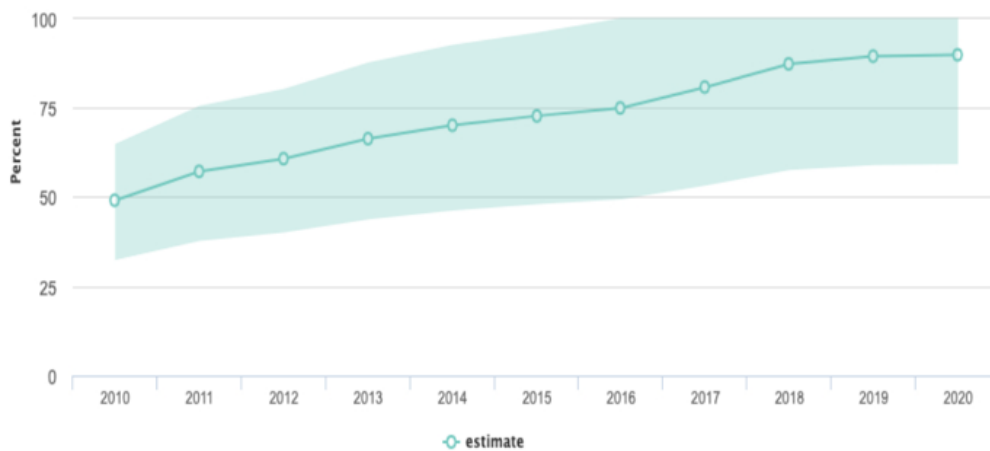
⁷² Rebeiro et al (2016) 1

⁷³ Rebeiro et al (2016) 4

⁷⁴ Rebeiro et al (2016) 3

means that younger populations and MSM are at higher probability of not adhering to their HIV treatment. Research in this vein is important as it helps public health practitioners better understand which populations remain at risk and highlight the need for additional or new policies and procedures to reach these populations.

Despite the ongoing challenges discussed above, it is important to note the drastic improvements in HIV care and prevention throughout the region. Simley et al found that “life expectancy of PLWHA on ART significantly improved from 2003 to 2017 and now approaches that of the general population in these areas”.⁷⁵ The authors argue that the increased availability of ART in the region played a significant role in this improvement, while also noting disparities between and within countries due to the social determinants of health.⁷⁶ In addition to progress in HIV screening and ART availability, the impressive advancements in reducing vertical transmission (mother-to-child) has been noteworthy. The below graph highlights this achievement by showing the percentage of pregnant women who receive ART:



77

⁷⁵ Simley et al (2021) 6

⁷⁶ Smiley et al (2021) 7

⁷⁷ <https://aidsinfo.unaids.org/>

As a region, approximately 90% of mothers receive ART. This is important as providing medication to prevent vertical transmission plays an crucial role in reducing the prevalence of HIV in the community, which in turn helps cut down on transmission.

Conclusion:

The goal of this sub-chapter is to provide a brief overview of the regional trends of HIV in Latin America. To achieve this goal, I provided a truncated account of regional societal and cultural forces that complicate efforts to treat and prevent HIV, highlighted the WHO's 90-90-90 initiative and Treat All guidelines, discussed the importance of treatment initiation and treatment adherence, noted regional life expectancy trends, and shown connections between these challenges and health equity. It is my hope that this information provides a solid foundation for the following chapter, which focuses on HIV in Brazil, Mexico, and Peru.

CHAPTER 3: The HIV Epidemics of Brazil, Mexico, and Peru

The goal of this chapter is to provide a detailed overview of the HIV epidemics in Brazil, Mexico, and Peru, the three countries from which the data in the Chapter 4 analysis originates. Each of the individual country overviews will take the following format: 1) I will examine the social and political contexts around HIV/AIDS from the early 1980s until laws for universal treatment were enacted, 2) I will provide an snapshot picture of the country's current HIV/AIDS epidemic, with a focus on treatment and prevention efforts and their effects, and discuss what makes the country's epidemic unique, 3) I will discuss the health equity issues that remain and must be addressed to fully curb the epidemics.

Brazil

Brazil's experience in dealing with HIV and managing the epidemic has earned it international acclaim. Chris Beyrer, former president of the International AIDS Society, once said, "What [Brazil] did in the early '90s was to really head this epidemic off at the pass".⁷⁸ In this light, it would be remiss to write a paper on HIV in Latin America and not dedicate a substantial section to Brazil. Furthermore, as the largest and most populated country in the region, Brazil plays an important role in regional efforts to prevent the spread and treat those living with HIV/AIDS. This country subsection will explain the social and political context of HIV and HIV policy in Brazil, provide a snapshot of the country's current HIV epidemic, and address health equity concerns for future interventions.

Social Context

⁷⁸ Okie (2006) p.1978

Prior to discussing the politics and policies of HIV in Brazil, it is necessary to understand the social context of gender in Brazil and how news of HIV's arrival played out in the country. HIV first appeared in Brazilian media in 1981 and was described as "um câncer misterioso em homossexuais que estava sendo pesquisado nos EUA".⁷⁹ Unfortunately, anti-gay hysteria quickly gained traction in the country. The media began to use terms such as "peste gay" and "praga gay", which contributed to a "um comportamento coletivo de preconceito, moralismo, medo, pânico, e até mesmo da indiferença ante a infecção pelo HIV".⁸⁰ Others write that HIV was viewed as a "doença 'estranha' que acometia pessoas consideradas 'estranhas'".⁸¹ Luckily, due to political forces to be discussed later in the sub-section and a period of intense social mobilization, fear and panic towards HIV and the gay community did not remain prominent in Brazil.

Richard Parker's seminal work, *Beneath the Equator: Cultures of Desire, Male Homosexuality, and Emerging Gay Communities in Brazil* discusses the social context for understanding gender and sex in the country. Many of Parker's findings in Brazil can be applied to other countries in the region. Parker emphasizes the differences between *atividade* and *passividade* in sexual encounters. He writes, "the symbolic structure of male/female interactions seems to function in many ways as a kind of model for the organization of same-sex interactions in Brazilian culture".⁸² That is to say, that in male/male sexual interactions, the male that takes the active role "does not necessarily sacrifice his culturally constituted

⁷⁹ Da Costa Maruques (2003) p.65

⁸⁰ Da Costa Maruques (2003) p.67

⁸¹ Nascimento (2005) p.83

⁸² Parker (1999) p.30

masculinidade”.⁸³ This is important to understand as MSM represent the largest risk group for HIV. Furthermore, as many members of the MSM population also engage in heterosexual relationships, this group serves as a “‘bridge’ group” that plays a large role in the spread of HIV to the heterosexual population.⁸⁴ Due to this connection, understanding gender dynamics is important when considering the HIV epidemic.

The early 1980s were a time of social and political mobilization in Brazil as the military dictatorship that had ruled the country since 1964 faced heavy criticism from activists, which created an environment conducive to change. This had a direct effect on social mobilization in the face of the HIV/AIDS epidemic. The arrival of HIV coincided with a high level of social mobilization. This led to the creation of non-governmental organizations (NGOs) dedicated to combatting the stigma of HIV and providing support to those living with HIV. Raimundo do Nascimento writes that Herbert Daniel and Herbert de Souza, two leaders in the fight against HIV/AIDS, brought their “tradições oposicionistas, cunhadas numa militância política de esquerda” to these efforts.⁸⁵ The role of social groups in Brazil’s fight against HIV/AIDS should not be understated. In fact, the first NGO dedicated to the HIV/AIDS epidemic in all Latin America was the Grupo de Apoio e Prevenção à Aids (GAPA), which was created in Sao Paulo in 1985.⁸⁶ Other NGOs quickly sprang up, including Valorização, Integração, e Dignidade do Doente da Aids (Pela Vida) and the Associação Brasileira Interdisciplinar de Aids (ABIA).⁸⁷ These NGOs and the social mobilization that occurred in response to the military dictatorship

⁸³ Parker (1999) p. 30-31

⁸⁴ Sanchez et al (2007) p.578-579

⁸⁵ Raimundo do Nascimento (2005) p.94

⁸⁶ Da Costa Marques (2003) p.97

⁸⁷ Da Costa Marques (2003) p.105

and HIV/AIDS epidemic has led some academics to argue that the “Brazilian response to AIDS thus emerged from the bottom up”.⁸⁸ This influence of social activists on public health, and particularly HIV, is evident in the legislation enacted in the post-dictatorship period.

Political Context:

The alarming spread of HIV coincided with the end of the military dictatorship that governed Brazil from 1964-1985. The military’s rule over the country weakened dramatically in the early 1980s, through a process known as *abertura*. During *abertura* the dictatorship began to decentralize resources and decision-making to sub-national governments to “appease new democratic forces”.⁸⁹ This pressure by pro-democracy individuals occurred at the same time as an economic recession. These political and economic pressures created an “immediate impetus” for health reform in the country.⁹⁰ This charge to create and implement health reform in the country was driven by the *sanitarista* movement, which had slowly gained prominent roles in state and municipal level health departments during the *abertura* process.⁹¹ The *sanitarista* movement would go on to play an enormous role in the country’s policy and general response to the HIV epidemic. It is important to note that from 1983-1985, the final years of the military dictatorship, “não havia ainda nenhuma resposta legítima oficializada do governo federal para a Aids no Brasil, portanto, não havia nenhuma linha de articulação central que orientasse e direcionasse os Estados onde a epidemia foi se configurando como uma realidade”.⁹² While this was not abnormal for the time, I mention to show how quickly things

⁸⁸ Berkman et al (2005) p.1168

⁸⁹ Nunn (2009) p.15

⁹⁰ Davidian (2021) p.70

⁹¹ Flynn (2013) p.8

⁹² Da Costa Marques (2003) p.90

changed. In “the mid-1980s the Brazilian National Secretary of Health declared that AIDS prevention research would not be a priority, for as long as it was restricted to ‘minority’ groups”.⁹³ These sentiments show the complete lack of response to the HIV crisis in the early to mid-1980s. Fortunately, this would quickly and drastically change after the re-democratization process, when the *sanitarista* movement obtained key positions in the new government’s health hierarchy.

The *sanitarista* movement was comprised of a “loose group of health professionals, doctors, nurses, and public health workers [that] developed in the late 1960s and 1970s in response to the military dictatorship. Critical of the health system’s impact on social exclusion, they view health as an issue of social justice, as a means to address the country’s historic social inequalities”.⁹⁴ Two monumental pieces of legislation show the role that the *sanitarista* movement played during this time and how impactful their influence was on Brazil’s public health system. Flynn writes, “A coalition of *sanitaristas* and progressive forces established health as a human right guaranteed by the state in Brazil’s new Constitution of 1988. Two years later, Congress passed the Health Act of 1990 which established the operating principles of the Unified Health System (Sistema Único de Saúde-SUS)”.⁹⁵ The inclusion of health as a human right in the 1988 Constitution and the creation of the public health system, SUS, in 1990 had far-reaching implications for Brazil’s response to the HIV/AIDS epidemic. Importantly, these only came to fruition due to the influence of the *sanitarista* movement in post-military dictatorship politics.

⁹³ Inciardi (2000) p.117

⁹⁴ Flynn (2013) p.8

⁹⁵ Flynn (2011) p.156

The first formalized, federal level response to the growing HIV epidemic was the creation of the National STD/AIDS Programme (NAP) by the Ministry of Health in 1986.⁹⁶ Nunn argues that NAP only played a minor role in HIV/AIDS policy, until the early 1990s, as the state ministries of health from Rio de Janeiro and São Paulo dominated the early HIV response since they were home to a vast majority of the cases.⁹⁷ HIV quickly spread in Brazil. During a visit in August 1991, a WHO official claimed that if concrete steps were not taken to prevent and treat the spread of HIV that Brazil “would shortly have an epidemic of the same magnitude of Africa’s”.⁹⁸ This remark led to a rapid response by then President Fernando Collor de Mello, whose government “announced \$22 billion cruzeiros in new AIDS spending for 1992, a 16-fold increase from 1991”, which would focus on providing antiretroviral therapy to those with HIV.⁹⁹ This commitment set a precedent of providing medication to those living with HIV.

Perhaps the most important piece of legislation, outside the codification of health as a human right in the 1988 Constitution and the 1990 creation of SUS, is Law 9.313, also known as Lei Sarney. Lei Sarney is named after Jose Sarney, who served as President of the Federal Senate when the law was passed. Lei Sarney had the following effects on Brazil’s response to the HIV/AIDS epidemic: “[Lei Sarney] mandated the state to provide free AIDS treatments to everyone in need. While medicines policies through the public health system remained underfunded and/or decentralized, the law resulted in a vertical program for the provision of free AIDS treatments throughout the country. The central government assumed responsibility

⁹⁶ Greco and Simão (2007) S38

⁹⁷ Nunn (2009) p.46

⁹⁸ Nunn (2009) p.59

⁹⁹ Nunn (2009) p.60

for procuring expensive anti-retroviral drugs (ARVs), while state and local governments acquired medicines used to treat opportunistic infections”.¹⁰⁰ In other words, the Brazilian state was now obligated to provide antiretroviral therapy to those living with AIDS. To do so, the government committed to set up a highly funded program. This commitment by the Brazilian federal government had enormous consequences on the HIV epidemic in the country.

Not only did Lei Sarney provide much-needed medications and have obvious health benefits, but it also made sense economically. Researchers estimate that between 1997-2000, approximately “234,000 hospital admissions were avoided, representing savings of \$677 million”.¹⁰¹ Furthermore, Brazil’s success in scaling-up their ART distribution garnered accolades world-wide and offered an alternative path for other LMICs to focus on treatment efforts and not just prevention.¹⁰² However, cost challenges related to procuring new antiretroviral therapies continuously occurred. This is primarily due to Brazil’s inclusion in the World Trade Organization (WTO) and the WTO’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). To combat ever-rising prices, José Serra, Minister of Health from March 1998 to February 2002, utilized a novel negotiation tactic that Brazil has relied on ever since. Succinctly put: “Since 2001, Brazil has consistently engaged in price negotiations with multinational pharmaceutical companies for the ARVs consuming the largest share of its treatment budget and has steadily scaled up AIDS treatment, which had long term impacts on the costs of AIDS treatment”.¹⁰³ All-in-all this method has been largely successful as Brazil has

¹⁰⁰ Flynn (2013) p.10

¹⁰¹ Flynn (2013) p.12

¹⁰² Flynn (2013) p.12

¹⁰³ Nunn (2009) p.141

frequently obtained significant discounts from the pharmaceutical companies that produce these drugs.¹⁰⁴ The last piece of policy in the history of Brazil's response to HIV/AIDs occurred at the end of 2013. In this year the country decided to take a treat-all approach and offer antiretroviral medication to all citizens living with HIV, regardless of the severity or stage of their illness.¹⁰⁵ Prior to this decision, the government provided antiretroviral therapy to those that met certain immunological conditions. It is interesting to note that Brazil adopted this policy two years before the World Health Organization officially recommended this approach.

This brief overview of Brazil's social and political response to the HIV epidemic shows that the country embraced *sanitarista* ideals during the transition to democracy. This is best seen in the inclusion of health as a human right in the 1988 Constitution and the creation of the Sistema Único de Saúde in 1990. The third key piece of legislation is Lei Sarney, which mandated that the federal government provide medication to those with AIDs. This set a precedent of Brazil providing treatment to its citizens rather than solely focusing on prevention efforts. By successfully scaling-up its HIV treatment program Brazil became a case study that other LMICs sought to copy.

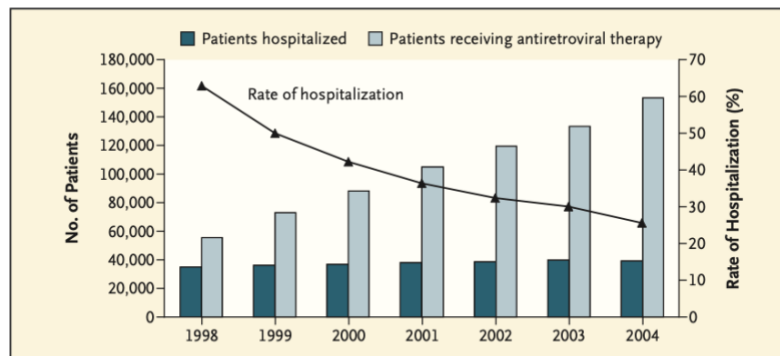
Treatment and Prevention Efforts, Outcomes, and 2020 Statistics

This sub-section will provide a brief overview of results from Brazil's treatment and prevention efforts and discuss the 2020 country level statistics from UNAIDS. Treatment guidelines in Brazilian shifted as the HIV epidemic, scientific knowledge, and the amount and production of antiretroviral medications changed. The CD4 count required to be eligible for

¹⁰⁴ For a detailed account see Nunn 2009 and Flynn 2011

¹⁰⁵ Piccoli et al (2017) p.1

antiretroviral therapy in the country shifted from 200 cells/mL in 2001, to 350 cells/mL in 2004, and 500 cells/mL in 2008.¹⁰⁶ Thus, in the early 2000s only those with significantly weakened immune systems were able to obtain antiretroviral therapy through federal government sources. The below graph shows the effects of antiretroviral therapy coverage on HIV-related hospitalization rates:



Numbers of AIDS-Related Hospitalizations and Patients Receiving Antiretroviral Therapy in Brazil and Rates of Hospitalization among Such Patients, 1998–2004.

Data are from Brazil's DATASUS (the database of the central health system) and National STD and AIDS Program.

107

This illustrates how hospitalization rates fell as more individuals obtain access to ART. For example, the number of patients hospitalized for AIDS-related hospitalization never exceeds 30,000 while the number of patients receiving antiretroviral therapy increased dramatically from just less than 60,000 to just under 160,000 between 1998 and 2004. Academics claim that this success in scaling-up distribution helped the country “control epidemic spread” and obtain a “relatively low and stable prevalence”.¹⁰⁸ This scaling-up was particularly impressive as it happened much more quickly and earlier when compared to most other LMIC countries.

¹⁰⁶ Rodrigues et al (2021) p.2

¹⁰⁷ Okie (2006) p.1978

¹⁰⁸ Okie (2006) p.1978

Recent studies show continued success in Brazil, as the availability of antiretroviral therapy for all individuals living with HIV has had a great impact on health outcomes. In 2014, Domingues and Waldman published a study that compared the causes of death among people living with HIV/AIDs in São Paulo between 1991-1996 (pre-HAART), 1997-1999 (early post-HAART), and 2000-2006 (late post-HAART) to understand the potential effects of antiretroviral therapy. They found a “nearly 15-fold increase in the rate of mortality from non-AIDS-related diseases between the pre-HAART period and late post-HAART period, principally from cardiovascular disease, bacterial/unspecified pneumonia, and non-AIDS defining cancer (NADCs)”.¹⁰⁹ In other words, those with HIV began to die from other diseases because their HIV was well treated.

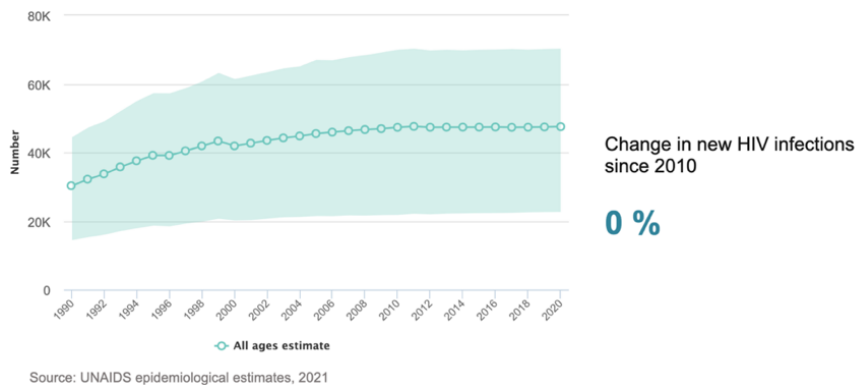
Grinsztejn et al conducted a similar study in Rio de Janeiro and found parallel results. They write: “Non-AIDS-related causes of death increased from 13.3% in 1986–1991 to as much as 38.3% in 2007–2009, while AIDS-related causes, for these same periods, decreased from 86.7% to 61.7%”.¹¹⁰ In other words, between these two period PLWHA began to die more frequently from non-AIDs related causes, which is explained by the expansion of ART availability and the accompanying viral suppression. Furthermore, they found that the health issues now causing death among the HIV+ population included cardiovascular disease, renal diseases, and end-stage liver disease.¹¹¹ These two studies are important as they show the shifting causes of death for PLWHA. Through the widespread and continuous usage of antiretroviral therapy, PLWHA can live longer lives and pass away from more common old-age ailments.

¹⁰⁹ Domingues and Waldman (2014) p.12

¹¹⁰ Grinsztejn et al (2013) p.3

¹¹¹ Grinsztejn et al (2013) p.1

The 2020 Brazil HIV fact sheet from UNAIDS provide a complete statistical overview of the country’s HIV epidemic. As of the 2020 data, approximately 930,000 adults and children in Brazil live with HIV, with the prevalence of disease being 0.4 for women aged 15 to 49 and 0.7 for men in this age bracket.¹¹² UNAIDS estimates that around 48,000 adults and children were newly infected with HIV between 2019-2020.¹¹³ This number of newly infected has stayed relatively consistent since 2000:



114

This consistency speaks to Brazil’s success in curbing widespread transmission of the disease among the population. Additionally, due to the widespread availability and distribution of antiretroviral therapy the number of AIDS-related deaths has fallen by 11% since 2010.¹¹⁵

UNAIDS also provides HIV prevalence (%) per risk group. As mentioned in Chapter 2, the prevalence among risk groups varies greatly throughout the region and plays a role in making the HIV epidemic in each country unique. The risk groups included in the UNAIDS data are: sex workers – prevalence 5.3%, men who have sex with men (MSM) – prevalence 18.3%, people who inject drugs – prevalence 5.9%, and transgender people – prevalence 30%.¹¹⁶ These drastic

¹¹² UNAIDS fact sheet – Brazil

¹¹³ UNAIDS fact sheet – Brazil

¹¹⁴ UNAIDS fact sheet – Brazil

¹¹⁵ UNAIDS fact sheet – Brazil

¹¹⁶ UNAIDS fact sheet – Brazil

variations of prevalence among the high-risk groups highlights work to be done to ensure health equity, which will be discussed in great deal in the following sub-section.

Health Equity in Brazil's HIV Epidemic:

As earlier mentioned in the Introduction, health equity is defined as “the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation”.¹¹⁷ Despite the impressive work done to curb transmission and provide treatment for those living with HIV, gaps in care still remain. These gaps tend to be most disproportionately felt by those who are socio-economically disadvantaged, making this a health equity problem. Additionally, stigma plays a role in the HIV epidemic, particularly for those that are HIV+ and have not disclosed their status. Addressing issues around stigma is an essential part of any health equity strategy.

A study carried out by Abadía-Barrero and Castro in 2006 focused on issues related to stigma and treatment adherence in Brazil. Importantly, they found that the Brazilian government's decision to make antiretroviral therapy widely, and freely, available helped reduce stigma.¹¹⁸ They argue that access to antiretroviral therapy “reverts the logic of interpretation of the disease by transforming AIDS from a fatal and incurable disease to a chronic and manageable one. Thus, it improves the person's well-being, changes the public perception of the disease, and allows people living with HIV to challenge and fight against stigma”.¹¹⁹ Given this, it stands to reason those efforts to improve access to ART should help

¹¹⁷ https://www.who.int/health-topics/health-equity#tab=tab_1

¹¹⁸ Abadía-Barrero and Castro (2006) p.1226

¹¹⁹ Abadía-Barrero and Castro (2006) p.1226

fight stigma as well. Passos and Souza investigated which HIV+ individuals have lowest quality of life scores and found that the lowest scores were “female, age (<47 years), low education levels, low socioeconomic class, unemployment... abuse or addiction of psychoactive substances...”.¹²⁰ This study shows that the population that would most benefit from additional intervention efforts is the same population that is marginalized.

A cohort study from Rio de Janeiro focused on social and demographic characteristics of HIV+ individuals that remained in care vs those that did not remain in care. This is done to better understand which populations may benefit from additional outreach or care coordination efforts. The research team found that “socio-demographic factors associated with good retention suggest that there may be social and behavioral determinants of health influencing retention in early HIV care in this urban Brazilian population”.¹²¹ Importantly, they found that younger and less-educated individuals were less likely to remain in care compared to older and more educated people.¹²² A separate team of researchers in Rio de Janeiro found that “having secondary level education compared to tertiary level increase the odds of late treatment initiation by 35%, while having basic education or incomplete basic education increase the odds of the outcome by 61 and 89%, respectively”.¹²³ They also found that black participants had increased odds of late treatment initiation when compared to white participants.¹²⁴ To make additional strides in HIV treatment and prevention and achieve health equity it is imperative to focus on these groups. This study underscores how access to HIV care

¹²⁰ Passos and Souza (2015) p.809

¹²¹ Silva et al (2016) p.1043

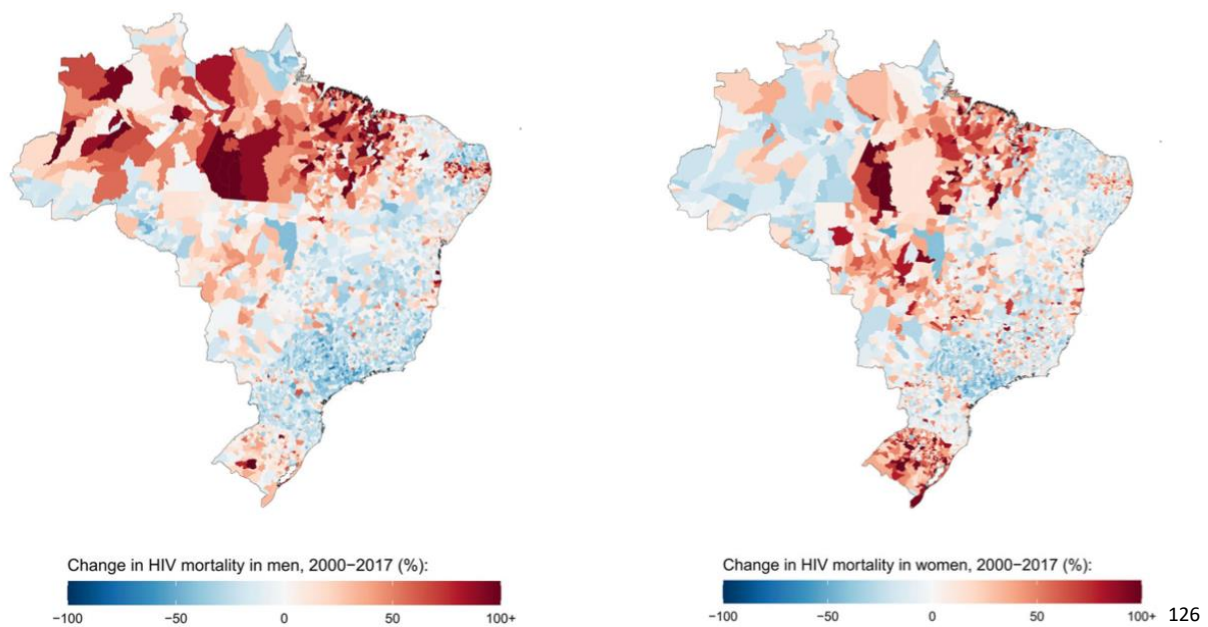
¹²² Silva et al (2016) p.1045-1046

¹²³ Rodrigues et al (2021) p.5

¹²⁴ Rodrigues et al (2021) p.5

is a health equity issue, as there are avoidable differences in retention rates and these differences have a statistical relationship with lower levels of education and being younger.

Another health equity issue in the Brazilian HIV epidemic is that the Northeast and North regions of the country have not benefited as much as other regions from the country's HIV work. Transmission rates and HIV-related deaths have increased in much of the North region and in pockets of the Northeast region since 2000. Importantly, these regions are also the blackest and poorest regions of the country. Paiva et al note that while the detection rates of AIDS have generally fallen across the country in recent years, there has been a 35.7% increase in AIDS detection rates in Northeast Brazil between 2006 and 2016.¹²⁵ This has led to these regions seeing the largest % changes in HIV mortality for both men and women:



These maps show that while the South and Southeast regions of the country have inarguably experienced great strides in curbing HIV transmission and lowering the number of HIV/AIDS-

¹²⁵ Paiva et al (2019) p.2

¹²⁶ Local Burden (2021) p.5

related deaths, much work remains to be done elsewhere. This is an example of geographic and economic health inequity.

Brazil Conclusion:

The purpose of this subsection was to provide a brief, yet comprehensive overview of the HIV epidemic in Brazil. Brazil's response to the epidemic benefited from the *sanitarista* movement, which quickly gained power after the end of the military dictatorship that ruled the country from 1964-1985. *Sanitarista* ideals are clear in the 1988 Constitution and in the 1990 creation of the Sistema Único de Saúde. Perhaps the most impactful piece of policy was the passage of Lei Sarney in 1996, which stated that the Brazilian state would provide medication to those living with the disease. From there, I briefly discussed various treatment and prevention efforts and provided the current 2020 UNAIDS statistics to give a snapshot of the epidemic. Lastly, I discussed health equity issues that continue to plague the country and show which populations and geographic areas may benefit from additional resources or outreach.

Mexico

Social Context:

Broadly speaking, Mexico cultural norms around gender and sexual relations are like those found in Brazil. Smallman writes, "Mexican men are expected to exhibit *machismo*, a behavior that is characterized by their confidence and dominance of women... Extramarital affairs are tolerated by men and viewed as a sign of virility... This sense that 'good' women do not enjoy sex further pushes men to visit sex workers for sex acts that they could not ask for within their homes".¹²⁷ As in Brazil, men who have sex with other men in Mexico retain their

¹²⁷ Smallman (2007) p.122

machismo when they take on the active role.¹²⁸ These cultural standards allow men to engage in commercial sexual interactions with other men, and importantly retain their *machismo*. This has important impacts on the country's HIV epidemic, men who have sex with men represent the at-risk population with the highest prevalence of HIV in Mexico and spread HIV to other populations. Indeed, Bautista-Arredondo et al argue that "women in Mexico are vulnerable to HIV infection mainly as a result of unprotected sex with stable partners".¹²⁹

While some evidence indicates that HIV was present in Mexico by 1981, the first cases were identified in 1983. One of the first cases "was a homosexual man who had a history of multiple trips to San Francisco... this was a forerunner of many early cases, which were concentrated in the gay community among middle- to upper-class men who lived in major urban centers".¹³⁰ Though HIV originally was concentrated in these major cities and their respective gay communities, it soon spread throughout the country. Unfortunately, discrimination and violence towards homosexuals followed. In early 1987, the Yucatan region experienced witch hunts that targeted homosexuals due to fears around HIV.¹³¹ Perhaps the most overt and direct threat of violence against homosexual populations occurred in 1991 while Guadalajara prepared to host the International Gay and Lesbian Association annual meeting. Graffiti popped up in the city with messages like: "Haz Patria. Mata a un Homosexual" and "Muerte a los Homosexuales".¹³² Smallman's book provides numerous other examples of discrimination faced by Mexico's homosexual population in the early years of the HIV epidemic.

¹²⁸ Smallman (2007) p.122

¹²⁹ Bautista-Arredondo et al (2015) p.2

¹³⁰ Smallman (2007) p.117

¹³¹ Smallman (2007) p.117

¹³² Smallman (2007) p.118

Like in Brazil, Mexico experienced a wave of social mobilization that contributed to the creation of HIV/AIDS and LGBT-focused non-governmental organizations (NGOs). A sample of the most prominent LGBT and HIV focused organizations includes: *Letra S*, *Ave de Mexico*, and *MEXSIDA*. These organizations played an important role in putting pressure on the national government to address the HIV epidemic, particular around education and outreach efforts.¹³³ As shown in the previous section, social society and NGOs played an important role in Brazil's response to the HIV epidemic. In his book, Smallman argues that these organizations in Mexico played a similarly important role by pressuring the government to improve its strategies in the fight against HIV.¹³⁴ Additionally, both Brazil and Mexico national governments decided to incorporate or involve some of these NGOs into the formal institutions that drove HIV policy.

In Mexico, the *Centro Nacional para la Prevención y el Control del VIH* (CENSIDA) has a director of prevention and social participation that has created a Department for NGOs within CENSIDA.¹³⁵ This has led to prominent HIV-focused organizations, such as *Ave de México* and *Letra S* to work together with CENSIDA, which "has allowed them to play a central role in the strengthening and functions of the network as a whole and in the definition and implementation of recent policies, such as prevention campaigns among MSM, campaigns for access to treatment, and campaigns against homophobia".¹³⁶ The role of social mobilization and the pressures they exerted on the Mexican government to address their concerns and improve its response to the HIV epidemic cannot be understated.

Political Context:

¹³³ Smallman (2007) p.120

¹³⁴ Smallman (2007) p.132

¹³⁵ Torres-Ruiz (2011) p.44

¹³⁶ Torres-Ruiz (2011) p.45

As shown in the previous sub-section, cultural and social forces in Mexico, particularly around *machismo*, likely contributed to the spread of HIV in the country. Additionally, the country's LGBT population faced discrimination, particularly in the early years of the epidemic, due to fears about HIV and the limited knowledge about transmission at the time. Fortunately, the Mexican government responded quickly and strongly against HIV. In 1986 the National Committee for AIDS Prevention (CONASIDA) was established, three years after the first documented cases. Then, in 1988, "a Presidential Decree transformed CONASIDA from a committee to a 'National Council', thus giving it multi-sectorial composition that went beyond the scope of individual health sector response".¹³⁷ Additionally, state governments throughout the country began to establish their own state agencies to fight HIV/AIDs, known as *Consejo Estatal Para la Prevención del VIH* (COESIDA).¹³⁸ These entities represent the key governmental institution in the fight against HIV.

The early work of CONASIDA and the state COESIDAs focused on two at-risk populations: recipients of blood transfusions and female commercial sex workers (CSWs).

Mexico's low prevalence of HIV among female CSWs is largely attributable to these efforts:

"In that year, female CSW began appearing at CONASIDA Counseling and Testing Centers to request HIV testing and risk reduction information. In coming forward voluntarily, these women provided an unprecedented opportunity for public health officials to gain access to an at-risk population that is officially invisible and traditionally suspicious of contact with the government. CONASIDA staff immediately began to work to forge links with these women and bring them into the public health planning process. Perhaps the most crucial system-level intervention that took place during this time was a negotiation between the Chief of Police in Mexico City and the Ministry of Health that allowed CONASIDA to conduct a variety of educational and structural interventions with sex workers without the harassment of the local police. In this way CONASIDA was able to develop substantive trust relationships with sex workers and their leaders without exposing them to official persecution."¹³⁹

¹³⁷ Del Rio and Sepúlveda (2002) p.1445

¹³⁸ Smallman (2007) p.119

¹³⁹ Del Rio and Sepúlveda (2002) p.1450

Partly due to these steps, prevalence of HIV in female CSWs has been remarkably low. Data from 1987-1998 shows that out of 1,997 female CSWs, only .3% tested positive for HIV.¹⁴⁰ Another factor that contributes to the low prevalence among female CWS is that most states and municipalities in the country regulate female CSWs and require regular health screenings.¹⁴¹ Together, these decisions have helped limit the prevalence of HIV in one of the at-risk populations. This has knock-on effects as men who visit female CSWs have a smaller chance of being exposed to HIV when compared to people who do the same in other Latin American countries, thus lowering the national prevalence of HIV.

The next substantial policy action occurred during the administration of President Ernesto Zedillo Ponce de Leon (1994-2000). On January 17, 1995, the Official Mexican Regulation for the Prevention and Control of Infection by the Human Immunodeficiency Virus was implemented. This regulation “represented a concerted effort by Mexican authorities to address the HIV/AIDS epidemic within the parameters of the right-to-health guarantees enshrined in Mexico’s constitution”.¹⁴² Importantly, many of the NGOs mentioned in the previous *Social Context* section played a role in this new regulation. From this point on, NGOs and civil society actors regularly influenced the state’s response to the epidemic. Like in Brazil, leaders of various NGOs worked together with the federal government to craft proposals for World Bank loans that would aid in the fight against the epidemic.¹⁴³ Some academics argue that the “greater inclusion of civil society actors in policy making was part of the

¹⁴⁰ Del Rio and Sepúlveda (2002) p1450

¹⁴¹ Smallman (2007) p.137

¹⁴² Torres-Ruiz (2011) p.43

¹⁴³ Torres-Ruiz (2011) p.43-44

democratization process” that occurred at the end of the Institutional Revolutionary Party’s (PRI) 71-year control of the country.¹⁴⁴ The similarities with Brazil and its experience of including civil society organizations, which arose due to re-democratization, as part of the HIV epidemic response are apparent.

The availability of ART for those living with HIV occurred in stages. In 1997, employees in the formal sector were able to obtain ART, while the first free government program started in 2000.¹⁴⁵ Due to “persistent pressure” from NGOs and “a more receptive Secretary of Health (Dr. Julio Frenk), Fox’s government committed to universal treatment coverage for all HIV/AIDS patients by the year 2006”.¹⁴⁶ Despite the original goal being 2006, Mexico was able to obtain the resources to make this a reality in 2003 when it established the *Seguro Popular* program.¹⁴⁷ This had a dramatic impact on the number of individuals receiving ART through the government, though widespread availability lagged behind. Statistics show that in 2006, approximately 14,500 previously uninsured PLWHA obtained ART medication through this new government plan, and this number increased to over 93,000 individuals by 2014.¹⁴⁸ As of 2014, approximately 62% of PLWH in Mexico were enrolled via *Seguro Popular* and received care through public health facilities.¹⁴⁹ Expanding free, universal access to those living with HIV serves as an additional example of the Mexican government making smart policy choices to limit HIV in the country. Smallman provides a concise summary to describe the low prevalence of HIV in Mexico: “Mexico’s epidemic remains at relatively low levels because of good

¹⁴⁴ Torres-Ruiz (2011) p.44

¹⁴⁵ Hernández-Avila et al (2015) p.e100

¹⁴⁶ Torres-Ruiz (2011) p.45

¹⁴⁷ Torres-Ruiz (2011) p.45

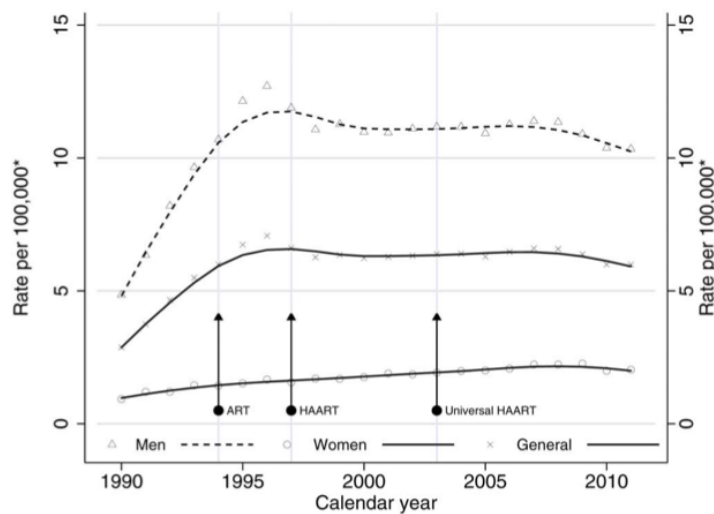
¹⁴⁸ Hernández-Romieu et al (2016) p.2

¹⁴⁹ Hernández-Romieu et al (2016) p.2

governmental policies, cultural factors such as a low rate of injecting drug use, and the aggressive efforts of NGOs”.¹⁵⁰ Indeed, low injection drug use, a primary risk behavior associated with HIV, and low HIV prevalence in female CSWs have contributed to Mexico’s success in managing HIV.

Treatment and Prevention Efforts, Outcomes, and 2020 Statistics

As previously mentioned, ART has been made available to various populations in the country since 1997, with the largest expansion occurring with the creation of Seguro Popular in 2003. By 2014 this program covered over 60% of PLWH in the country. Interestingly, research published in 2012 showed that “mortality attributed to AIDS related events has not changed in the last decade”, at least partially due to late testing / late treatment initiation.¹⁵¹ The below graph shows HIV/AIDS Mortality by sex between 1990-2011:



152

The graph shows an increase of deaths prior to the roll-out of highly active antiretroviral therapy (HAART), and a slight decline after access of HAART became universal. Furthermore,

¹⁵⁰ Smallman (2007) p.163

¹⁵¹ Crabtree-Ramírez et al (2012) p.507

¹⁵² Hernández-Avila et al (2015) p.e104

the change in new HIV infections has increased by 26% since 2010, from 16,000 in 2010 to 20,000 in 2020.¹⁵³ In this way, the HIV epidemic in Mexico is different than in Brazil, as Brazil has experienced a plateau in the number of new infections and a substantive decrease in AIDS-related deaths.

The 2020 Mexico fact sheet from UNAIDS provides a complete statistical overview of the country's HIV epidemic. As of 2020, around 340,000 adults and child in Mexico live with HIV, with the prevalence of the disease being 0.1 for women aged 15 to 49 and 0.6 for men in this age bracket.¹⁵⁴ UNAIDS estimates that 20,000 individuals were newly infected with HIV in 2019-2020.¹⁵⁵ As mentioned earlier, this represents a 26% increase from 2010. Thus, even though Mexico currently enjoys relatively low prevalence of HIV, compared to Brazil, the HIV epidemic in the country is still growing, unlike in Brazil. Importantly, UNAIDS also provides HIV prevalence (%) per risk group. As mentioned in Chapter 2, the prevalence among risk groups varies greatly throughout the region and plays a role in making the HIV epidemic in each country unique. The risk groups included in the UNAIDS data are: sex workers – prevalence 0.8%, men who have sex with men (MSM) – prevalence 11.9%, people who inject drugs – 2.9%, and transgender people – prevalence 4.9%.¹⁵⁶ These variations of prevalence among the high-risk groups highlights work to be done to ensure health equity, which will be discussed in great deal in the following sub-section.

Health Equity in Mexico's HIV Epidemic:

¹⁵³ <https://aidsinfo.unaids.org/>

¹⁵⁴ UNAIDS fact sheet – Mexico

¹⁵⁵ UNAIDS fact sheet - Mexico

¹⁵⁶ UNAIDS fact sheet – Mexico

As aforementioned, the national and sub-national HIV epidemics throughout the region vary greatly. The UNAIDs data demonstrates that the prevalence of HIV in injecting drug users and female commercial sex workers, two key at-risk groups, is low in Mexico. On the other hand, Mexico has a “higher than average prevalence... among sex workers (male), transgender, transsexual and transvestite persons, and prison inmates”.¹⁵⁷ Hernández-Avila et al conclude in their paper titled, “Effect of Universal Access to Antiretroviral Therapy on HIV/AIDS Mortality in Mexico, 1990-2011”, that “type of employment, gender, age, and state of residence are social determinants that contribute to HIV/AIDS mortality in Mexico... the heterogeneity and gaps in HIV/AIDS mortality highlight the need to boost country-specific operational research in HIV/AIDS prevention and treatment”.¹⁵⁸

Other research has shown that the incidence of HIV in Mexico City’s male commercial sex workers is high, which supports the idea that Mexico would benefit from tailoring outreach and prevention programs to this population.¹⁵⁹ While the UNAIDs data showed that the prevalence of HIV in sex workers was less than 1%, the prevalence rate among male commercial sex workers in Mexico City is higher than 18%.¹⁶⁰ This is large gap between female commercial sex workers and male commercial sex workers is important from a health equity lens. The efforts of the Mexican government have already successfully limited the spread of HIV in female CSWs. Therefore, it stands to reason that similar success should be feasible with additional and tailored outreach efforts for male CSWs.

¹⁵⁷ Bautista-Arredondo et al (2015) p.1

¹⁵⁸ Hernández-Avila et al (2015) p.e107

¹⁵⁹ Ganley et al (2021) p.1

¹⁶⁰ Ganley et al (2021) p.1

Another aspect of the HIV epidemic in Mexico that is unique is the drastically different prevalence levels of the disease throughout the country. Outside of Mexico City, the state that consistently has had the highest incidence of AIDS cases has been Baja California, which shares a border with the United States.¹⁶¹ Strathdee attributes the sub-national epidemic on the US-Mexico border to two factors: the sex and drug trades.¹⁶² While the prevalence of HIV in female commercial sex workers is lower than 1% nationally, an intervention in Tijuana and Ciudad Juarez found a prevalence of 6% among this population.¹⁶³ The article goes on to argue that the high prevalence in this border region may play a role in the increasing number of HIV infections per year over the last decade on the country level as “migrants may be infected with HIV when they return home” to other states in Mexico.¹⁶⁴ Supporting this claim are statistics that show that over 20% of individuals with AIDS in Michoacán and Zacatecas had previously lived in the United States.¹⁶⁵ This creates an interesting health equity dilemma, as this population exists in a border space between two nations. Nonetheless, avoidable, and remediable differences exist for this geographic population, and that from a health equity perspective, finding ways to address this unique reality would be beneficial for Mexico and its response to the country’s HIV epidemic.

The last population that I will examine from a health equity perspective in Mexico is women. This may seem counterintuitive as the 2020 UNAIDS statistics show that 82.4% of the adults living with HIV in Mexico are men, but women face an outsized risk of HIV due to social

¹⁶¹ Strathdee (2008) p.1

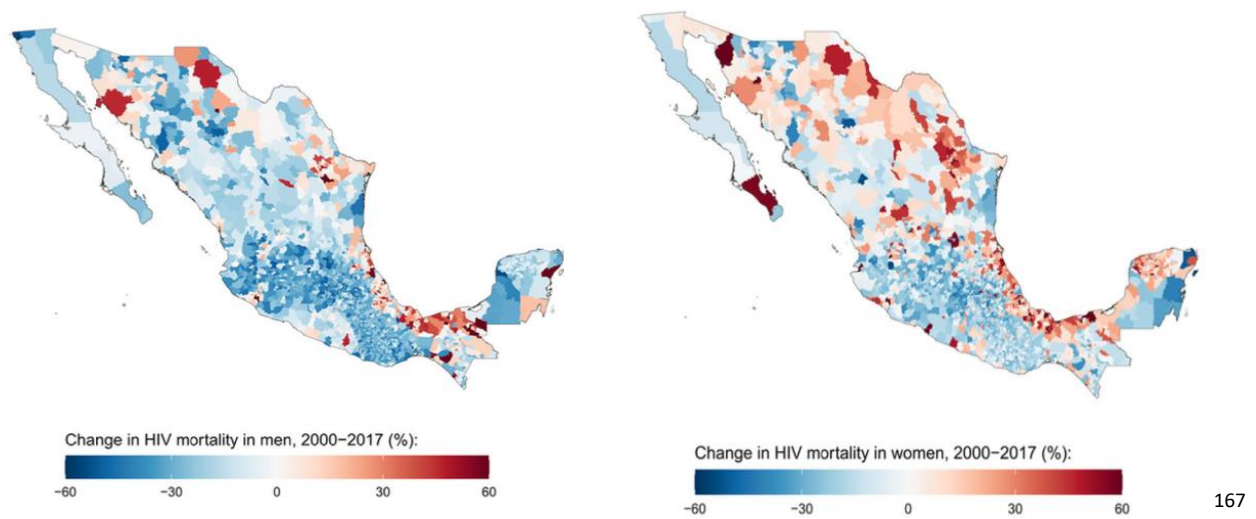
¹⁶² Strathdee (2008) p.1

¹⁶³ Strathdee (2008) p.1

¹⁶⁴ Strathdee (2008) p.1

¹⁶⁵ Strathdee (2008) p.1

forces, like *machismo*. Due to this, addressing the impacts of the HIV epidemic on women constitutes a health equity problem as this population faces an unfair difference in HIV risk due to social inequalities. The HIV epidemic in the country can be split into two gender specific sub-epidemics: “one linked to sexual risk behavior among MSM with relatively high levels of education and low levels of poverty, and a different one among women explained by social vulnerability and economic marginalization”.¹⁶⁶ The growing impact of HIV on women comes across in the maps below:



These maps illustrate that an increase in HIV mortality between 2000 and 2017 occurred in more municipalities and in more regions of the country for women compared to men. As women come to be a larger number of those living with HIV in the country, it will be imperative to create interventions to address the primary modes of HIV acquisition for this population.

Mexico Conclusion:

¹⁶⁶ Bautista-Arredondo et al (2015) p.8

¹⁶⁷ Local Burden (2021) p.11

This sub-chapter aims to provide a concise examination of the HIV epidemic in Mexico by focusing on four subjects. First, on a cultural level gender relations are dominated by the ideas of *machismo*. *Machismo* and gender dynamics also play a role in the health equity concerns regarding women and the ways in which this population is typically exposed to HIV in Mexico. The second subject of focus is the political and policy decisions made by the Mexican government in response to HIV. Two key points include the decision to provide ART by the early 2000s and the incorporation NGO leaders into the government's response. Third, Mexico possesses low prevalence numbers of HIV and a few typical high-risk groups, such as female CSWs and injecting drug users, possess low prevalence rates. Lastly, we discussed health equity implications and what makes the HIV epidemic in Mexico unique. The two populations that would most benefit from more tailored prevention and outreach efforts are male commercial sex workers and women. Additionally, Mexico is home to a unique sub-epidemic that centers on the country's border with the United States. Addressing this border region and the aforementioned populations will be key to the future of Mexico's response to the HIV epidemic.

Peru

Social Context:

Culture norms around gender and sexuality in Peru, and the Andean region more generally, are similar to those in Brazil in Mexico. A Colombian epidemiologist provided the following quote to describe norms around masculinity in this sub-region, and how they enable male-male sexual encounters: "Soy tan macho que me cojo otro hombre".¹⁶⁸ Understanding

¹⁶⁸ Smallman (2007) p.174-175

this notion of masculinity is of paramount importance as the HIV epidemic in Peru has historically been incredibly concentrated in the men-who-have-sex-with-men population.

The first documented case of HIV was identified in 1983 and involved a male that had recently travelled to New York.¹⁶⁹ This is similar to Mexico, in which early cases of HIV were commonly seen among middle to upper class men who had recent travel to the United States. The public's response to HIV and the media's coverage of the disease "spread panic and anxieties about 'sexual promiscuity' and presented the disease as coming from outside the country, or from marginal segments of society, such as transvestites working in hair salons, and prostitutes".¹⁷⁰ This contributed to stigma and discrimination towards those included in at-risk populations. Indeed, some of the more sensationalist pieces of news referred to the disease a "cancer gay" or "peste rosa"; while one headline stated: "Sida, la plaga infernal".¹⁷¹ It is important to note the economic situation in Peru during this initial phase of HIV/AIDS. HIV arrived in the country during a period of sustained economic crisis and poor political leadership. These factors contributed to high levels of poverty, which in turn led to widespread unemployment that "llevaron a muchos jóvenes a la prostitución".¹⁷² In this way the social determinants of health played a role in the initial spread of HIV in Peru, as poverty pushed young people into prostitution to survive. Ironically, the poverty and political issues of the time may have played a role in limiting the spread of HIV in the early years of the epidemic. Smallman writes: "social and political misery may have delayed the onset of the epidemic.

¹⁶⁹ Cueto (2002) p.20

¹⁷⁰ Cáceres et al (2008) p.47

¹⁷¹ Cueto (2002) p.22

¹⁷² Cueto (2002) p.19

Many well-to-do, urban gays – the first group affected by HIV elsewhere in Latin America – emigrated abroad, given the harsh conditions within the country. Perhaps more important... the fear of political violence probably also limited tourism”.¹⁷³

Issues around intersectional stigma also played, and continue to play, a role in the Peruvian HIV epidemic. Traditionally, stigma relating to HIV tends to focus on the taboo of sex/sexuality and on the poor health outcomes and death. Intersectional stigma, however, focuses on populations with “multiple stigmatizing conditions (e.g., being poor, female, and a racial/ethnic minority)”.¹⁷⁴ This intersectional stigma tends to afflict female HIV+ individuals “due to culturally bound gender roles”.¹⁷⁵ As we will see, this is becoming a growing problem in countries like Peru where the number of HIV cases in women has rapidly increased in the last few decades. Additionally, addressing and understanding intersectional stigma is crucial to achieve goals around health equity.

Political Context:

Unlike Brazil and Mexico where the discovery and initial spread of HIV in their countries occurred during a wave of democratization, Peru experienced a civil war throughout much of the 1980s. This violent period was followed by the rule of Alberto Fujimori from 1990-2000, a time of authoritarian rule. During the early years of Fujimori’s government Peru’s HIV response came from the top-down. On this Smallman writes “Fujimori once ‘inaugurated a continent-wide AIDS and sexually transmitted disease conference by promoting condom use from the

¹⁷³ Smallman (2007) p.179

¹⁷⁴ Valencia-Garcia et al (2017) p. 145-146

¹⁷⁵ Valencia-Garcia et al (2017) p.145

pulpit of the city's main cathedral".¹⁷⁶ This top-down approach stands in stark contrast to the experience in Brazil where NGOs and other grass roots organizations played a key role in pressuring the government to address the epidemic.

Cáceres and Mendoza claim that Peru's governmental response to the HIV epidemic can be divided into 4 phases:

Between 1985 and 1995, a slow organizational phase took place, with scarce resources, weak directives, and a legal counterpart that reflected the stigmatization of AIDS and sexual diversity... Between 1996 and 2000, during Fujimori regime, a modern biomedical program was developed that linked HIV prevention to STI control and that developed a nationwide strategy based on improved surveillance, outreach and periodical medical checkups of members of "core groups" (ie, FSWs and MSM), and free syndromic STI management based on STI clinics... After 2001, government-controlled resources were more limited, and the program was downsized and played a less active role... At present [2009], access to ART is nearly universal and fully funded by the Peruvian government, and GFATM projects essentially support prevention activities. In 2006, with UNAIDS support, a 2007– 2011 Multisectoral Strategic Plan for HIV/AIDS21 was designed in a national consulting process, which in early 2007 was approved by the Council of Ministers, the highest level of the Executive Branch."¹⁷⁷

These 4 phases show how one country's response to the epidemic can ebb and flow depending on a myriad of different facts, such as the macroeconomic situation and political orientation of the head of state. Importantly, two non-governmental entities played important roles in Peru's efforts to combat HIV: NGOs and international groups.

Despite the top-down approach during the Fujimori years, the HIV epidemic created an environment conducive to the emergence of NGOs and other advocacy groups. Organizations that focused on LGBT rights became much more numerous and pronounced. One example is the Movimiento Homosexual de Lima (MHOL), which engages in HIV prevention efforts.¹⁷⁸

While the government's response initially did not include NGOs, primarily as they did not yet

¹⁷⁶ Smallman (2007) p.182

¹⁷⁷ Cáceres and Mendoza (2009) p.s61-s62

¹⁷⁸ Cáceres et al (2008) p.49

exist, they were quickly incorporated during the late 1990s.¹⁷⁹ This cooperation between the Peruvian government and the NGOs contributed to a decline in the total number of AIDs cases from 1997-2000, leading Peter Piot, then executive director of UNAIDS, to “commend Peru for its successes”.¹⁸⁰ On a domestic level, Cáceres et al note that the country’s HIV response shifted with “the conceptual transformation of HIV/AIDS from a moral problem into a health and human rights issue”.¹⁸¹ Another key reason behind this success is the role that international organizations have played in helping Peru finance and implement prevention and treatment efforts.

Various international players have worked with the Peruvian government on the country’s HIV response. Three organizations stand out: the U.S. Navy Medical Research Institute Detachment (NAMRID) in Lima, the World Health Organization (WHO), and the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM). In the early years of the epidemic NAMRID played a key role as it “facilitated the voluntary testing of groups at risk” and “helped the Peruvian state clean up the blood banks”.¹⁸² While NAMRID assisted the Peruvian government in the beginning of the epidemic, the WHO and GFATM have consistently provided substantial amounts of money to improve the country’s prevention and testing efforts, as well as education. The period from 1996-2000, described in the Cáceres and Mendoza block quote, relied heavily on funding from the WHO to improve the country’s surveillance systems and the modern biomedical program to treat those with HIV.¹⁸³ The GFATM, on the other hand, assisted

¹⁷⁹ Cáceres and Mendoza (2009) p.s61

¹⁸⁰ Smallman (2007) p.182

¹⁸¹ Cáceres et al (2008) p.52

¹⁸² Smallman (2007) p.182

¹⁸³ Smallman (2007) p.182

in the financing of the Peru's national antiretroviral program: "a national proposal was approved by GFATM, in 2003, with a total budget of some US\$24 million for HIV/AIDS... Simultaneously, the Ministry of Health had been working to establish technical norms for treatment provision and, in May 2004, officially launched a national antiretroviral treatment (ART) programme, which, under strong initial support from the GFATM project, would eventually become funded solely with domestic funds".¹⁸⁴ This ART program quickly became successful and in one year after its creation was already providing ART to "50% of those who needed treatment but were not receiving it [in the past]".¹⁸⁵ In 2004, the Peruvian legislature modified pre-existing AIDS legislation to make ART a right in the country.

Treatment and Prevention Efforts, Outcomes, and 2020 Statistics

As the previous section on the Political Context and response to the HIV epidemic demonstrate, Peru's actions have largely been successful in preventing the spread of the disease and treating those with HIV. One of the crucial prevention programs implemented by the Peruvian government focused on perinatal transmission. Peru was one of the first three countries in the region, alongside Bolivia and Brazil, to offer prophylaxis to prevent perinatal transmission.¹⁸⁶ Relatedly, the Peruvian government's 2021 HIV Overview document shows that only .23% of HIV cases identified in the country between 2000-2021 are linked to perinatal transmission.¹⁸⁷ By essentially eliminating perinatal transmission early in the epidemic the Peruvian government made important strides in its fight against HIV.

¹⁸⁴ Cáceres et al (2008) p.48

¹⁸⁵ Cáceres et al (2008) p.49

¹⁸⁶ Smallman (2007) p.183

¹⁸⁷ Boletín HIV Peru (2021) p.5

Peru has made impressive progress in achieving the 90-90-90 targets created by UNAIDS to end the HIV/AIDS epidemic. Importantly, the Peruvian government has offered ART for free throughout the country since 2004. The most recent UNAIDS data states that over 98% of Peruvians with HIV know their status and that 79% of people living with HIV are on ART; unfortunately, this edition of the statistics does not provide data on the percent of people receiving ART with viral suppression.¹⁸⁸ However, reports from 2019 estimate that approximately 77% of individuals on ART had reached viral suppression.¹⁸⁹ This data shows that despite the excellent achievements in combating HIV, there is still work to be done to achieve the 90-90-90 targets.

The HIV epidemic in Peru is centered on two at-risk groups: men who have sex with men (MSM) and transgender women (TW). These two populations “account for at least 60% of new HIV diagnoses, likely a conservative estimate because many men who may have acquired HIV through sex with other men neither identify as homosexual or bisexual nor report those sexual experiences”.¹⁹⁰ This is important as many individuals in the men who have sex with men population may also have wives. On this topic and its effects on the Peruvian HIV epidemic, Smallman writes: “In ‘monogamous’ relationships, women perceived that they had to accept that their husbands would sometimes cheat. Some poor but straight men had gay sex for money. Most homosexual men did not use condoms with stable partners. Sex workers did not consistently use condoms... In general, the rate of condom use remained low, despite women’s

¹⁸⁸ UNAIDS data sheet Peru

¹⁸⁹ Counins (2019) p.e733

¹⁹⁰ Chow et al (2016) p.2

expectations that their partners were being unfaithful to them”.¹⁹¹ In this way, men who have sex with men serve as “a ‘bridge’ group for spreading into the heterosexual population because of high frequency of reported bisexuality”.¹⁹² In recent years this has led to an increased “heterosexualization” and “feminization” of the HIV epidemic.¹⁹³ This is a similar phenomenon to what has occurred in Mexico. Men who engage in extramarital sex and/or sex with other men serve as the conduit via which their female partners are exposed to HIV.

The 2020 Peru fact sheet from UNAIDS provides a complete statistical overview of the country’s HIV epidemic. The data shows that the efforts made by the Peruvian government to combat the disease have successfully lowered the number of new infections and AIDS-related deaths in the country. The “change in new HIV infections since 2010” is -3% while the “change in AIDS-related deaths since 2010” is -46%.¹⁹⁴ As of 2020, around 91,000 adults and child in Peru live with HIV, with the prevalence of the disease being 0.2 for women aged 15 to 49 and 0.5 for men in this age bracket.¹⁹⁵ UNAIDS estimates that 4,100 individuals were newly infected with HIV in 2019-2020.¹⁹⁶ Importantly, UNAIDS also provides HIV prevalence (%) per risk group. As mentioned in Chapter 2, the prevalence among risk groups varies greatly throughout the region and plays a role in making the HIV epidemic in each country unique. The risk groups included in the UNAIDS data are: sex workers – prevalence 2.3%, men who have sex with men (MSM) – prevalence 10%, and transgender people – prevalence 30.6%.¹⁹⁷ This data, especially

¹⁹¹ Smallman (2007) p.181

¹⁹² Sanchez et al (2007) p.578-579

¹⁹³ Cáceres and Mendoza (2009) p.s62

¹⁹⁴ UNAIDS fact sheet – Peru

¹⁹⁵ UNAIDS fact sheet – Peru

¹⁹⁶ UNAIDS fact sheet - Peru

¹⁹⁷ UNAIDS fact sheet – Peru

the significant change in AIDS-related deaths, shows the success of Peru's efforts against HIV. However, these statistics also provide insights into which populations would benefit from additional prevention efforts. In particular, transgender people in Peru suffer from extremely high prevalence of HIV.

Health Equity in Peru's HIV Epidemic:

This section will focus on three issues related to equity in Peru's HIV epidemic: stigma of HIV and the relationship between stigma and access to treatment and testing, transgender women (TW), and women. Each of these issues would benefit from additional interventions to achieve health equity.

Stigma around HIV has existed since the disease was first discovered in 1983. Examples of stigma and discrimination specific to Peru were provided earlier in this *Social Context* section of this subchapter. Stigma towards HIV serves as a barrier to testing and treatment, as well as being a force that negatively impacts the lives of those living with HIV. Researchers in Lima conducted a study of PLWHA to understand how perceptions of stigma influenced retention in HIV care. The researchers concluded that "the associations observed here between HIV stigma domains and retention in care reinforce the complex nature of HIV stigma and the multifaceted approaches that must be taken to reduce HIV stigma to improve retention in HIV care, ART adherence, and other outcomes".¹⁹⁸ In this way, HIV-related stigma represents a key health equity problem. PLWHA who feel stigmatized due to their status are less likely to remain engaged in their care. This leads to poor health outcomes for these people and increases the likelihood that these individuals spread HIV to others, as they will not achieve viral suppression

¹⁹⁸ Valenzuela et al (2015) p.240

of their HIV. Additional issues around access play a role in health equity. Even though Peru has “generally good” HIV care, evidence suggests that individuals that are transgender or younger have “lower access to HIV services”.¹⁹⁹ Other access-related issues involve: “el costo elevado de la atención, la distancia, la incompatibilidad de horarios, la carencia de especialistas y la carencia de TARGA [ART]; sin embargo, la prevalencia de ninguna de estas fue mayor a lo reportado para el rubro de maltrato”.²⁰⁰ These quotes re-iterate the idea that Peru must improve access to HIV care, especially for those lower on the socio-economic ladder. As an example, these individuals may have transportation issues or time restraints that limit their ability to regularly visit a clinic.

As shown by the 2020 UNAIDS Peru Fact Sheet, transgender individuals are the at-risk group with the highest prevalence of HIV in the country. Thus, stopping the spread of HIV amongst this population is of utmost importance and providing tailored outreach and interventions to this population may be necessary. Unfortunately, studies conducted in the country approximate that between 20-60% of transgender women (TW) and MSM have never been tested for HIV.²⁰¹ This represents an enormous challenge as these populations, especially TW, represent the at-risk groups with the highest prevalence of the disease. This means that the number of HIV+ individuals in the country is likely undercounted. Clark et al published an article in 2020 that focused on the myriad of factors that contributed to such a high prevalence of HIV among TW. They found that this high prevalence:

“can be traced to multiple interconnected factors: (1) Social and economic marginalization that often results in involvement in commercial sex; (2) Cultural ideals of feminine passivity and interpersonal power dynamics, with both romantic and commercial partners, that encourage TW

¹⁹⁹ Chow et al (2016) p.6

²⁰⁰ Girón et al (2007) p.123-124

²⁰¹ Chow et al (2016) p.6

to assume the pasiva (receptive) role during intercourse and thereby limit control over condom use, and (3) Routine stigma and discrimination in healthcare systems that discourage engagement with HIV prevention and treatment services [14–16].”²⁰²

These findings underscore the idea that socio-economic factors often lie at the heart of health equity problems, as social and economic marginalization are key factors that push TW to engage in commercial sex, which is a high-risk activity.

The last population to be addressed in this sub-section is women. Since the turn of the century, Peru has seen a “heterosexualization” and “feminization” in its HIV epidemic.²⁰³ The situation in Peru is like that of Mexico, as women are primarily exposed to HIV by their husbands or other stable partners. Cultural norms around gender and sex play a crucial role in the HIV epidemic for this population. Stigma is also a barrier to care for this population: “women with HIV in Peru are silenced and lose status within society... when a Peruvian woman is known to be HIV positive, she is often seen as the unfaithful partner in a marital relationship, responsible for contracting HIV, and thus experiences stigma within her marriage, family, and society”.²⁰⁴ Women in Peru are exposed to HIV due to the actions of others, yet bear the brunt of the consequences due to cultural norms.

Peru Conclusion:

This sub-chapter aimed to provide an overview of the HIV epidemic in Peru by discussing four themes. First, the initial social and cultural reaction to HIV in mirrored the reactions seen in Brazil and Mexico. Sensationalist news articles othered those at-risk of the disease and discrimination occurred against at-risk groups, particularly the country’s LGBT populations.

²⁰² Clark et al (2020) p.234

²⁰³ Cáceres and Mendoza (2009) p.s62

²⁰⁴ Valencia-Garcia et al (2017) p.146

Interestingly, the political and economic turmoil of the 1980s and early 1990s may have played a role in limiting the spread of HIV in the country. Secondly, Peru's political and policy response can largely be broken down into 4 distinct periods. Generally speaking, Peru's actions to combat the HIV epidemic have been viewed favorably and both domestic NGOs and international organizations played important roles in the government's response. NGOs applied internal pressure on the government and international organization provided funding to implement surveillance, testing, and HIV care. The third section of this sub-chapter explained the general trends in Peru's HIV epidemic. Originally, the epidemic was concentrated among MSM, however, this group served as a "bridge" population to other segments of Peruvian society.²⁰⁵ Statistics show that MSM and transgender individuals have the highest prevalence of HIV and that a process of feminization of the epidemic has begun. The last section focused on health equity issues in Peru, with special attention given to issues around stigma/access, transgender women, and women. Each of these areas require and deserve special consideration. Additional tailored interventions and outreach to these groups will help Peru towards health equity in its fight against HIV.

Conclusion:

The purpose of this chapter was to provide overviews of the HIV epidemics of Brazil, Mexico, and Peru, by focusing on the social and political contexts of HIV, information on each country's treatment and prevention efforts, a snapshot of the country's current HIV epidemic, and a focus on health equity concerns. A key takeaway from this chapter is that each country has a different experience with HIV and faces unique challenges moving forward. By and large,

²⁰⁵ Sanchez et al (2007) p.578-579

socially, and economically marginalized groups would stand to benefit the most from additional intervention efforts. In utilizing a health equity perspective, we can better understand the social and institutional inequities that prevent these groups from having similar rates of HIV care retention, and tailor intervention efforts that consider these inequities. In Brazil, research and data suggest that more needs to be done to improve the HIV epidemic in the North and Northeast regions of the country, among the less educated, and with younger populations. For Mexico, additional outreach campaigns and intervention efforts should consider the role of migration and immigration, within Mexico and between Mexico and the United States, the unique risks facing women, and the challenges related to HIV care and male commercial sex workers. Additional efforts to combat the HIV epidemic in Peru should focus on transgender individuals and women. By focusing on these various groups, Brazil, Mexico, and Peru would make significant advances in their respective efforts to end their HIV epidemics and towards health equity.

CHAPTER 4: Registry Linkage Project in Brazil, Mexico and Peru

Introduction:

Data from the Joint United Nations Programme on HIV/AIDS shows that approximately 2.4 million people in the Latin America and the Caribbean region live with HIV.²⁰⁶ Large clinical cohorts help public health researchers understand and measure the quality of HIV treatment; however, significant absences of patients from care occur, creating a group that is lost to follow-up (LTFU) within the clinical cohort. This impacts public health research by creating a potential emigrative selection bias, as the outcome-experience of the population that is LTFU may differ substantially from those that remain in care.²⁰⁷ Studies have shown the significant scale of LTFU populations in HIV+ clinical cohorts in Latin America.²⁰⁸

Access and adherence to antiretroviral (ART) therapy represents one of the primary strategies for ending the HIV epidemic. Research shows that “life expectancy of PWH [people living with HIV] on ART significantly improved from 2003 to 2017 and now approaches that of the general population in these areas [Latin America and the Caribbean]”.²⁰⁹ This underscores the importance of treatment adherence. Unfortunately, researchers note that treatment adherence is one of the primary challenges to HIV treatment in Latin America.²¹⁰

Understanding the demographic profiles of those that are LTFU is important as it will help public health practitioners better understand what populations need additional or modified interventions to improve treatment adherence. Additionally, this data helps

²⁰⁶ <https://aidsinfo.unaids.org/>

²⁰⁷ Hernán et al (2004)

²⁰⁸ Carriquiry et al (2015)

²⁰⁹ Smiley et al (2021) p.6-7

²¹⁰ Luz et al (367-268)

researchers and public health practitioners better recognize issues around health equity. The World Health Organization defines health equity as: “the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation)”.²¹¹ In order to lower the burden of HIV, it is necessary to focus on these populations that are LTFU, as these individuals tend to not achieve viral suppression and are thus more likely to spread HIV to others.²¹² The data analyses carried out below will help researchers and public health practitioners better understand which demographic groups would most benefit from additional efforts, helping towards the goal of health equity.

Methods:

For this project, I am working with Dr. Peter Rebeiro and many of his colleagues from the Caribbean, Central and South America network for HIV epidemiology (CCASAnet). CCASAnet serves as the network for the Latin American region in the International epidemiology Databases to Evaluate AIDS (IeDEA) and is the largest observational HIV cohort collaboration in Latin America. While the Data Coordinating Center for CCASAnet is housed at Vanderbilt University Medical Center (VUMC), the network is a collaboration of researchers from seven Latin American countries with a goal to better understand the HIV epidemic in the region via top-tier research. My specific project includes data from the following sites: the Instituto Nacional de Infectologia Evandro Chagas at Fundação Oswaldo Cruz in Rio de Janeiro, Brazil

²¹¹ https://www.who.int/health-topics/health-equity#tab=tab_1

²¹² Rebeiro et al (2016) p.7

(INI-Brazil); the Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubirán in Mexico City, Mexico (INCMNSZ-Mexico); and the Instituto de Medicina Tropical Alexander von Humboldt in Lima, Peru (IMTAvH-Peru).

The total source population in the database prior to study exclusions was 20,605. All pediatric cases were dropped, resulting in 18,513 individuals being included in this analysis. Then, I stratified the patients by sex assigned at birth (sex) and age. The outcome was defined as: being LTFU over the course of the study (vs. remaining in care until study closure). I created 6 age groups: 18-19, 20-29, 30-39, 40-49, 50-59, and 60+. Next, I ran three analyses at each site: 1) an unadjusted logistic regression using the outcome and sex, 2) an age-adjusted logistic regression using the outcome, sex, and age groups, and 3) a joint-effect logistic regression, using the outcome, biological sex at birth, age groups, and a sex-by-age-group interaction. The reference population for the age-groups was the 20–29-year-old group as it was the most popular of all the groups. These analyses help us understand age-adjusted differences in status (remaining in care vs being LTFU) for male and female patients via odds ratios. All necessary ethical approvals were obtained from the Vanderbilt University Medical Center Institutional Review Board (IRB) prior to the author accessing the data. All data analysis was done in STATA 16.1.

Results:

TABLE 1: The Study Population

| | <u>Brazil</u> | <u>Mexico</u> | <u>Peru</u> | <u>Total</u> |
|-------------------------|----------------------|----------------------|--------------------|---------------------|
| <u>Birth Sex</u> | | | | |
| Men | 4,301(72.4%) | 1,976 (89.6%) | 7,876 (76.0%) | 14,153 (76.4%) |
| Women | 1,641 (27.6%) | 229 (10.4%) | 2,490 (24.0%) | 4,360 (23.6%) |

| | | | | |
|-------------------|---------------|-------------|---------------|---------------|
| Total | 5,942 | 2,205 | 10,366 | 18,513 |
| <u>Age</u> | | | | |
| Age 18-19 | 131 (2.2%) | 61 (2.8%) | 383 (3.7%) | 575 (3.1%) |
| Age 20-29 | 1,854 (31.2%) | 684 (31.0%) | 3,981 (38.4%) | 6,519 (35.2%) |
| Age 30-39 | 2,003 (33.7%) | 786 (35.6%) | 3,341 (32.2%) | 6,130 (33.1%) |
| Age 40-49 | 1,272 (21.4%) | 436 (19.8%) | 1,658 (16.0%) | 3,366 (18.2%) |
| Age 50-59 | 529 (8.9%) | 165 (7.5%) | 720 (7.0%) | 1,414 (7.6%) |
| Age 60+ | 153 (2.6%) | 73 (3.3%) | 283 (2.7%) | 509 (2.8%) |

Table 1 provides an overview of the study population and shows the number and percentages of patients in each of the three clinical cohorts (by country), stratified by sex and age group. As you can see, the number of male patients at each site is much larger than the number of female patients, with the percentage of males varying from 72.4% in Brazil to 89.6% in Mexico. Table 1 also shows that over two-thirds of the total study population fall in the 20-29 or 20-29 age groups.

TABLE 2: UN-ADJUSTED LOGISTIC REGRESSION:

| | Odds Ratio | p-value | 95% CI |
|-----------|------------|---------|-----------|
| Brazil | 1.25 | 0.003 | 1.08-1.44 |
| Mexico | 1.19 | 0.460 | 0.75-1.86 |
| Peru | 0.94 | 0.206 | 0.85-1.03 |
| All Sites | 0.98 | 0.534 | 0.91-1.05 |

Table 2 shows the results from the un-adjusted logistic regression from each of the three sites. The analysis shows that female patients have 1.25 times the odds of being LTFU when compared to males in Brazil and that this odds ratio is statistically significant (p-value = 0.003, 95% CI 1.08-1.44). In the case of Mexico, females have 1.19 the odds of being LTFU compared to males, however, the confidence interval (CI) contains the null, meaning that this result is not statistically significant. One potential reason for this finding is that the sample size in the

Mexico cohort is a bit smaller than the other sites. At the Mexican site, female patients comprised only 10.4% of the cohort, by far the lowest percentage out of any of the three sites. Thus, it is plausible that a relationship exists between sex and status, but that the number of females included in the analysis is too small to achieve statistical significance. In Peru the point estimate is close to the null and there is no significant statistical relationship found between sex and outcome status in this unadjusted logistic regression. When analyzing the database in its entirety, the un-adjusted logistic regression model showed no statistically significant difference in female patients being more likely LTFU than males.

TABLE 3: AGE-ADJUSTED LOGISTIC REGRESSION:

| | Odds Ratio | P-Value | 95% CI |
|-------------------|-------------------|----------------|---------------|
| Brazil 18-19 | 0.84 | 0.457 | 0.55-1.31 |
| Brazil 30-39 | 0.98 | 0.771 | 0.83-1.15 |
| Brazil 40-49 | 0.87 | 0.120 | 0.73-1.04 |
| Brazil 50-59 | 0.57 | 0.000 | 0.46-0.71 |
| Brazil 60+ | 0.47 | 0.000 | 0.33-0.67 |
| Brazil – All Ages | 1.28 | 0.001 | 1.11-1.48 |
| | | | |
| Mexico 18-19 | 0.66 | 0.321 | 0.28-1.51 |
| Mexico 30-39 | 0.77 | 0.160 | 0.54-1.11 |
| Mexico 40-49 | 0.50 | 0.000 | 0.34-0.73 |
| Mexico 50-59 | 0.56 | 0.002 | 0.28-0.76 |
| Mexico 60+ | 0.24 | 0.000 | 0.14-0.44 |
| Mexico – All Ages | 1.36 | 0.188 | 0.86-2.16 |
| | | | |
| Peru 18-19 | 1.27 | 0.045 | 1.01-1.59 |
| Peru 30-39 | 0.85 | 0.001 | 0.78-0.94 |
| Peru 40-49 | 0.83 | 0.003 | 0.74-0.94 |
| Peru 50-59 | 0.76 | 0.001 | 0.64-0.89 |
| Peru 60+ | 0.54 | 0.000 | 0.42-0.68 |
| Peru – All Ages | 0.94 | 0.172 | 0.85-1.03 |

I will summarize the main findings from the table as related to each country. Interestingly, Brazil is the only country that showed statistically significant odds ratios for the outcome across

all ages. Female patients have 1.28 times the odds of being LTFU in Brazil compared to males after adjusting for age (p-value = 0.001, 95% CI 1.11-1.48). This age-adjustment is important as it accounts for differences in age group distribution between the sexes. The data from Mexico shows a positive odds ratio for this calculation, however, as in the un-adjusted logistic regression, the p-value and confidence interval render this result non-significant. The rest of the outcomes from this logistic regression provide odds ratios for each of the specified age groups at the sites, adjusted for sex, when compared to the reference age group. In Brazil, people in the 50-59 and 60+ age groups had 43% and 53% lower odds, respectively, of being LTFU when compared to the 20-29 age group, after adjusting for sex. Similar results were observed in Mexico and Peru. In the Mexican cohort, individuals in the 40-49, 50-59, and 60+ age groups had 0.5, 0.56, and 0.24 times the odds of being LTFU compared to the 20-29 age group after adjusting for sex. In Peru, this trend was observed in the 30-39, 40-49, 50-59, and 60+ age groups, with the odds of being LTFU shrinking as the age group increased. All in all, these findings suggest that individuals in older age groups are much less likely to be LTFU when compared to the 20-29 age group. These findings are consistent with the literature.²¹³

TABLE 4: LOGISTIC REGRESSION INCLUDING A SEX-BY-AGE INTERACTION FOR JOINT EFFECTS:

| | Odds Ratio | P-Value | 95% CI |
|----------------|-------------------|----------------|---------------|
| Brazil 1#18-19 | 0.81 | 0.670 | 0.31-2.13 |
| Brazil 1#30-39 | 0.73 | 0.117 | 0.49-1.08 |
| Brazil 1#40-49 | 0.84 | 0.423 | 0.55-1.29 |
| Brazil 1#50-59 | 0.76 | 0.301 | 0.46-1.27 |
| Brazil 1#60+ | 1.34 | 0.472 | 0.60-2.99 |
| | | | |
| Mexico 1#18-19 | 3.34 | 0.320 | 0.31-36.13 |
| Mexico 1#30-39 | 2.85 | 0.135 | 0.72-11.28 |
| Mexico 1#40-49 | 2.32 | 0.192 | 0.65-8.27 |

²¹³ Carriquiry et al (2015) p.5

| | | | |
|----------------|------|-------|------------|
| Mexico 1#50-59 | 2.21 | 0.286 | 0.52-9.47 |
| Mexico 1#60+ | 3.87 | 0.149 | 0.61-24.25 |
| | | | |
| Peru 1#18-19 | 1.92 | 0.011 | 1.16-3.18 |
| Peru 1#30-39 | 1.33 | 0.012 | 1.07-1.67 |
| Peru 1#40-49 | 1.30 | 0.063 | 0.99-1.71 |
| Peru 1#50-59 | 1.38 | 0.085 | 0.95-2.01 |
| Peru 1#60+ | 2.25 | 0.010 | 1.22-4.15 |

The table shows the status sex-difference in outcome between females and males in their respective age groups compared to the sex-difference in outcome females and males from the 20–29-year-old, reference group. The clearest differences exist in the Peruvian cohort. The difference is statistically significant in the following age groups: 18-19, 30-39, and 60+. The status sex-difference between females and males 18-19, 30-39, and 60+ was 1.92 times, 1.33 times, and 2.25 times, greater compared to the status difference between females and males 20-29 years of age, respectively. As shown in TABLE 4 above, there was no statistically significant difference found in Brazil or Mexico for this logistic regression.

Discussion:

The most noteworthy findings from this study are that, generally speaking, females and individuals in the younger age groups are more likely to be LTFU compared to males and older individuals. The clearest example of sex playing a role in LTFU status is seen in Brazil. The analysis shows that females in Brazil have 1.28 times the odds of being LTFU compared to males, after adjusting for age. The 95% confidence intervals (95% CI) seen in the analysis of the Mexican cohort suggest that there may be a relationship between sex and status there as well. For example, the 95% CI for the un-adjusted logistic regression is 0.75-1.86, while the odds ratio is 1.19 with a p-value of 0.460. Since the 95% CI appears lopsided above 1, it is plausible that a

positive relationship exists, but that the Mexican cohort is relatively underpopulated, particularly for the female demographic. Importantly, the female population of the Mexican cohort is only 10.4% of the entire Mexican cohort, by far the lowest out of the three sites. We see similar results in the age-adjusted analysis for the Mexico cohort.

A second, much clearer finding, is the relationship between the older age groups and lower odds of being LTFU compared to the younger reference group. The age-adjusted logistic regression found statistically significant differences at each of the sites. These showed that those in the older age groups had lower odds of being LTFU when compared to the reference group. Importantly, the odds of being LTFU decreased in a dose-response fashion as the age-group increased. For example, in Peru the 30–39-year-old age group had 15% lower odds of being LTFU, compared to the reference population, while the 60+ age group had 46% lower odds of being LTFU, compared to the reference population. This trend was seen in the results from each country. To make strides towards health equity, these discrepancies must be addressed.

Another interesting finding arises when we compare the odds of the various age groups across the sites. In the 50–59-year-old age group, for example, the odds of being LTFU varied across the sites. In Brazil this age group had 43% lower odds of being LTFU when compared to the reference group in Brazil, while the Mexican and Peruvian 50–59-year-old age group had 44% and 24% lower odds when compared to their reference age group, respectively. There is a trend for the age groups in the Peruvian cohort showing less significant lowered odds remaining in care compared to the same age groups from the Brazilian and Mexican sites. The largest significant decrease in odds of being LTFU is seen in the 60+ age group of the Mexican cohort,

as this group has 76% lower odds of being LTFU compared to the reference group in Mexico. Interestingly, the 18–19-year-old age group in Peru is the only age group across all three sites that sees a statistically significant increase in risk of the outcome compared to the reference age group, as they are 1.27 times more likely of being LTFU (p-value 0.045 95% CI 1.01-1.59). These findings of older populations being less likely to be LTFU is consistent with the literature. Silva et al.’s research in Brazil found that older individuals are more likely to have good retention in care while Rebeiro et al. found that older age “was associated with increased probability” of ART usage.^{214 215} Similarly, research conducted by Carriquiry et al. showed that younger individuals are “more likely to be LTFU”.²¹⁶

There are some limitations in this analysis. One limitation that has already been mentioned relates to the number of females in the Mexican cohort. As seen in Table 1, the Mexican cohort is only 10.4% percent female while the Brazilian and Peruvian cohorts were 27.6% and 24.0% female, respectively. This likely played a role in the wide 95% confidence intervals seen throughout the analyses in the Mexican cohort. A second limitation is the potential lack of generalizability of these results. This is largely a limitation since this analysis included only one site from each country and that these sites were in large, urban environments. Due to this, we cannot infer what these results might mean for HIV+ populations on other parts of these countries.

Conclusion:

²¹⁴ Silva et al (2016) p. 1046

²¹⁵ Rebeiro et al (2016) p.3

²¹⁶ Carriquiry et al (2015) p.5

This project involved data from three sites in Latin America: Brazil, Mexico, and Peru. The goal was to better understand which demographic characteristics are associated with higher odds of being LTFU. This is important as the LTFU population is at higher risk for poor outcomes related to their HIV+ status, as they are less likely to have good treatment adherence. The results show that females are more likely to be LTFU compared to males and that older age groups have lower odds of being LTFU compared to the 20–29-year-old reference group.

Interventions targeting female and younger populations to improve ART initiation, clinical retention, and general engagement in HIV care should continue to be explored in Latin American HIV+ populations, and further research investigating the underlying mechanisms of these sex- and age-based disparities should be conducted. The World Health Organization states, “Health equity is achieved when everyone can attain their full potential for health and well-being”.²¹⁷ The analyses from this project show that unfair and avoidable differences exist that prevent women and younger populations from remaining in care. These findings have important implications that can help guide future intervention, prevention, and treatment efforts. In doing so, Brazil, Mexico, and Peru can get closer to achieving health equity.

²¹⁷ https://www.who.int/health-topics/health-equity#tab=tab_1

CHAPTER 5: Conclusion

The purpose of this paper is to provide insights into the importance of HIV as a public health issue in Latin America and assess what work needs to be done to achieve health equity in the region. Health equity is “the absence of unfair, avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically or by other dimensions of inequality (e.g. sex, gender, ethnicity, disability, or sexual orientation)”.²¹⁸ Despite the impressive efforts and investments to curtail the spread and furnish treatment, gaps in care continue to exist in the region. These gaps in care tend to be related to structural issues and disproportionately affect marginalized populations.

Chapter 1 presents a brief overview of HIV as a Global Health issue, discusses the importance of social medicine as a regional school of thought, explains the concept of health equity, and touches on the project seen in Chapter 4. The goal of this chapter is to provide the reader with a roadmap for the rest of the thesis and essential knowledge about key concepts. Chapter 2 has two main aims. The first aim is to give the reader all the background knowledge required on HIV, from the origins of the disease to the disease progression, to proven prevention and treatment efforts. The second aim focuses on providing an overview of HIV in Latin America by exploring regional trends and challenges, with a special focus on health equity.

Chapter 3 is divided into three sub-chapters, each of which take on the same format. These three sub-chapters review the social context, political history, treatment and prevention efforts, most recent UNAIDs statistics, and health equity considerations of HIV. The countries

²¹⁸ https://www.who.int/health-topics/health-equity#tab=tab_1

examined are Brazil, Mexico, and Peru. This is important as these case studies show the various faces of the HIV epidemics in these respective countries. Chapter 4 consists of statistical analyses that utilize data from the three aforementioned countries. The goal of this section is to statistically show differences in odds of being loss-to-follow-up between various demographic groups. This information helps us understand which populations would benefit from additional outreach efforts to achieve health equity.

It is undeniable that challenges remain in responding to HIV, both on the regional level and within each country. This paper seeks to provide information about which populations would benefit most from additional intervention efforts, by utilizing a health equity perspective. As discussed in Chapter 2, the two key challenges to successfully managing HIV are late treatment initiation and treatment adherence. As this paper has shown, those at higher odds of being LTFU suffer from structural forces and marginalization, which limit their access to care. Patients who are LTFU are at increased odds of having poor treatment adherence, which leads to poor clinical outcomes and potential additional spread of HIV. If the governments and public health authorities can address these issues, the region's future in combatting HIV will look brighter.

Bibliography:

- Abad, Leticia Arroyo. "Persistent Inequality? Trade, Factor Endowments, and Inequality in Republican Latin America." *The Journal of Economic History* 73, no. 1 (March 2013): 38–78. <https://doi.org/10.1017/S0022050713000028>.
- Abadía-Barrero, César Ernesto, and Arachu Castro. "Experiences of Stigma and Access to HAART in Children and Adolescents Living with HIV/AIDS in Brazil." *Social Science & Medicine* 62, no. 5 (March 2006): 1219–28. <https://doi.org/10.1016/j.socscimed.2005.07.006>.
- Adelzon Assis de Paula et al. "A Comparison of Accuracy and Computational Feasibility of Two Record Linkage Algorithms in Retrieving Vital Status Information from HIV/AIDS Patients Registered in Brazilian Public Databases." *International Journal of Medical Informatics*, 2018, 7.
- Amorim, Annibal Coelho de, Valcler Rangel Fernandes, Juraci Vieira Sérgio, and José Paulo Vicente da Silva. "Health and Equity in Latin America: Utopias and Reality." *Health Promotion International* 34, no. Supplement_1 (March 1, 2019): i11–19. <https://doi.org/10.1093/heapro/daz014>.
- Anderegg, Nanina, Leigh F Johnson, Elizabeth Zaniewski, Keri N Althoff, Eric Balestre, Matthew Law, Denis Nash, Bryan E Shepherd, Constantin T Yiannoutsos, and Matthias Egger. "All-Cause Mortality in HIV-Positive Adults Starting Combination Antiretroviral Therapy: Correcting for Loss to Follow-Up," 2017, 10.
- AVERT. "HIV and AIDS in Latin America the Caribbean Regional Overview." Accessed August 6, 2021. <https://www.avert.org/professionals/hiv-around-world/latin-america/overview>
- Bautista-Arredondo, Sergio, Edson Servan-Mori, Fenella Beynon, Andrea González, and Patricia Volkow. "A Tale of Two Epidemics: Gender Differences in Socio-Demographic Characteristics and Sexual Behaviors among HIV Positive Individuals in Mexico City." *International Journal for Equity in Health* 14, no. 1 (December 2015): 147. <https://doi.org/10.1186/s12939-015-0286-4>.
- Bay Area Regional Health Inequities Initiative. "A Public Health Framework for Reducing Health Inequities." Accessed October 14, 2021. <https://www.barhii.org/enlarged-framework>
- Berkman, Alan, Jonathan Garcia, Miguel Muñoz-Laboy, Vera Paiva, and Richard Parker. "A Critical Analysis of the Brazilian Response to HIV/AIDS: Lessons Learned for Controlling and Mitigating the Epidemic in Developing Countries." *American Journal of Public Health* 95, no. 7 (July 2005): 1162–72. <https://doi.org/10.2105/AJPH.2004.054593>.

Cáceres, C., M. Cueto, and N. Palomino. "Policies around Sexual and Reproductive Health and Rights in Peru: Conflict, Biases and Silence" *This Article Is Based on a Longer Study That Was Developed in Collaboration with Sexuality Policy Watch, with Funding Provided by the Ford Foundation. For an Extended Discussion of the Issues Examined in This Article, See 'Sexual and Reproductive Rights Policies in Peru: Unveiling False Paradoxes', Which Is Available as Part of the e-Book, *SexPolitics: Reports from the Front Lines*, Edited by Richard Parker, Rosalind Petchesky, and Robert Sember, 2007. This e-Book Includes a Series of Case Studies, as Well as a Crosscutting Analysis, Focused on the Politics of Sexual Health and Rights in Eight Countries and Two Institutional Contexts. *SexPolitics* Can Be Found Online At ."
Global Public Health 3, no. sup2 (July 2008): 39–57.
<https://doi.org/10.1080/17441690801981159>.

Cáceres, Carlos F, and Walter Mendoza. "The National Response to the HIV/AIDS Epidemic in Peru: Accomplishments and Gaps-A Review." *JAIDS Journal of Acquired Immune Deficiency Syndromes* 51, no. Supplement 1 (May 2009): S60–66.
<https://doi.org/10.1097/QAI.0b013e3181a66208>.

Carriquiry, Gabriela, Valeria Fink, John Robert Koethe, Mark Joseph Giganti, Karu Jayathilake, and Meridith Blevins. "Mortality and Loss to Follow-up among HIV-Infected Persons on Long-Term Antiretroviral Therapy in Latin America and the Caribbean." *Journal of the International AIDS Society* 18, no. 1 (2015): 8.

Center for Disases Control and Prevention. "PrEP Effectiveness." Accessed September 15, 2021.
<https://www.cdc.gov/hiv/basics/prep/prep-effectiveness.html#:~:text=PrEP%20is%20highly%20effective%20for,74%25%20when%20taken%20as%20prescribed>

Chow, Jeremy Y, Kelika A Konda, Annick Borquez, Patricia Caballero, Alfonso Silva-Santisteban, Jeffrey D Klausner, and Carlos F Cáceres. "Peru's HIV Care Continuum among Men Who Have Sex with Men and Transgender Women: Opportunities to Optimize Treatment and Prevention." *International Journal of STD & AIDS* 27, no. 12 (October 2016): 1039–48.
<https://doi.org/10.1177/0956462416645727>.

Clark, J. L., A. G. Perez-Brumer, S. L. Reisner, X. Salazar, S. McLean, L. Huerta, A. Silva-Santisteban, et al. "Social Network Organization, Structure, and Patterns of Influence Within a Community of Transgender Women in Lima, Peru: Implications for Biomedical HIV Prevention." *AIDS and Behavior* 24, no. 1 (January 2020): 233–45.
<https://doi.org/10.1007/s10461-019-02506-8>.

Coelho, Lara E, and Paula M Luz. "Life-Expectancy with HIV in Latin America and the Caribbean." *The Lancet HIV* 8, no. 5 (May 2021): e247–48. [https://doi.org/10.1016/S2352-3018\(21\)00050-3](https://doi.org/10.1016/S2352-3018(21)00050-3).

- Cousins, Sophie. "A Complex Epidemic Prevents Peru Reaching HIV Goals." *The Lancet HIV* 6, no. 11 (November 2019): e733–34. [https://doi.org/10.1016/S2352-3018\(19\)30351-0](https://doi.org/10.1016/S2352-3018(19)30351-0).
- Crabtree-Ramírez, Brenda, Yanink Caro-Vega, Francisco Belaunzarán-Zamudio, and Juan Sierra-Madero. "High Prevalence of Late Diagnosis of HIV in Mexico during the HAART Era." *Salud Pública de México* 54, no. 5 (October 2012): 506–14. <https://doi.org/10.1590/S0036-36342012000500007>.
- Crabtree-Ramírez, Brenda, Angelina Villasís-Keever, Arturo Galindo-Fraga, Carlos del Río, and Juan Sierra-Madero. "Effectiveness of Highly Active Antiretroviral Therapy (HAART) Among HIV-Infected Patients in Mexico." *AIDS Research and Human Retroviruses* 26, no. 4 (April 2010): 373–78. <https://doi.org/10.1089/aid.2009.0077>.
- Cristina da Costa Marques, Maria. *A História de uma Epidemia Moderna: A Emergência Política da AIDS/HIV no Brasil*. RiMa Editora, 2003.
- Cueto, Marcos. "El rastro del SIDA en el Perú" 9 (2002): 24.
- Daniels, Joe Parkin. "Populism Threatens Brazil's HIV/AIDS Response." *The Lancet HIV* 6, no. 10 (October 2019): e650–51. [https://doi.org/10.1016/S2352-3018\(19\)30301-7](https://doi.org/10.1016/S2352-3018(19)30301-7).
- Davidian, Andreza. "Health Reform in Brazil: The *Sanitaristas* as Programmatic Actors." *European Policy Analysis* 7, no. S1 (January 2021): 64–95. <https://doi.org/10.1002/epa2.1107>.
- Domingues, Carmen-Silvia Bruniera, and Eliseu Alves Waldman. "Causes of Death among People Living with AIDS in the Pre- and Post-HAART Eras in the City of São Paulo, Brazil." Edited by Sten H. Vermund. *PLoS ONE* 9, no. 12 (December 11, 2014): e114661. <https://doi.org/10.1371/journal.pone.0114661>.
- Flynn, Matthew. "Corporate Power and State Resistance: Brazil's Use of TRIPS Flexibilities for Its National AIDS Program." In *Intellectual Property, Pharmaceuticals and Public Health*, by Kenneth Shadlen, Samira Guennif, Alenka Guzmán, and N. Lalitha, 13876. Edward Elgar Publishing, 2011. <https://doi.org/10.4337/9780857938619.00011>.
- Flynn, Matthew. "Origins and Limitations of State-Based Advocacy: Brazil's AIDS Treatment Program and Global Power Dynamics." *Politics & Society* 41, no. 1 (March 2013): 3–28. <https://doi.org/10.1177/0032329212473086>.
- Flynn, Matthew B. "Global Capitalism as a Societal Determinant of Health: A Conceptual Framework." *Social Science & Medicine* 268 (January 2021): 113530. <https://doi.org/10.1016/j.socscimed.2020.113530>.

- Galvão, Jane. "Brazil and Access to HIV/AIDS Drugs: A Question of Human Rights and Public Health." *American Journal of Public Health* 95, no. 7 (July 2005): 1110–16. <https://doi.org/10.2105/AJPH.2004.044313>.
- Ganley, Karla Y., Marta Wilson-Barthes, Andrew R. Zullo, Sandra G. Sosa-Rubí, Carlos J. Conde-Glez, Santa García-Cisneros, Mark N. Lurie, et al. "Incidence and Time-Varying Predictors of HIV and Sexually Transmitted Infections among Male Sex Workers in Mexico City." *Infectious Diseases of Poverty* 10, no. 1 (December 2021): 7. <https://doi.org/10.1186/s40249-020-00792-2>.
- German Advisory Committee Blood (Arbeitskreis Blut), Subgroup 'Assessment of Pathogens Transmissible by Blood'. "Human Immunodeficiency Virus (HIV)." *Transfusion Medicine and Hemotherapy* 43, no. 3 (2016): 203–22. <https://doi.org/10.1159/000445852>.
- Ghosn, Jade, Babafemi Taiwo, Soraya Seedat, Brigitte Autran, and Christine Katlama. "HIV." *The Lancet* 392, no. 10148 (August 2018): 685–97. [https://doi.org/10.1016/S0140-6736\(18\)31311-4](https://doi.org/10.1016/S0140-6736(18)31311-4).
- Girón, J Maziel, Eddy R Segura, Victor Salazar, Rocío Valverde, Ximena Salazar, and Carlos F Caceres. "Percepciones de las Personas Viviendo con VIH/SIDA Sobre Los Servicios de Salud y el Tratamiento Antirretroviral de Gran Actividad: Un Estudio Transversal en Cinco Ciudades del Perú." *Rev Peru Med Exp Salud Publica* 24, no. 3 (2007): 211-217
- Greco, Dirceu B, and Mariangela Simão. "Brazilian Policy of Universal Access to AIDS Treatment: Sustainability Challenges and Perspectives." *AIDS* 21, no. Suppl 4 (July 2007): S37–45. <https://doi.org/10.1097/01.aids.0000279705.24428.a3>.
- Grinstejn, Beatriz, Paula M. Luz, Antonio G. Pacheco, Desiree V. G. Santos, Luciane Velasque, Ronaldo I. Moreira, Maria Regina C. Guimarães, et al. "Changing Mortality Profile among HIV-Infected Patients in Rio de Janeiro, Brazil: Shifting from AIDS to Non-AIDS Related Conditions in the HAART Era." Edited by Yazdan Yazdanpanah. *PLoS ONE* 8, no. 4 (April 5, 2013): e59768. <https://doi.org/10.1371/journal.pone.0059768>.
- Hacker, Mariana A., Samuel R. Friedman, Paulo Roberto Telles, Sylvia Lopes Teixeira, Vera Bongertz, Mariza G. Morgado, and Francisco Inácio Bastos. "The Role of 'Long-Term' and 'New' Injectors in a Declining HIV/AIDS Epidemic in Rio de Janeiro, Brazil." *Substance Use & Misuse* 40, no. 1 (January 2005): 99–123. <https://doi.org/10.1081/JA-200030511>.
- Hartmann, Christopher. "Postneoliberal Public Health Care Reforms: Neoliberalism, Social Medicine, and Persistent Health Inequalities in Latin America." *American Journal of Public Health* 106, no. 12 (December 2016): 2145–51. <https://doi.org/10.2105/AJPH.2016.303470>.

- Hernán, Miguel A., Sonia Hernández-Díaz, and James M. Robins. "A Structural Approach to Selection Bias." *Epidemiology* 15, no. 5 (September 2004): 615–25.
<https://doi.org/10.1097/01.ede.0000135174.63482.43>.
- Hernández-Ávila, Juan E, Lina S Palacio-Mejía, Alfonso Hernández-Romieu, Sergio Bautista-Arredondo, Jaime Sepúlveda Amor, and Mauricio Hernández-Ávila. "Effect of Universal Access to Antiretroviral Therapy on HIV/AIDS Mortality in Mexico 1990–201." *J Acquir Immune Defic Syndr* 69, no. 3 (2015): 9.
- Hernández-Romieu, Alfonso C., Carlos del Rio, Juan Eugenio Hernández-Ávila, Hugo Lopez-Gatell, José Antonio Izazola-Licea, Patricia Uribe Zúñiga, and Mauricio Hernández-Ávila. "CD4 Counts at Entry to HIV Care in Mexico for Patients under the 'Universal Antiretroviral Treatment Program for the Uninsured Population,' 2007–2014." Edited by Antonio Guilherme Pacheco. *PLOS ONE* 11, no. 3 (March 30, 2016): e0152444.
<https://doi.org/10.1371/journal.pone.0152444>.
- Hoenigl, Martin, Antoine Chaillon, David J. Moore, Sheldon R. Morris, Sanjay R. Mehta, Sara Gianella, K. Rivet Amico, and Susan J. Little. "Rapid HIV Viral Load Suppression in Those Initiating Antiretroviral Therapy at First Visit after HIV Diagnosis." *Scientific Reports* 6, no. 1 (December 2016): 32947. <https://doi.org/10.1038/srep32947>.
- Hoffman, Kelly, and Miguel Angel Centeno. "The Lopsided Continent: Inequality in Latin America." *Annual Review of Sociology* 29, no. 1 (August 2003): 363–90.
<https://doi.org/10.1146/annurev.soc.29.010202.100141>.
- Hull, Mark W., and Julio S.G. Montaner. "HIV Treatment as Prevention: The Key to an AIDS-Free Generation." *Journal of Food and Drug Analysis* 21, no. 4 (December 2013): S95–101.
<https://doi.org/10.1016/j.jfda.2013.09.043>.
- Inciardi, James A., Surratt, Hilary L., and Telles, Paulo R. *Sex, Drugs, and HIV/AIDS in Brazil*. Boulder: Westview Preaa, 2000.
- Institute for Health Metrics and Evaluation (IHME). "Financing Global Health 2020: The impact of COVID-19." Accessed March 2, 2022 <https://www.healthdata.org/policy-report/financing-global-health-2020-impact-covid-19>
- Joint United Nations Programme on HIV/AIDS. "Country Fact Sheet - Brazil". Accessed August 3, 2021. <https://aidsinfo.unaids.org/>
- Joint United Nations Programme on HIV/AIDS. "Country Fact Sheet - Mexico". Accessed August 3, 2021. <https://aidsinfo.unaids.org/>
- Joint United Nations Programme on HIV/AIDS. "Country Fact Sheet - Peru". Accessed August 3, 2021. <https://aidsinfo.unaids.org/>

- Joint United Nations Programme on HIV/AIDS. "Regional Fact Sheet – Latin America." Accessed August 3, 2021. <https://aidsinfo.unaids.org/>
- Joint United Nations Programme on HIV/AIDS. "Regional Fact Sheet – Caribbean." Accessed August 3, 2021. <https://aidsinfo.unaids.org/>
- Joint United Nations Programme on HIV/AIDS. "Global HIV & AIDS statistics – Fact Sheet". Accessed August 3, 2021. <https://www.unaids.org/en/resources/fact-sheet>
- Joseph Harris. "Brazil: Constituting Rights, Setting Precedents, Challenging Norms." In *Achieving Access: Professional Movements and the Politics of Health Universalism*. Ithaca, NY: Cornell University Press, 2017.
- Kaiser Family Foundation. "The Global HIV/AIDS Epidemic." Accessed August 21, 2021. <https://www.kff.org/global-health-policy/fact-sheet/the-global-hiv-aids-epidemic/>
- Klimas, Nancy, Anne O'Brien Koneru, and Mary Ann Fletcher. "Overview of HIV." *Psychosomatic Medicine* 70, no. 5 (June 2008): 523–30. <https://doi.org/10.1097/PSY.0b013e31817ae69f>.
- Koenig, Serena P, Ahra Kim, Bryan E Shepherd, Carina Cesar, Valdilea Veloso, Claudia P Cortes, Denis Padgett, et al. "Increased Mortality After Tuberculosis Treatment Completion in Persons Living With Human Immunodeficiency Virus in Latin America." *Clinical Infectious Diseases* 71, no. 1 (June 24, 2020): 215–17. <https://doi.org/10.1093/cid/ciz1032>.
- Krieger, Nancy. "Latin American Social Medicine: The Quest for Social Justice and Public Health." *American Journal of Public Health* 93, no. 12 (2003): 1989-1991.
- Leyva-Moral, Juan M., Blanca K. Loayza-Enriquez, Patrick A. Palmieri, Genesis M. Guevara-Vasquez, Ursula E. Elias-Bravo, Joan E. Edwards, María Feijoo-Cid, Lucy Y. Davila-Olano, Juan R. Rodriguez-Llanos, and Franco E. Leon-Jimenez. "Adherence to Antiretroviral Therapy and the Associated Factors among People Living with HIV/AIDS in Northern Peru: A Cross-Sectional Study." *AIDS Research and Therapy* 16, no. 1 (December 2019): 22. <https://doi.org/10.1186/s12981-019-0238-y>.
- Local Burden of Disease HIV Collaborators. "Mapping Subnational HIV Mortality in Six Latin American Countries with Incomplete Vital Registration Systems." *BMC Medicine* 19, no. 1 (December 2021): 4. <https://doi.org/10.1186/s12916-020-01876-4>.
- Luz, Paula M., Valdilea G. Veloso, and Beatriz Grinsztejn. "The HIV Epidemic in Latin America: Accomplishments and Challenges on Treatment and Prevention." *Current Opinion in HIV and AIDS* 14, no. 5 (September 2019): 366–73. <https://doi.org/10.1097/COH.0000000000000564>.

- Marrazzo, Jeanne M., Gita Ramjee, Barbra A. Richardson, Kailazarid Gomez, Nyaradzo Mgodli, Gonasagrie Nair, Thesla Palanee, et al. "Tenofovir-Based Preexposure Prophylaxis for HIV Infection among African Women." *New England Journal of Medicine* 372, no. 6 (February 5, 2015): 509–18. <https://doi.org/10.1056/NEJMoa1402269>.
- Melo, Eduardo Alves, Ivia Maksud, and Rafael Agostini. "Cuidado, HIV/Aids e atenção primária no Brasil: desafio para a atenção no Sistema Único de Saúde?" *Revista Panamericana de Salud Pública* 42 (2018). <https://doi.org/10.26633/RPSP.2018.151>.
- Montenegro, Luiz, Luciane Velasque, Sara LeGrand, Kathryn Whetten, Ricardo de Mattos Russo Rafael, and Monica Malta. "Public Health, HIV Care and Prevention, Human Rights and Democracy at a Crossroad in Brazil." *AIDS and Behavior* 24, no. 1 (January 2020): 1–4. <https://doi.org/10.1007/s10461-019-02470-3>.
- National Institute of Allergy and Infectious Diseases. "Antiretroviral Drug Discovery and Development." Accessed August 10, 2021. <https://www.niaid.nih.gov/diseases-conditions/antiretroviral-drug-development>
- National Institute of Allergy and Infectious Diseases. "National Adoption of 'Treat All' Policy Leads More People with HIV to Start Treatment Quickly" Accessed September 15, 2021. <https://www.niaid.nih.gov/news-events/treat-all-hiv-policy>
- Nielsen, René Clausen, Miguel Luengo-Oroz, Maeve B. Mello, Josi Paz, Colin Pantin, and Taavi Erkkola. "Social Media Monitoring of Discrimination and HIV Testing in Brazil, 2014–2015." *AIDS and Behavior* 21, no. S1 (July 2017): 114–20. <https://doi.org/10.1007/s10461-017-1753-2>.
- Nunn, Amy. *The Politics and History of AIDS Treatment in Brazil*. New York, NY: Springer New York, 2009. <https://doi.org/10.1007/978-0-387-09618-6>.
- Nunn, Amy Stewart, Elize Massard da Fonseca, Francisco I. Bastos, and Sofia Gruskin. "AIDS Treatment In Brazil: Impacts And Challenges." *Health Affairs* 28, no. 4 (July 2009): 1103–13. <https://doi.org/10.1377/hlthaff.28.4.1103>.
- Okie, Susan. "Fighting HIV — Lessons from Brazil." *N Engl J Med*, 2006, 5.
- Pacheco, Antonio G, Valeria Saraceni, Suely H Tuboi, Lilian M Lauria, Lawrence H Moulton, José Cláudio Faulhaber, Bonnie King, Jonathan E Golub, Betina Durovni, Solange Cavalcante, Lee H Harrison, Richard E Chaisson, and Mauro Schechter. "Estimating the Extent of Underreporting of Mortality Among HIV-Infected Individuals in Rio de Janeiro, Brazil." *AIDS Research and Human Retroviruses* 27, no. 1 (2011): 25-28. <https://doi.org/10.1089/aid.2010.0089>

- Paiva, Simone de Sousa, Nathália Lima Pedrosa, and Marli Teresinha Gimeniz Galvão. "Análise Espacial Da AIDS e Os Determinantes Sociais de Saúde." *Revista Brasileira de Epidemiologia* 22 (2019): e190032. <https://doi.org/10.1590/1980-549720190032>.
- Passos, Susane Müller Klug, and Luciano Dias de Mattos Souza. "An Evaluation of Quality of Life and Its Determinants among People Living with HIV/AIDS from Southern Brazil." *Cadernos de Saúde Pública* 31, no. 4 (April 2015): 800–814. <https://doi.org/10.1590/0102-311X00000514>.
- Perú Ministerio de Salud: Centro Nacional de Epidemiología, Prevención y Control de Enfermedades. *Situación epidemiológica del VIH-SIDA en el Perú Febrero 2021*. https://www.dge.gob.pe/portal/docs/vigilancia/vih/Boletin_2021/febrero.pdf. (accessed October 7, 2021)
- Piccoli, Nilo Jorge, Monique Araújo de Brito, and Selma Rodrigues de Castilho. "Assessment of Pharmaceutical Services in HIV/AIDS Health Units in the City of Niterói, Brazil." *Brazilian Journal of Pharmaceutical Sciences* 53, no. 2 (2017). <https://doi.org/10.1590/s2175-97902017000216113>.
- Raimundo do Nascimento, Dilene. *As Pestes do Século XX: Tuberculose e Aids no Brasil, uma história comparada*. Fundação Oswaldo Cruz, 2005.
- Rebeiro, Peter F, Carina Cesar, Bryan E Shepherd, Raquel B De Boni, Claudia P Cortes, Fernanda Rodriguez, Pablo Belaunzaran-Zamudio, et al. "Assessing the HIV Care Continuum in Latin America: Progress in Clinical Retention, CART Use and Viral Suppression," 2016, 8.
- Rebolledo-Ponietsky, K, C V Munayco, and E Mezones-Holguín. "Migration Crisis in Venezuela: Impact on HIV in Peru." *Journal of Travel Medicine* 26, no. 2 (February 1, 2019). <https://doi.org/10.1093/jtm/tay155>.
- Richard Parker. *Beneath the Equator: Cultures of Desire, Male Homosexuality, and Emerging Gay Communities in Brazil*. New York: Routledge, 1999.
- Rio, Carlos del, and Jaime Sepúlveda. "AIDS in Mexico: Lessons Learned and Implications for Developing Countries." *AIDS* 16, no. 11 (July 2002): 1445–57. <https://doi.org/10.1097/00002030-200207260-00001>.
- Rodrigues, Amanda, Claudio J. Struchiner, Lara E. Coelho, Valdilea G. Veloso, Beatriz Grinsztejn, and Paula M. Luz. "Late Initiation of Antiretroviral Therapy: Inequalities by Educational Level despite Universal Access to Care and Treatment." *BMC Public Health* 21, no. 1 (December 2021): 389. <https://doi.org/10.1186/s12889-021-10421-8>.

Roser, Max and Hannah Ritchie. "HIV/AIDS." *Our World in Data*. Accessed September 21, 2021. <https://ourworldindata.org/hiv-aids#death-rates-are-highest-for-younger-adults-and-children-under-five-years-old>

Sanchez, Jorge, Javier R Lama, Lourdes Kusunoki, Hugo Manrique, Pedro Goicochea, Aldo Lucchetti, Manuel Rouillon, et al. "HIV-1, Sexually Transmitted Infections, and Sexual Behavior Trends Among Men Who Have Sex With Men in Lima, Peru." *JAIDS Journal of Acquired Immune Deficiency Syndromes* 44, no. 5 (April 15, 2007): 578–85. <https://doi.org/10.1097/QAI.0b013e318033ff82>.

Silva, Daniel S., Raquel B. De Boni, Jordan E. Lake, Sandra W. Cardoso, Sayonara Ribeiro, Ronaldo I. Moreira, Jesse L. Clark, Valdilea G. Veloso, Beatriz Grinsztejn, and Paula M. Luz. "Retention in Early Care at an HIV Outpatient Clinic in Rio de Janeiro, Brazil, 2000–2013." *AIDS and Behavior* 20, no. 5 (May 2016): 1039–48. <https://doi.org/10.1007/s10461-015-1235-3>.

Silva-Santisteban, Alfonso, Eddy R Segura, Clara Sandoval, Maziel Girón, Margarita Petretera, and Carlos F Caceres. "Determinants of Unequal HIV Care Access among People Living with HIV in Peru." *Globalization and Health* 9, no. 1 (2013): 22. <https://doi.org/10.1186/1744-8603-9-22>.

Simon, Viviana, David D Ho, and Quarraisha Abdool Karim. "HIV/AIDS Epidemiology, Pathogenesis, Prevention, and Treatment." *The Lancet* 368, no. 9534 (August 2006): 489–504. [https://doi.org/10.1016/S0140-6736\(06\)69157-5](https://doi.org/10.1016/S0140-6736(06)69157-5).

Smallman, Shawn. *The AIDS Pandemic in Latin America*. The University of North Carolina Press, 2007.

Smiley, Casey L, Peter F Rebeiro, Carina Cesar, Pablo F Belaunzaran-Zamudio, Brenda Crabtree-Ramirez, Denis Padgett, Eduardo Gotuzzo, et al. "Estimated Life Expectancy Gains with Antiretroviral Therapy among Adults with HIV in Latin America and the Caribbean: A Multisite Retrospective Cohort Study." *The Lancet HIV* 8, no. 5 (May 2021): e266–73. [https://doi.org/10.1016/S2352-3018\(20\)30358-1](https://doi.org/10.1016/S2352-3018(20)30358-1).

Strathdee, Steffanie A. "Mexico's Evolving HIV Epidemic." *JAMA* 300, no. 5 (August 6, 2008): 571. <https://doi.org/10.1001/jama.300.5.571>.

Torres, Thiago Silva, Sandra Wagner Cardoso, Luciane de Souza Velasque, Luana Monteiro Spindola Marins, Marília Santini de Oliveira, Valdilea Gonçalves Veloso and Beatriz Grinsztejn. "Aging with HIV: An Overview of an Urban Cohort in Rio de Janeiro (Brazil) Across Decades of Life." *The Brazilian Journal of Infectious Diseases* 17, no. 3 (2013): 324–331. <http://dx.doi.org/10.1016/j.bjid.2012.10.024>

- Torres-Ruiz, Antonio. "HIV/AIDS and Sexual Minorities in Mexico: A Globalized Struggle for the Protection of Human Rights." *Latin American Research Review* 46, no. 1 (2011): 30–53. <https://doi.org/10.1353/lar.2011.0000>.
- U.S. Department of Health and Human Services. "HIV Treatment as Prevention." Accessed August 10, 2021. <https://www.hiv.gov/tasp>
- United Nations. "Countries Most Affected by HIV/AIDS Are Least Able to Pay for Prevention and Treatment." Accessed October 14, 2021. <https://www.un.org/press/en/2001/aids18.doc.htm>
- Valencia-Garcia, Dellanira, Deepa Rao, Lara Strick, and Jane M. Simoni. "Women's Experiences with HIV-Related Stigma from Health Care Providers in Lima, Peru: 'I Would Rather Die than Go Back for Care.'" *Health Care for Women International* 38, no. 2 (February 2017): 144–58. <https://doi.org/10.1080/07399332.2016.1217863>.
- Valenzuela, Carla, Cesar Ugarte-Gil, Jorge Paz, Juan Echevarria, Eduardo Gotuzzo, Sten H. Vermund, and Aaron M. Kipp. "HIV Stigma as a Barrier to Retention in HIV Care at a General Hospital in Lima, Peru: A Case–Control Study." *AIDS and Behavior* 19, no. 2 (February 2015): 235–45. <https://doi.org/10.1007/s10461-014-0908-7>.
- Villar Uribe, Manuela, Maria-Luisa Escobar, Ana Lorena Ruano, and Roberto F. Lunes. "Realizing the Right to Health in Latin America, Equitably." *International Journal for Equity in Health* 20, no. 1 (December 2021): 34. <https://doi.org/10.1186/s12939-020-01332-y>.
- Ware, Norma C., Monique A. Wyatt, Elvin H. Geng, Sylvia F. Kaaya, Oche O. Agbaji, Winnie R. Muyindike, Guerino Chalamilla, and Patricia A. Agaba. "Toward an Understanding of Disengagement from HIV Treatment and Care in Sub-Saharan Africa: A Qualitative Study." Edited by Janet Parsons. *PLoS Medicine* 10, no. 1 (January 8, 2013): e1001369. <https://doi.org/10.1371/journal.pmed.1001369>.
- World Health Organization. "Health Equity." Accessed October 14, 2021. https://www.who.int/health-topics/health-equity#tab=tab_1
- World Health Organization. "Summary of the Global HIV Epidemic, 2020." Accessed August 21, 2021. <https://www.who.int/data/gho/data/themes/hiv-aids>
- Yamin, Alicia Ely, Andrés Pichon-Riviere, and Paola Bergallo. "Unique Challenges for Health Equity in Latin America: Situating the Roles of Priority-Setting and Judicial Enforcement." *International Journal for Equity in Health* 18, no. 1 (December 2019): 106. <https://doi.org/10.1186/s12939-019-1005-3>.