

THE IMPACT OF GENTRIFICATION ON HIV LINKAGE AND RETENTION
IN SAN FRANCISCO

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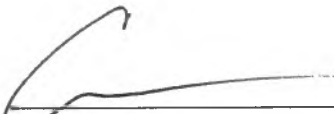
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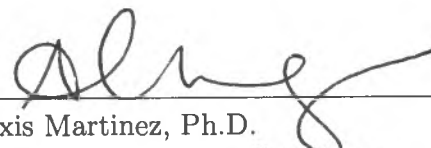
I certify that I have read *THE IMPACT OF GENTRIFICATION ON HIV LINKAGE AND RETENTION IN SAN FRANCISCO* by Finn Black and that in my opinion this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirements for the degree: Master of Arts in Geography at San Francisco State University.



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This thesis explores the impact of gentrification, evictions, and housing costs in San Francisco on people living with HIV. The research presented is a mixed-methods, exploratory study that seeks to generate hypotheses and research frameworks for future work. In this thesis, I combine spatial analysis of socioeconomic, eviction, and epidemiologic data with qualitative surveys and in-depth interviews. In doing so, I explore how numerous San Francisco residents with HIV have been forced out of the city to areas with fewer medical resources while the HIV-positive residents who stay struggle to manage their health while facing increased housing insecurity and stigma.

I certify that the Abstract is a correct representation of the content of this thesis.



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Chapter 1

Introduction

1.1 Background: HIV and Housing in San Francisco

San Francisco, CA., was once a major center of the AIDS epidemic in the United States. In 1992, the city experienced its record high of 2,332 new HIV diagnoses (San Francisco Department of Public Health, 2016). In recent years, San Francisco has received increased attention for its vigorous HIV treatment and prevention infrastructure and in 2015, the number of new HIV diagnoses in San Francisco dropped to a record low of 255 (McNeil, 2015; San Francisco Department of Public Health, 2016). San Francisco's decline in new HIV diagnoses is widely attributed to the city's improvement in services for HIV prevention, testing, and treatment and its aggressive policy of offering immediate HIV treatment to individuals who test positive (McNeil, 2015; Getting to Zero SF, 2017).

One potential factor in San Francisco's decline in new HIV cases that is often

overlooked is gentrification. In 2015, The New York Times published an article suggesting that the flight of low-income residents from San Francisco may have eased the city's burden of new infections, while growing wealth in the city made funding expensive public health interventions feasible (McNeil, 2015). Despite this recognition, the academic community has not addressed whether displacement of San Francisco residents at risk for HIV has contributed to fewer HIV infections. It is hard to determine whether San Francisco has lost the populations most at risk of contracting and transmitting HIV. There is no data on whether HIV negative San Franciscans with risk factors like injection drug use have contracted HIV after leaving San Francisco. Likewise, there is no data on whether HIV-positive San Franciscans who have left the city have transmitted HIV to individuals in their new communities. Similarly, it is difficult to assess what HIV in San Francisco would look like if the city did not experience a housing affordability crisis a complex hypothetical scenario that may be impossible to accurately model. However, there are several important pieces of information that make a compelling case for investigating the impact of gentrification on the epidemiology of HIV in the San Francisco Bay Area. The results of the 2015 HIV Epidemiology Annual Report (San Francisco Department of Public Health, 2016) show that by the end of 2015, one third of living San Francisco HIV cases had moved outside of San Francisco. It is not clear how many of those people left San Francisco due to the cost of living, However, if the out-migration of people living with HIV has increased in recent years, San Francisco's loss of individuals

capable of transmitting HIV may be contributing to the decrease in new cases, and perhaps to an increase in new cases outside of San Francisco as well.

There is limited evidence of to a relationship between the out-migration of people living with HIV in San Francisco and the increasing cost of living in the city. Yet, there is compelling data that begs more inquiry into how HIV and housing costs interrelate. It is well established that, especially for low-income individuals, finding and keeping housing in San Francisco is increasingly challenging. The median rent for San Francisco residents in 2016 was \$1,558 a month, a figure that includes all individuals who pay rent regardless of the type of housing (United States Census Bureau, 2016). For a 1-bedroom apartment, the median rent in 2016 was approximately \$3500 a month (Newman, 2016b). Without question, the increased cost of housing presented numerous challenges for low-income individuals. There is also overwhelming evidence that shows a link between rent increases and a rise in evictions. One study conducted by the housing rights advocacy group Causa Justa in collaboration with the Alameda County Department of Public Health argues that many landlords view the eviction of rent-controlled tenants as a strategy to rent their properties at market rate (Philips et al., 2008). In 2016 2,080 eviction notices were served in San Francisco, a striking increase from the 1,174 served in 2009 (San Francisco Rent Board, 2017). Figure 1.1 shows this increase in eviction notices overall note the recent increase in evictions for purposes of development. Losing a rent-controlled apartment to eviction and paying expensive market rates is especially problematic

for low-income individuals (Philips et al., 2008).

San Franciscans with HIV are disproportionately impacted by the struggle to find and keep housing. According to the City of San Francisco's HIV/AIDS Housing Five-Year Plan (City of San Francisco, 2014), 78 percent of HIV-positive San Franciscans are at risk of becoming homeless, where risk of homelessness is defined as being low-income and not receiving housing subsidies. At present, San Francisco only has enough subsidized housing to serve about one tenth of this population.

While this lack of housing support may be contributing to San Francisco's loss of HIV cases, another important potential impact is on the health of people living with HIV (PLWH) who remain in San Francisco. In spite of the limited housing resources available to HIV-positive individuals residing in San Francisco, public health research provides strong evidence to support the role of stable housing in improving HIV treatment outcomes. Studies have demonstrated that a lack of stable housing is associated with lower rates of linkage to medical care, lower rates of viral suppression (Aidala et al., 2007, 2016), poorer perceived well-being (Logie et al., 2016) and increased HIV risk behaviors such as injection drug use and multiple sex partners (Riley et al., 2007; Shubert and Bernstine, 2007; Kidder et al., 2008; Chambers et al., 2007; Fletcher et al., 2014). The statistics in San Francisco partly support these findings. By the end of 2015, it was estimated that approximately 72 percent of all San Francisco HIV cases were virally suppressed, compared to only 33 percent for homeless San Francisco cases (San Francisco Department of Public

San Francisco Evictions 1997 - 2016

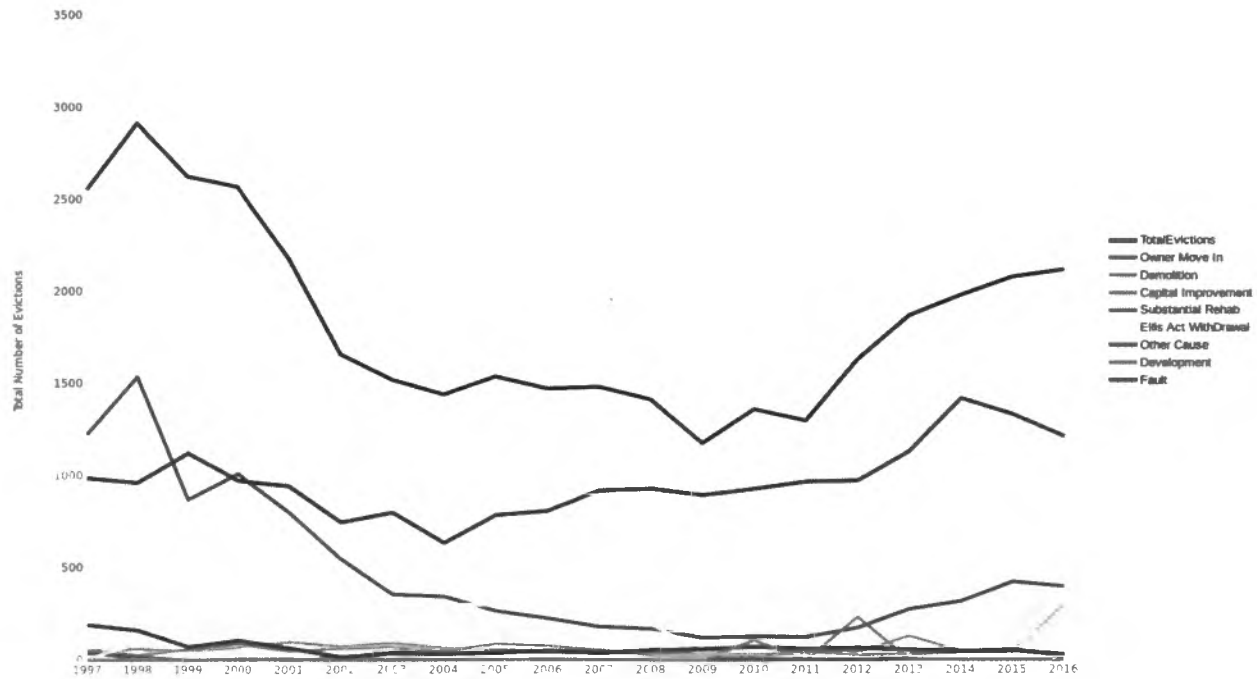


Figure 1.1: San Francisco Evictions by Cause, 1997-2016

Health, 2016).

1.2 Gentrification as a Social Determinant of Health

The Centers for Disease Control and Prevention (CDC) define gentrification as a change in property value from high to low, often accompanied by the displacement of long-term residents (Centers for Disease Control and Prevention, 2015a). The CDC considers gentrification and associated displacement an important determinant of poor health outcomes in low income populations, with gentrification exacerbating health inequities and leading to higher rates of chronic illnesses in displaced populations. If affordable housing is understood to be an important part of a comprehensive HIV treatment and prevention plan, San Francisco's housing crisis raises an important question: how does gentrification fit into San Francisco's problem of housing insecurity among people living with HIV? Understanding the constraints of researching this broad and complex topic for a Masters thesis, my central goal was to lay a foundation for my future graduate research while also offering others a framework for investigating gentrification as an issue of public health. Within this broader question of gentrification's impact on PLWH in San Francisco, my thesis has two primary goals:

- 1) To investigate how housing affordability and evictions in San Francisco contribute to HIV linkage and retention in San Francisco. Specifically, I am inter-

ested in how people living with HIV are impacted by housing costs, the loss of housing, and difficulty in finding housing, and whether the struggle to find and keep housing impacts their ability to manage their HIV.

- 2) To generate hypotheses and a research framework for further investigation into the migration of PLWH outside of San Francisco. After obtaining my M.A., I wish to investigate whether PLWH who are displaced by gentrification are retained in medical care elsewhere. I anticipate that this question may be difficult to answer and aim to use what I learn from this thesis to inform my future research.

My decision to pursue these questions was heavily influenced by my own experience working in the HIV field in Alameda County. As a volunteer HIV counselor and linkage-to-care coordinator at the Berkeley Free Clinic, my role within the HIV field is to help newly diagnosed individuals get medical care. In my capacity as an HIV linkage coordinator, I maintain relationships with service providers throughout San Francisco and Alameda Counties. In my work, I made two informal observations that led me to my research topic. The first was that linking HIV-positive people to care was much easier if they resided in San Francisco rather than Alameda County. San Francisco has protocols for getting newly diagnosed PLWH into care quickly, while my colleagues and I are just beginning to discuss how to adopt such protocols in Alameda County. I noticed that my clients who received care in San Francisco were on medication within 24-72 hours while my Alameda County clients sometimes

waited weeks or months before beginning treatment. My second informal observation was that my counterparts at HIV service organizations throughout Alameda County were noticing an increase in the number of HIV-positive people moving from San Francisco to Alameda County and that these individuals were struggling to receive care in their new neighborhoods. At networking meetings, my colleagues and I discussed the irony of San Francisco receiving publicity for its "Getting to Zero" campaign when it seemed like many of its HIV-positive residents were moving away and potentially falling out of care. Meanwhile, I became curious about how those San Francisco PLWH who remained in San Francisco managed the dual struggles of managing their HIV while maintaining their housing.

For the scope of my Master's thesis, it is not practical for me to determine whether displaced San Franciscans with HIV are retained in care elsewhere and/or likely contributing to new HIV infections. Such a study would involve obtaining highly sensitive patient data that is not generally released to graduate students. Therefore, this thesis will focus on retention in care of PLWH who remain in San Francisco and how those individuals are impacted by evictions and housing affordability. Although keeping my research within the scope of San Francisco is partly a question of practicality, there are compelling public health reasons to focus on PLWH living in San Francisco. San Francisco is severely lacking in affordable housing and housing insecurity is a major problem for San Franciscans living with HIV. Although there is research on the general relationship between HIV status and hous-

ing affordability, and on the specific problem of housing affordability and insecurity in San Francisco, there is a need for research on how gentrification influences the health outcomes of HIV-positive individuals residing in San Francisco. Although the Centers for Disease Control and Prevention (CDC) has identified gentrification as an important social determinant of chronic, non-infectious diseases such as asthma and diabetes, the role of gentrification in the epidemiology of HIV is unknown (Centers for Disease Control and Prevention, 2015a). Understanding how gentrification and evictions contribute to housing insecurity among PLWH may be useful in prioritizing housing support resources in San Francisco. Moreover, raising awareness about the role of gentrification and eviction in HIV treatment outcomes may encourage other scholars to tackle the question of what happens to PLWH who are displaced from San Francisco.

1.3 Aim, Scope, and Overview

Because gentrification as a determinant of HIV outcome is not a thoroughly researched topic, I designed my thesis as a broad, exploratory study that aims to generate rather than test hypotheses. As such, I used a variety of methods and perspectives and remained open to whatever themes emerged from my data. Data collection and analysis methods included vulnerability mapping, epidemiologic analyses, qualitative surveys, and in-depth interviews. What ties these methods together is the goal of understanding whether and where gentrification and evictions might

fit into San Francisco's problem of housing insecurity among PLWH and what researchers might do in the future to understand the issue more thoroughly. I do not aim to draw broad causal relationships or propose generalizable theories. Rather, this is an exploratory project that includes an extensive overview of research from multiple fields, analysis of several types of spatial data, and qualitative research with both HIV-positive San Franciscans and HIV service providers.

This thesis begins with an overview of the work and theories that contributed to my research. Chapter 2 presents a review of literature of geographic and public health research. I first offer a short overview of medical and health geography, emphasizing how medical and health geographers have approached spatial health disparities and taking note of methodological disputes between the two subfields. This part of my literature review frames my research within the history of health and medical geography and provides context for understanding my choice to use mixed methods. I then focus my attention on spatial research in housing and public health. I discuss the small body of work relevant to HIV and gentrification and explain how the history of geographic research in public health influenced my research design. Chapter 3 outlines the theoretical frameworks that influence my research. In particular, I consider the importance of political ecologies of disease and the emerging concept of Structural One Health to understanding the complex etiology of HIV outcomes. Both of these ideas have been developed and used by medical geographers to emphasize political and economic determinants of health in spatial

epidemiology. As with my literature review, Chapter 3 provides further context for my choice of mixed methods. I describe specific methods I chose in Chapter 4, where I present an in-depth overview of my research design and the methods I relied on for obtaining data and for conducting analysis. I address the advantages and limits of each method and explain how those methods complemented each other.

Because I employed a wide range of data collection and analysis methods, I organize the presentation of my procedures and results into two chapters. Chapter 5 presents the methods and results of my quantitative analyses. I first analyze gentrification and evictions in San Francisco and the relationship between the two to identify where gentrification-related displacement was most likely to occur. This is followed by an analysis of public HIV data from the San Francisco Department of Public Health's HIV Epidemiology Section. Using spatial analysis of HIV viral suppression rates, HIV prevalence, and gentrification-related displacement, I perform a vulnerability assessment to indicate where housing support for PLWH may be most urgently needed.

Chapter 6 presents my qualitative methods and results. I used two types of qualitative research: an online, open-ended survey of HIV service providers in San Francisco and in-depth, semi-structured interviews with San Francisco PLWH. The survey aimed to reach a large number of service providers who would have contact with a large number of PLWH. I envisioned that service providers would be in an excellent position to make observations about their clients facing evictions

and housing insecurity. To obtain more in-depth information on the experiences of PLWH in San Francisco, I interviewed PLWH about their experiences in obtaining, keeping, and losing housing while managing their HIV. Qualitative data was coded and analyzed using grounded theory analysis.

While Chapters 5 and 6 explain research procedures and results, Chapter 7 triangulates the spatial analysis, data from service providers, and data from PLWH. I consider how these three research components complement each other and explore the issue of housing access and HIV within the broader geographic themes of place, scale, and human migration.

Chapter 8 discusses of potential implications of my research for public health and HIV research in San Francisco. First, I reflect on my research methods, revisit likely biases, and consider how these methods could be improved. Then, using the results laid out in Chapters 5 and 6 and the triangulation of analyses from Chapter 7, I propose several research frameworks and hypotheses regarding the impact of gentrification and eviction on HIV epidemiology in San Francisco.

Chapter 2

Literature Review

2.1 Introduction

In the previous chapter, I noted that the relationship between gentrification and HIV in San Francisco has received little attention from scholars. However, gentrification as a social determinant of general health has been of increasing interest to public health and policy researchers. In the San Francisco Bay Area, a joint study between the housing advocacy group Causa Justa and the Alameda County Department of Public Health found that gentrification has displaced communities of color from more urbanized counties to more suburban counties with fewer public health resources (Philips et al., 2008). The Haas Institute at U.C. Berkeley found a similar dynamic of gentrification, displacement, and resource disparities in Richmond, CA, echoing that vulnerable populations were being pushed into areas with fewer health and social services (Moore et al., 2016). Scholarly literature similarly supports the idea

that gentrification has an impact on public health, especially with respect to access to basic resources such as food (Petrovic, 2007; Angelovski, 2015).

Although these studies suggest that gentrification has a negative impact on the health of low income populations, there is much less research on how gentrification specifically impacts people living with HIV, a chronic infectious disease that requires lifelong management. The small body of literature that does exist consists primarily of epidemiologic studies that focus on HIV transmission rather than treatment outcomes or patient quality of life (Maas et al., 2006; Pulvirenti et al., 2007; Druyts et al., 2009). Nonetheless, this research presents compelling evidence for gentrification and place having an impact on HIV and thus a large part of my literature review examines health policy and epidemiology research alongside works by geographers.

Before examining this research on gentrification and HIV, I begin with a discussion of the recent history of medical and health geographers approaches to health inequities as a whole. I will then narrow my focus to geographic perspectives on gentrification and health. This part of my literature review frames my own research within a broader geographic context and emphasizes the geographic in my thesis. Finally, I focus on public health and social science research on the relevance of place in HIV epidemiology and treatment outcomes. In offering a comprehensive review of the literature, this chapter aims to illustrate how my thesis addresses a research gap that is not exclusive to geography.

2.2 Social determinants of health: perspectives from geography

Within the subfields of health and medical geography, there have been competing interpretations of how best to examine and discuss health inequities. Historically, medical geography has focused on quantitative studies of disease epidemiology while health geography has focused on qualitative studies of health care systems and patient well-being (Kearns and Moon, 2002). Despite this distinction, several geographers have made calls for integrating quantitative methods from medical geography with qualitative methods from health geography. As the work of these scholars informed my choice of mixed methods, I briefly review them here.

The call for integrating qualitative methods into medical geography originates with Kearns (1993). Kearns critiqued medical geographies emphasis on quantitative methods and argued that geographic research on health and medicine was largely in the "shadow of biomedicine". Attempting to disrupt the standard approaches in medical geography, Kearns proposed combining the quantitative methods of medical geography with theories and methods from human geography and public health. Shortly after, Mayer (1994) stressed the importance of disease ecology as an integrative theoretical framework in medical geography that allows geographers to take an interdisciplinary approach to social determinants of health. Mayer proposed evaluating disease patterns and causation from social, cultural, and biomedical per-

spectives. Similarly, Rosenberg (1998) argued that combining epidemiology's "data driven" approach with human geography's qualitative methods would produce a more complete understanding of the complex biomedical and sociocultural determinants of health.

These calls for an integrated, mixed-methods approach to health inequities are especially relevant to spatial research on HIV, where patterns of transmission are strongly influenced by social determinants (Brown, 1995). The next section of this literature review focuses on geographic approaches to health inequity, noting where geographers used integrative methods to deepen our understanding of health determinants.

2.3 Geographic perspectives on health inequities

The realization that medical geographers needed a more critical perspective on health determinants helped set the stage for investigations into geographies of health disparities. Smith and Easterlow (2005) traced the development of geographies of health inequity to the early 2000s, arguing that prior work on health inequity largely came from the fields of medical sociology and public health. Like the health geographers named in the previous section, Smith and Easterlow (2005) expressed frustrations with the medical versus health and quantitative versus qualitative divide. They also argued that the positioning of structure against agency in issues of health inequity presented a false dichotomy that prevents health geographers from looking

at health disparities in a multi-faceted way. Notably, Smith and Easterlow stressed the necessity of thinking about how, just as neighborhoods may serve as a determinant of ill health, illness may drive people to certain neighborhoods. Describing health and housing as intertwined variables that mutually impact one another, they proposed that illness may displace individuals into low-income neighborhoods at the same time that low-income neighborhoods contribute to illness.

Smyth (2008) echoed Smith and Easterlow's idea that health geographers should integrate both structure and agency in investigations of health inequities and presented an interesting take on the structure vs. agency dichotomy. She argued that by shifting the scale of focus away from individuals, quantitative analysis of health inequities emphasizes the role of structural determinants of health. Smyth contended that quantitative data is thus useful for developing public health interventions that do not place the responsibility for illness on the individual. Nonetheless, Smyth suggested the importance of qualitative research and, recommended that health geographers should use mixed methods in investigations of health inequities.

Recently, some geographers have responded to this recurring call for mixed-methods research in health inequities. Cairns-Nagi and Bambra (2013) used mixed-methods to investigate health resilience in populations where individuals were healthier than their socioeconomic status would predict. They used demographic and public health data to find socioeconomically deprived populations with better than predicted health and investigated possible causes of good health with in-depth inter-

views and focus groups. Similarly, Ross et al. (2016) used interviews to supplement a quantitative analysis of the relationship between bisexuality, poverty, and mental illness in Canadians while Chodur et al. (2016) paired spatial analysis of food deserts on Native American reservations with interviews of tribal members regarding their access to healthy food. These types of mixed methods studies set a precedent for using qualitative data analysis to complement spatial epidemiologic methods. Health geographers have been calling for such an integration of methods across the field for the past two decades, but the call for mixed methods studies has been especially urgent in geographies of HIV/AIDS.

2.4 Gentrification, HIV, and the Importance of Place

The proposal for geographers of HIV to integrate epidemiologic methods with critical geography has been made repeatedly since the height of the AIDS epidemic. Health geographer Brown (2014) has argued that studies taking a strict logical positivist approach to geographies of HIV do not tend to produce useful knowledge. Brown has been especially critical of epidemiological studies of queer male behavior and HIV; his most recent criticisms of geographic approaches to HIV echo his critiques from the mid-1990s (Brown, 1995, 2014). In "Ironies of distance: an ongoing critique of the geographies of AIDS", (Brown, 1995) Brown examined how the geographic literature on HIV focused on the spread of the virus rather than the movements of and relations between the people the virus infects, a critique similar to that of

Kearns (1993) analysis of medical geography as a whole. Brown (1995) argued that cartographic representations of the HIV epidemic needed to place more emphasis on human relationships and called for greater use of qualitative methods in HIV research. He restated this critique almost 10 years later in his *Progress in Human Geography* report "There goes the gayborhood?" (Brown, 2014), suggesting that geographies of HIV have yet to synthesize social and spatial methods.

Brown (1995) is supported by Gould and Woods (2003) review of research into geographies of HIV, which failed to find any studies that used qualitative or mixed methods. Gould and Woods, like Brown (1995), argued that geographers who focused on spatial modeling of HIV would miss out on the nuanced social determinants and interpersonal relationships that are so important in HIV risk and transmission. Gould and Woods solution was for geographers to ground their work in an understanding of critical social theory and combine spatial analysis with qualitative methods, reflecting health geography's larger methodological dialogue.

In the past decade, numerous health geographers have attempted to address the lack of qualitative research in geographies of HIV. Queer health geographer Nathaniel Lewis (Lewis, 2014b, 2015) focuses on the impact of place on HIV risk among queer men. Much of his work attempts to integrate the concept of place into the dialogue on queer men's health, examining public health in the context of mobility and queer identity (*ibid.*). In three recent studies on queer male health, place, and migration, Lewis examined and contrasted the experiences of queer men

living in major urban and periurban areas (Lewis, 2014b,a, 2015). In "Rupture, resilience, risk", Lewis (2014b) examined how movement from smaller communities to larger cities impacts the health of gay-identified men. His study relied on in-depth, semi-structured interviews with 48 informants who had recently moved. Lewis found that the ability to move to a major urban hub, even with the stresses of finding a new community and learning to navigate new norms, served as a source of personal resilience for the men in the study and promoted well-being (Lewis, 2014b). While some individuals seemed to move to cities to improve their health, Lewis also suggested that migrations away from cities were motivated by the increased cost of urban living and need for economic security later in life (Lewis, 2014a).

Lewis further investigated the suburbanization of older, queer male populations in "HIV beyond the metropolis" (Lewis, 2015). Examining the experiences of queer men living in the suburbs of Halifax, Nova Scotia, Lewis conducted in-depth semi-structured interviews with queer men and HIV service providers to understand how mobility and displacement from cities impacts HIV risk. Informants reported that living away from urban gay hubs lessened their perception of risk for HIV, with some of the informants thus feeling less inclined to use condoms during anal sex. This perception of lower risk held especially true for men who had formerly lived in larger cities like Toronto, Ontario and Vancouver, British Columbia. Hence, these study participants felt that by moving, they had distanced themselves from the HIV epidemic (ibid.). Moreover, Lewis identified that the potential increase in

risk behaviors from this sense of security was exacerbated by the scarcity of HIV testing sites in the smaller communities. Study informants reported being unable to access healthcare and feeling concerned about the lack of anonymity in smaller communities (*ibid.*).

While Lewis focused on the experiences of queer men in suburban areas, Rosser et al. (2008) were interested in the experiences of individuals who managed to remain in gentrifying gay neighborhoods. They argued that community cohesiveness in gay communities was historically cemented by HIV activism and as such, was a protective factor against HIV. Their qualitative study of community cohesiveness and gentrification in queer neighborhoods suggested that influxes of new, affluent residents disrupted the interpersonal support networks that protected against HIV. Rosser et al. conducted interviews with residents of gay neighborhoods about how their neighborhoods were changing. Study informants expressed concerns about a perceived rise in HIV and STI incidence, and often attributed these changes to a loss of community cohesion. Furthermore, this loss was attributed to the displacement of community members due to gentrification. In their analysis, Rosser et al. distinguished between structural gentrification (displacement of community members by rising cost of living) and cultural gentrification (assimilation of community members into mainstream society). Rosser et al. argued that prior to gentrification queer communities had more radical politics and were often cemented by HIV/AIDS activism, whereas many modern gay neighborhoods value individual "rights" above

social justice issues and are inaccessible to low-income individuals.

The inaccessibility of gay neighborhoods and their associated resources is further examined by Frye et al. (2014). In their qualitative, narrative-based study, "I didn't think I'd ever get out of the fucking park", Frye et al. (2014) offered a perspective on queer migrations removed from the dominant narrative of white gay men with access to resources moving to large cities. Their interviews with queer black and Latino men in New York City examined how intersecting forms of oppression of low-income men of color restrict mobilities and increase their social isolation, in turn negatively influencing sexual health. This study suggests that research on the relationship between gentrification and HIV should not only consider those at-risk individuals who are displaced, but also those whose options to move are restricted.

While health geographers have argued for the value of qualitative methods in HIV research, critical urban geographers can offer a way of understanding gentrification as a social determinant of health. In "Plague and power relations" (Wallace, 2007), health geographer Rodrick Wallace placed the early years of the HIV epidemic in New York City and San Francisco within the context of the cities' responses to post-civil rights integration. According to Wallace, New York City exhibited a "coherent epidemic" that seemed to impact the entire metropolitan area while the San Francisco Bay Area had several intense but localized outbreaks that acted as separate, smaller epidemics. Wallace attributes these different disease patterns to the ways the two cities evolved from the civil rights movement to the years leading up

to the epidemic New York City disinvested from black neighborhoods, resulting in widespread urban decay and intra-urban migration, while San Francisco's black neighborhoods underwent gentrification, forcing many residents out of the city entirely. Wallace argues that these differing patterns led to New York City having a diffuse epidemic, with vulnerable populations dispersed throughout the city, while the San Francisco Bay Area had multiple local epidemics, with vulnerable populations forced into concentrated, impoverished neighborhoods.

The displacement of vulnerable populations into impoverished areas relates to revanchism, a term coined by critical urban geographer Smith (1996) to describe punitive "revenge" focused policies, such as the criminalization of homelessness, that gentrifying cities adopt in an effort to "take back" a city from poor populations, thus making urban land more desirable for affluent populations and corporations (Smith, 1996). The populations most harmed by revanchist policies are marginalized people including the homeless, poor people of color, people who do survival sex work, and people who inject drugs. These groups include some of the populations most at risk for HIV: people engaged in sex work and injection drug use; and the populations most likely to have poor treatment outcomes: people of color and the homeless (CDC 2012, SF DPH 2012).

Critical urban health geographer DeVerteuil (2011) has explored how revanchism intersects with the provision of social services, examining whether the organizations that serve vulnerable populations are also displaced by gentrification. Interestingly,

DeVerteuil's spatial analysis of changing social service landscapes found that gentrification tends to lead to entrapment of service agencies rather than displacement, with rising rents making it unrealistic for organizations to move to new locations (DeVerteuil, 2011). As a result, social services may end up trapped on rent-controlled islands amidst increasingly expensive buildings, lacking the mobility to follow the populations they serve and unable to find new spaces if they are eventually evicted (ibid). This is significant to public health when vulnerable people are displaced from a community with a strong network of resources to a community with fewer resources if services are not following their clients, they are likely going to be less effective at reaching people.

2.5 Contributions from public health and epidemiology

The theme of revanchist urbanism is apparent in the literature on HIV and gentrification even outside of the field of geography. Within public health, Rhodes et al. (2005) conducted a review of literature on injection drug use and gentrification to examine the social production of HIV risk for people who inject drugs (PWID). They concluded that gentrification makes the built environment more dangerous for PWID while displacement negatively impacts protective social factors. Evidence suggested that increased police presence in gentrifying areas encouraged PWID to inject in less safe environments and use dirty equipment, while gentrification-induced displacement was highly disruptive to peer support networks of PWID (ibid.). Because

these peer networks served to reinforce harm reduction behaviors, the displacement of individuals within the network could lead to a return to risky injection practices (ibid.).

The idea of socially produced environments of HIV risk is a recurring theme in public health literature. Maas et al. (2006) analyzed data from a cohort study of PWID in Vancouver, British Columbia and found that residence in the Downtown-Eastside neighborhood was a predictor of HIV infection risk independent of behaviors and demographics. Although Maas et al. (2006) conducted a strictly quantitative study, the investigators integrated an understanding of human relationships and social factors into their discussion. Maas et al. hypothesized that the high prevalence of HIV infection in the Downtown-Eastside neighborhood combined with social connections, such as networks of people who inject drugs together, might explain this difference. Maas et al. also noted that movement of cohort members into and out of this neighborhood carried the potential for HIV infection to move between networks of people in different areas.

Youm et al. (2009) further explored the relationship between gentrification, displacement, and the spread of HIV in their study of "sexual bridging communities" in Chicago, IL. A sexual bridging community forms when members of one population migrate to a new population and maintain sexual contacts in the area they move from while developing new contacts in the area they move to. This is significant to public health when one community has a higher prevalence of HIV than another, as

the network of sexual partners forms a "bridge" across which the virus can spread (Youm et al., 2009). What makes this study especially relevant is the authors conclusion that the main driver of sexual bridging was displacement of low-income people due to gentrification (ibid.).

Research on the impact of gentrification on transmission focuses on incidence, prevalence, and the movement of the virus with displaced populations. There is less abundant work investigating how gentrification impacts the well-being of people living with HIV. This may reflect a revanchist view of urban poverty that conceptualizes high risk groups as undesirable others (Smith, 1996). That is, the concern with respect to gentrification and HIV is that the virus might move from "high risk" areas of concentrated poverty into the more valued "general population". A less cynical idea is DeVerteuil (2011) suggestion that gentrification is a complex process that is challenging to define and study.

Although research focusing on the role of gentrification on HIV treatment outcomes is scarce, there is a sizable body of research regarding the role of stable housing in HIV treatment adherence. A rigorous literature review conducted by Philadelphia's chapter of the AIDS Coalition to Unleash Power (ACT UP) (ACT-UP Philadelphia, 2010) found a large body of research that cited homelessness and unstable housing as factors in poor HIV treatment outcomes. Notable works cited a strong relationship between homelessness and poor adherence to HIV treatment regimens and identified a relationship between homelessness, HIV risk behaviors, and

poor HIV treatment adherence (Kidder et al., 2007; Shubert and Bernstine, 2007). More recently, Surratt et al. (2015) did a cross-sectional study of HIV-positive people who use drugs found that housing insecurity and food insecurity were strongly predictive of poor adherence to antiretroviral treatment.

This body of research relating HIV outcomes to housing stability did not focus on gentrification specifically, but the following studies assessed housing insecurity as it relates to socioeconomic disparities in gentrifying neighborhoods. In Vancouver, a city with stark socioeconomic inequities produced in part by gentrification, neighborhood residence functioned as an independent predictor of HIV treatment adherence and HIV-related mortality, with the impoverished Downtown Eastside neighborhood having the lowest adherence and highest mortality rates (Druyts et al., 2009). A quantitative modeling study suggested an association between frequent migration and poor adherence to HIV treatment among HIV patients in British Columbia (Lima et al., 2009), raising concerns about the health outcomes of displaced PLWH. Locally relevant is Whittle et al. (2015)'s study of food insecurity among San Franciscans living with HIV. Whittle et al. found that these San Franciscans struggled to balance the costs of their medical care with the increased rent in gentrifying neighborhoods, which left them with little money for basic necessities like food (Whittle et al., 2015). Whittle et al. found that this struggle to afford food and housing had a negative impact on the health of patients, especially those unstably housed in single-occupancy hotels in the Mission District and Tenderloin neighborhoods. A

longitudinal study conducted in New York City found a link between food insecurity and poor health outcomes among PLWH (Feldman et al., 2015). That said, Whittle et al.'s study placed more emphasis on the role of gentrification in creating that food insecurity.

2.6 Discussion of research gaps

Although there is very little work on HIV and gentrification within the field of geography, the work that does exist offers a unique perspective that combines spatial analysis with critical social theory. This perspective is valuable because HIV tends to be found at the intersection of social stigma and poverty (Freudenberg et al., 2006). If we view the etiology of HIV-related illnesses as based in socioeconomic as well as biological processes, then research on geographies of HIV should be informed by critical as well as medical geography.

A knowledge gap exists regarding whether migrations of at-risk populations and the diffusion of HIV are related to each other and/or to gentrification, and there is virtually nothing written about the fate of HIV risk groups, such as queer men and PWID, who are displaced from urban areas. According to critical urban geographers Slater (2006) and DeVerteuil (2011), the existence of this gap is not surprising. In "The eviction of critical perspectives from gentrification research", Slater argued that studying displaced populations is challenging for two reasons (Slater, 2006). The first problem is methodological: people who have been displaced by evictions,

by virtue of their having moved, are hard to find. The second problem is political: it is more controversial to focus on those groups harmed by gentrification than to study the causes and process of gentrification itself (ibid.). In other words, focusing on the experiences of the displaced is a radical act. DeVerteuil (2011) references Slater when he calls for geographers to put more energy into examining the effects of gentrification on displaced populations. While echoing Slater's point that centering the displaced is not the most practical or politically safe route to take, DeVerteuil argues that critical geographers need to take a stronger stance against gentrification and should not strive to maintain neutrality. As such, the goal of this thesis is not only to address a major gap in research on gentrification and HIV, but to respond to health geographers who see a need for mixed methods in HIV research and to urban geographers who have called for research on gentrification to take a more critical stance.

Over the past 20 years, health/medical geographers have repeatedly called for research in health inequities to use mixed-methods, incorporate social justice frameworks, and approach health disparities in a multi-faceted way. Recent work in health geography has attempted to respond to these calls, but geographers continue to identify a need for more mixed-methods in work on HIV (Brown, 2014; Lewis, 2015). While health geography research on HIV and gentrification has identified changes in HIV risk perception (Lewis, 2014a, 2015) and community cohesion (Rosser et al., 2008) among gay men in gentrifying areas, public health research on HIV and gentri-

fication has suggested that neighborhood residence (Maas et al., 2006; Druyts et al., 2009), displacement (Rhodes et al., 2005; Lima et al., 2009), and cost-of-living (Feldman et al., 2015; Whittle et al., 2015) may all function as social determinants of HIV treatment outcome. In the next chapter, I explore some of the broader ideas and theories from health geography and public health that inform my own research and discuss the value of using these theories to frame research in health inequities.

Chapter 3

Theoretical Framework

3.1 Introduction

In Chapter 2 I discussed how health geographers have critiqued geographic research on HIV for lacking a coherent theoretical framework. I made note of Kearns and Moon (2002)'s argument that geographers would be better positioned to make coherent arguments for policy reform by situating their work within a theoretical framework. Kearns and Moon argued that explicitly stating the theories that frame geographic research provides a stronger foundation for making arguments for social change, and that without such a framework, geographers may find that analysis of how things are overshadows analysis of how things could be. In this chapter, I elaborate on the particular theories that influenced my study design and explain how and why I incorporated these theories into my research. The specific theories I drew upon are political ecologies of disease and the concept of One Health as

applied to structural determinants of disease. Both of these ideas influenced the transdisciplinary nature of my work, my use of mixed, multi-scalar methods, and the interpretation of my data.

My motivation to study gentrification and HIV is rooted in my background as an HIV service provider at the Berkeley Free Clinic, which primarily serves uninsured, immigrant, and homeless populations. As such, I have a perspective on HIV that draws from both the direct service and academic fields. My own work helping HIV-positive clients navigate structural barriers to healthcare influenced my decision to explore the epidemiology of HIV with an emphasis on structural determinants. My longer term plans for this thesis include disseminating information to community advocacy and public health organizations and providing a framework and hypotheses for future research in housing access and health of people living with HIV. Conducting a project that was relevant to and accessible by community-based organizations wishing to pursue public health advocacy work was especially important to me. To help keep my research focused on that goal, I intentionally grounded my work in the idea that social structures, human environments, and human health outcomes are all interrelated, which I borrowed from Mayer (1996)'s framework of political ecologies of disease and Wallace et al. (2014)'s concept of Structural One Health.

Both political ecologies of disease and Structural One Health are ideas developed by medical geographers. Both frameworks involve visualizing human environments in an ecological way and encourage an interdisciplinary approach to studying deter-

minants of disease that specifically incorporates social and political determinants. As I explain later in this chapter, a political ecology of disease framework encourages a mixed-methods approach to medical geography that incorporates an analysis of social determinants of health. As such, political ecologies of disease heavily influenced my research methodology. The concept of Structural One Health (Wallace et al., 2014) informed the ideas for public health interventions that I incorporated into my analysis and heavily influenced the way I framed my research questions and structured my discussion.

3.2 Viewing HIV Through the Lens of Political Ecology of Disease

Political ecology of disease is an approach to human health outcomes that originated in human geography with Mayer (1996). It uses a mixed-methods, multi-scalar approach to examine relationships between politics, the economy, social structures, the environment, and human beings (Mayer, 1996). Political ecology of disease developed from two different theoretical frameworks: political ecology (Robbins, 2012) and disease ecology (Mayer, 1996). As applied to medical geography, political ecology of disease bears similarities to Meade (1977) disease ecology, which examines relationships between human health, society, and the environment. Arguably, disease ecology as defined by Meade is very similar to political ecology, which integrates

environmental and human factors into an analysis of social issues (Robbins, 2012). Geographers looking at health and disease have proposed integrating political ecology and disease ecology, offering a "political ecology of disease" as a framework for incorporating social and political determinants of health into health geography (Mayer, 1996; King, 2010). It is important to acknowledge that political ecology, disease ecology, and political ecology of disease overlap considerably and that any of these theoretical frameworks may be described by different scholars in different ways (Robbins, 2012). For the purpose of this thesis, what matters is not terminology but rather that my work is informed by geographers who synthesized ideas from ecology and social sciences into an understanding of disease context and causation. There are certain contexts where political ecology and disease ecology mean almost the same thing; I use Mayer (1996)'s phrase "political ecology of disease" here to emphasize that my work is informed by a political ecological approach to health.

Because of its emphasis on human relationships and social determinants, political ecology is especially useful as a framework for geographies of HIV, as vulnerability to HIV is largely determined by social factors (Mayer, 1996; King, 2010). King (2010) suggested an approach to HIV geography that incorporated analyses of human-environment relationships, resource distribution, power relations, and socioeconomic vulnerability. In particular, King believed a political ecology approach to HIV would enable researchers to emphasize how individual behaviors regarding HIV risk and treatment are influenced by their environment and socioeconomic sta-

tus. Although scholars have examined individual social determinants of HIV in isolation, studies that take a more ecological approach are conspicuously absent (Latkin et al., 2013). The question of how gentrification and eviction impacts HIV care incorporates socioeconomic vulnerability, changes in the built and human environments, and health outcomes concepts rooted in political ecology. An ecological approach to gentrification and HIV is thus central to the design of my thesis.

Although my own work is within geography, political ecology has broader implications for public health practice. Historically, public health interventions geared towards HIV prevention emphasized the role of "high risk" or infected individuals in preventing future infections (Brown, 2006). Such interventions thus made certain individuals responsible for protecting the health of the "general population" (ibid.). Brown (2006) suggests that political ecology could be a useful framework for moving public health research away from the development of behavior-based interventions and towards interventions that address structural determinants of disease. In his own research Brown identifies a common, behavior-based model of HIV prevention that instructs "high risk" groups (e.g. men who have sex with men) to abstain from sex, have less sex, or only have "safer" sex with condoms. Brown posits that an intervention informed by political ecology, rather than emphasizing individual behavior changes, would be more holistic, incorporating comprehensive sexual education, healthcare reform, and attempts to reduce social stigma around queer sexualities and drug use (ibid). In Chapter 8 of my thesis, where I discuss the

implications of my research for public health practice, including suggestions in line with a holistic approach to HIV prevention.

3.3 Beyond Political Ecology: Structural One Health

A political ecology of disease evaluates the social determinants of ill health; the ecology in question is largely human ecology. One Health, on the other hand, focuses on the impact of animal and environmental health on human health. Although the idea that human health, animal health, and ecosystem health are all interrelated has traditionally been used to advocate for a unification of human medicine, veterinary science, and ecology (Centers for Disease Control and Prevention, 2016), some scholars suggest incorporating social determinants of health in the model (Wallace et al., 2014). In examining the city of San Francisco as a complex human ecosystem in which diseases have multiple, interrelated causes, I am informed not only by political ecology but by Wallace et al. (2014)'s concept of Structural One Health, the idea that complex relationships between the human environment, natural environment, and diseases are impacted by political and economic structures. This concept is closely tied to political ecologies of disease but provides a more explicit framework for developing public health interventions. Beyond providing a framework for understanding the interrelated human and natural systems that contribute to disease, Structural One Health encourages public health researchers to challenge, dismantle, and transform harmful social structures. The political and ecological thinking of

Structural One Health informed the transdisciplinary nature of my research and my desire to consider public health interventions in terms of root causes.

Structural One Health as proposed by Wallace et al. (2014) consists of three basic concepts. The first is the idea of being explicit about the "domain of crisis" when addressing a public health problem. This means undertaking public health research with an understanding of what the problem is, where it comes from, and whether one's efforts at an intervention actually solve that problem or simply mitigate damage. For example, if housing insecurity was found to reduce adherence to an HIV treatment regimen, an intervention at the root might involve improving affordable housing access for HIV-positive people. A palliative, or damage control, health intervention might involve providing medication adherence counseling and pill box organizers to insecurely housed patients. While the former interventions frames the "domain of crisis" as housing access and addresses it, the latter might help some patients but would fail to address the underlying cause of poor adherence. Wallace et al. state that "palliative efforts in the name of the system that brought about the calamities may deepen the very crisis such efforts were ostensibly undertaken to alleviate". They encourage researchers to think of ultimate as well as proximate causes of health crises and envision interventions that are geared towards addressing the former.

The second tenet is to inform one's research question in terms of the health problem, not in terms of the traditions of one's field. That is, Wallace et al. (2014)

encourage transdisciplinary thinking even when it's unconventional, as in their own example of integrating a critical understanding of neoliberalism and industrial agriculture into a study of the epidemiology of swine flu. Although such an approach may seem natural to geographers, especially those informed by political ecology, such an outside approach may be especially beneficial to biomedicine and epidemiology.

Finally, Wallace et al. encourage researchers to approach causality in a multifaceted way, understanding that diseases may have multiple determinants existing at multiple scales that transcend any individual field of study. An integrative approach is therefore necessary to fully understand complex causation. With respect to spatial research, Wallace et al. argue that researchers should look for more than "spatial correlations between land uses and particular diseases" and explore how land use patterns tie into local and global patterns of production, consumption, and capital. Although Wallace et al. were writing within the context of avian influenza and industrialized agriculture, their ideas are also applicable to changes in urban land use patterns. My analysis of HIV outcomes focused on housing security considers not only spatial association between HIV outcomes and gentrification related displacement, but the specific ways in which changes to the urban landscape and economy impact patients.

3.4 Conclusion

In designing this thesis, I used political ecology of disease to inform my decision to examine gentrification and HIV from multiple angles and at multiple scales, while the concept of Structural One Health informed my decisions to use a transdisciplinary perspective that considered epidemiologic, socioeconomic, and qualitative data and to consider potential health interventions that take an integrative approach towards determinants of HIV treatment outcome. In my next chapter, I will explain my specific research angles (socioeconomic and epidemiologic data, provider perspectives, and patient perspectives) and scales (neighborhood, census tract, and individual) and why I chose them.

Chapter 4

Methodology and Research Design

4.1 Introduction

In the previous chapter, I provided an overview of the key ideas in geography and public health that informed my overall research. In particular, I positioned the question of HIV and gentrification within broader conceptual and theoretical debates in public health and geography. At the same time, I situated my research within a framework that emphasizes social and political determinants of health. In this chapter, I draw from the same ideas with the aim of discussing how they relate to the design of my research and the methods I used. I then describe how I designed the quantitative and qualitative components of my thesis research and what I hoped to learn from each data collection strategy. For each part of my research design, I consider potential ethical issues and anticipate sources of error.

4.1.1 Use of Mixed Methods

A major goal of my research was to formulate hypotheses regarding gentrification's impact on retention in medical care for people living with HIV (PLWH) and to propose a framework for further research. Because this work is hypothesis generating rather than hypothesis testing and tackles a largely unstudied issue, I chose a broad approach to data collection that involves both spatial analysis and qualitative methods. I decided that a combination of spatial analysis, qualitative surveys, and interviews would allow my thesis to tell a story that neither form of data could tell on its own. Importantly, integrating qualitative methods into a geography of HIV re-centers the human beings at risk for and living with the virus and captures nuances that would be lost in strictly quantitative research (Brown, 1995). The spatial analysis of my research involved using GIS to analyze gentrification, eviction data, and public HIV epidemiology data. I integrated qualitative elements through the use of semi-structured interviews of HIV-positive San Franciscans and a qualitative survey of HIV service providers in San Francisco.

Using mixed methods in HIV geography research also addresses an important research gap in health and medical geography (Rosenberg, 1998): integrating quantitative measures of disease outcomes with qualitative measures of vulnerability. Geographers specifically focusing on HIV emphasized the need for mixed methods research to better understand social determinants of HIV outcomes (Brown, 2014; Lewis, 2015). I hoped that using mixed methods in my own research would provide

a more nuanced picture of structural determinants of HIV retention than would any one method alone.

4.2 Research Design

4.2.1 Part 1: Analyzing Gentrification, Evictions, and HIV Linkage in San Francisco

My main research question was whether and how gentrification and evictions in San Francisco impact the ability of people living with HIV (PLWH) to stay in care. To begin my investigation, I mapped out San Francisco's landscapes of gentrification, evictions, and HIV. This spatial analysis allowed me to determine where San Franciscans living with HIV may be most impacted by evictions and gentrification-related displacement. I did not aim to establish a causal relationship through this analysis. My goal was rather to show how many San Francisco HIV cases were located in gentrifying neighborhoods and eviction "hot spots." At the same time, a spatial analysis would enable me to depict whether neighborhoods with poor HIV treatment outcomes were also neighborhoods undergoing gentrification.

My spatial analysis had three major components. First, I applied a gentrification metric developed by Bates (2013) to San Francisco, classifying census tracts by stage of gentrification as of 2015, a process that I explain in greater detail in Chapter 5. Next, I mapped recent (2011-2015) evictions in San Francisco and conducted

a hot spot analysis to find where evictions were clustered. Finally, I used publicly available data from the San Francisco Department of Public Health's HIV Epidemiology Section to show where (by census tract) HIV cases were located and where (by neighborhood) viral suppression rates were the lowest. By overlaying these three map layers, I was able to determine which census tracts had both large numbers of HIV cases and were located in eviction "hot spots" and gentrifying areas. At the same time, I was able to demonstrate what gentrification and evictions looked like in neighborhoods with poor viral suppression.

Origin of the Gentrification Analysis Metric

To analyze gentrification in San Francisco, I used Bates (2013) gentrification metric, which was originally applied to urban planning in Portland, Oregon. Bates' typology was adopted by activist and advocacy groups in the San Francisco Bay Area to inform social justice and healthcare advocacy work (Philips et al., 2008; Moore et al., 2016). Bates' approach relies on using GIS to locate census tracts experiencing demographic change towards whiter, more affluent populations concurrent with an increase in housing values. Using information on demographics and housing values, Bates created a system for classifying census tracts into early, middle, and late stages of gentrification.

Shortly after Bates (2013)' gentrification analysis was published, other individuals began to adapt the method for their own use. Causa Justa, a housing rights ad-

vocacy group, collaborated with the Alameda County Department of Public Health to analyze gentrification in the San Francisco Bay Area (Philips et al., 2008). Their analysis, conducted in 2011, yielded results that informed a strategy for affordable housing development in the San Francisco Bay Area. More recently, U.C. Berkeley's Haas Institute for a Fair and Inclusive Society applied the same gentrification analysis to Richmond, CA., demonstrating that gentrification in Richmond contributed to decreased access to healthcare among displaced African Americans (Moore et al., 2016).

Bates' typology is replicable and useful for creating visual representations of gentrification, both advantages when using the classification method for communication and advocacy. Although Bates' typology may have set a precedent for gentrification analysis, it is not flawless. Several sources of error led to my making slight modifications to the method, which I explain shortly. One problem is the reliance on changes in housing value as a measure of changing housing costs. Using housing values to estimate housing costs relies on the assumption that the value of a property reflects what landlords are actually charging for rent. Geographer Smith (1987) rent-gap theory suggests this assumption is false. Smith argued that rent increases in gentrifying areas reflect a landlord's potential for income (how much new residents are willing to pay) when this exceeds the rent old residents pay. The ability of affluent new residents to pay more rent drives up rent and property values, but not necessarily at the same time. Knowing how much rent people are actually

paying is probably a better measurement of housing costs than how much rental properties are theoretically worth.

A second challenge of using Bates gentrification metric is the availability of data. Bates original analysis used race, education, renter status, and property value data from the U.S. Census Bureau for the decennial census years 1990, 2000, and 2010, which does not allow for conducting an analysis for non-decennial census years. Her analysis also included income data from the Department of Housing and Urban Development (HUD) for the year 2010. Data from HUD is only available for select years and therefore also limits which years can be analyzed. In addition, income data from HUD is based on small sample sizes and has very large margins of error, sometimes in excess of 50%. Bates excluded these margins of error in the gentrification analysis and subsequent analyses replicated the error (Philips et al., 2008; Moore et al., 2016).

To address these issues of internal validity and data availability, I made two changes to Bates' typology. First, rather than estimating costs of housing using property values, I looked at what families were actually paying to rent their homes, in the event that landlords were charging rent that did not accurately reflect property values. My decision to do this was informed by the observation of Smith (1996). Second, I obtained my income data from the American Community Survey 5-year estimates, upon which the HUD data is based. The ACS data is released yearly and thus allowed me to do a more recent gentrification analysis (2015 rather than 2010).

Sources of Error in the Gentrification Typology

Although the approaches I used respond to the limitations of Bates approach, there are still two major sources of error in my gentrification analysis: error margins in my data sources and the external validity of the analysis as a whole. The data I used in my analysis included decennial census data for the years 2000 and 2010 and American Community Survey data for the year 2015. Margins of error were included in the data for the years 2010 and 2015. I had a choice of adding or subtracting error margins from the measurements, potentially overestimating gentrification or underestimating it. To err on the side of overestimation, I decided to make my gentrification method more sensitive for two reasons. Previous applications of this gentrification typology handled their error margins in the same way (Bates, 2013; Philips et al., 2008; Moore et al., 2016). Philips et al. (2008) gentrification analysis for San Francisco for the year 2010 gave me a baseline for comparison. I also reasoned that it was preferable to overestimate the need for affordable housing rather than underestimate the need and allow vulnerable populations to go unnoticed.

A more challenging issue is that of external validity: whether I could use the results of my analysis to make generalizations about San Francisco. Though Bates' classification method supposedly measures gentrification, gentrification is essentially defined by what the typology measures. Without other forms of evidence to support the usefulness of this classification method, it is unclear whether the way in which census tracts are classified reflects the lived experiences of individuals who reside

there. An even greater problem is that the typology suggests a linear temporal progression from early to late stages of gentrification - that may not in fact exist.

I also considered whether Bates' use of relative measurements of housing value and demographic change might present an additional challenge to external validity. Changes in demographic makeup and housing value are measured at the scale of census tract relative to the scale of city. For example, Bates would consider a census tract to be whiter if it experienced a larger increase in the proportion of non-Hispanic whites than Portland did in her original study (Bates, 2013). This means definitions of demographic change and increases in housing value may vary greatly between cities: a whiter tract in San Francisco may be different than a whiter tract in Portland. Whether these relative measurements are problematic depends on whether gentrification is conceptualized as a localized or regional phenomenon. If gentrification is presented as an increase in housing value with a concomitant decrease in low-income communities of color that occurs within certain areas of a city, it is reasonable to witness changes in tracts relative to changes in a city as a whole. However, if the goal of research is to analyze gentrification in a multi-scalar way and examine what is happening between as well as within cities, it is important to consider how change is defined and compare areas to each other.

In confronting the issue of external validity, my primary concern was whether the gentrification analysis reflected where people were facing displacement. Because my analysis only includes San Francisco, I decided to make census tract level measure-

ments relative to city-wide measurements. In other words, I intended to compare census tracts to the city as a whole, but did not intend to compare them to regions outside of San Francisco.

Incorporating Eviction Data

I incorporated eviction data into my analysis of gentrification to determine whether there was any association between density of evictions and "stage" of gentrification. I used this approach because I realized my quantitative research design was based in part on the assumption that at least some residents displaced by gentrification lose their homes to evictions. If this were the case, and if the gentrification typology were accurate, I therefore would expect that census tracts classed in earlier stages of gentrification would experience higher rates of evictions. I designed my eviction analysis to test this hypothesis.

To conduct my eviction analysis, I accessed public eviction notice data from the San Francisco Rent Board (2017). This dataset covers all eviction notices served in San Francisco from 1997 onwards and is updated monthly. Eviction location is given at the level of city block (e.g. 1600th block of Mission Street). Block-level data posed a cartographic challenge multiple evictions occurring on the 1600th block of Mission Street, for example, would result in coincident data points but was not a barrier to analysis since I could aggregate points to the level of census tract or census block group. Chapter 5 explains how I analyzed the relationship between

gentrification stage and eviction density.

Sources of Bias and Error in Eviction Notice Data

The main challenge in working with eviction notice data was the lack of address-level locations. As I explained above, all evictions occurring on a given city block were assigned the location, resulting in a large number of coincident data points. I handled the problem of coincident data points by aggregating eviction counts to census block group and census tract levels.

An additional potential source of error is that eviction notice data does not account for tenants who successfully contest their evictions and thus may overestimate the total number of evictions. I am thus operating under the assumption that a map of attempts to evict tenants provides an accurate estimate of where successful evictions are occurring.

With respect to external validity, it is important to note that evictions do not provide a complete picture of gentrification-related displacement. Not everyone who suffers from housing insecurity or displacement has been evicted. Individuals may be priced out of expensive neighborhoods and move elsewhere without being served an eviction notice. Furthermore, without data on the outcome of eviction notices or where evicted individuals moved, there is no way to ascertain whether eviction contributes to demographic change in an area or whether it is associated with continued housing insecurity.

Use of Data from the SF DPH's HIV Epidemiology Annual Reports

After conducting my analyses of gentrification and eviction, I assessed where San Francisco's HIV cases were located and determined where individuals with poorer treatment outcomes were likely to live. To do this, I obtained HIV data from the 2015 Annual HIV Epidemiology Report published by the San Francisco Department of Public Health's HIV Epidemiology Section (San Francisco Department of Public Health, 2016). Data on HIV prevalence are released at the level of census tract while data on HIV treatment outcomes are released at the level of neighborhood. I used viral suppression as my measurement of treatment outcome. Being virally suppressed, which the SF DPH HIV Epidemiology Section defines as having a viral load of less than 200 copies per mL of blood, is the standard way of assessing whether an individual with HIV has their infection under control (San Francisco Department of Public Health, 2016). The annual HIV epidemiology reports are published online as .pdf files. To make it easier to work with the census tract and neighborhood level data, I requested the data in spreadsheet form from Dr. Susan Sheer at the HIV Epidemiology Section at SF DPH.

Although individual level HIV surveillance data exists, concerns about patient privacy mean access to the data is restricted and not easily obtained by graduate students. Using publicly available data was not only more practical but reduced ethical concerns about patient privacy and allowed me to create an analysis that is replicable by non-academics (e.g. activists, community organizations). However,

using publicly available data introduced several limitations, which I address below.

Sources of Bias and Error in Epidemiologic Data

The greatest limitation of using publicly available HIV data was the aggregated spatial scale at which data is released. To protect the confidentiality of patients, prevalence data is released at the level of census tract and all other variables are released at a neighborhood level that the SF DPH creates from aggregated census tracts. Data is not released for any area with fewer than 500 residents or fewer than 5 cases. This means my analysis of areas with low rates of viral suppression takes place at the neighborhood scale and is thus somewhat vague.

A second limitation is the incompleteness of address data. San Francisco HIV cases are defined as individuals diagnosed with HIV while residents of San Francisco (San Francisco Department of Public Health, 2016). Notably, the data I used does not account for HIV cases who are homeless or whose addresses were unknown. Such cases were not assigned to census tracts/neighborhoods but were reported as separate categories. For 2015, this includes 586 homeless cases and 448 cases of unknown address out of 13,856 total living cases (4.2% and 3.2% of all cases, respectively). These two categories have lower rates of viral suppression than any neighborhood in San Francisco (San Francisco Department of Public Health, 2016). Omitting these groups, especially if the individuals included in them live in gentrifying areas, is likely interfering with my assessment of how epidemiologic landscapes and eviction

landscapes intersect. However, the fact that homeless individuals have especially low rates of viral suppression is useful information in a study of housing insecurity, and I do compare the viral suppression rates for homeless cases to housed cases in Chapter 5.

Finally, the use of 200 viral copies per mL of blood as the threshold for viral suppression presents an additional source of error. Although maintaining a suppressed viral load has been a consistent goal of HIV treatment, the definition of viral suppression has changed over time due to improvements in HIV treatment regimens and viral load tests. Although the SF DPH uses 200 copies/mL as the cutoff value for viral suppression, the International AIDS Society's HIV treatment guidelines uses 50 copies/mL as the cutoff value for developed countries (Thompson et al., 2010). Since the SF DPH threshold is less stringent, the data from SF DPH may overestimate viral suppression rates from the perspective of scholars who prefer the 50 copies/mL cutoff.

4.2.2 Research Design Part 2: Patient and Provider Perspectives on HIV and Gentrification

My thesis also aimed to learn how San Franciscans with HIV have been directly impacted by gentrification, displacement, and housing costs. I decided to include a qualitative component to my thesis because quantitative analysis of socioeconomic, housing, and health data provides could not speak to the ways in which gentrification

influenced individual people living with HIV. I used qualitative methods to better capture the details and nuances of individuals' experiences. In order to get at the experiences of individuals, I collected qualitative data from both HIV service providers in San Francisco (e.g. case managers, clinicians, social workers) and HIV positive San Franciscans.

I decided to include the perspectives of service providers regarding housing insecurity among their clients as most of these individuals interact with large numbers of people living with HIV. I felt that service providers could offer insights into the barriers and challenges faced by their clients. Because of time constraints, I chose to use an online qualitative survey rather than interviews to quickly reach a large number of service providers and obtain detailed information. The survey questions focused on provider experiences with clients who faced unstable housing, eviction, and displacement. The survey questions were intentionally broad and open-ended, allowing providers the space to offer rich anecdotal evidence around evictions and displacement of HIV-positive individuals. In part, I hoped these responses might indicate if providers thought this was a common occurrence and whether they believed gentrification was impacting their clients.

In order to learn what individuals living with HIV thought about gentrification, I decided to interview them and ask about their experiences and perceptions. In particular, I decided to ask participants how they believed San Francisco was changing, whether they had been impacted by changes in the housing market, and whether

this had impacted their ability to manage their HIV. I collected this data in the form of semi-structured interviews, asking broad questions and allowing each participant to drive the direction of the conversation. These interviews focused on the participants experiences with finding and keeping housing in San Francisco while living with HIV. I recruited participants passively using Craigslist ads and fliers. I left fliers at several large HIV service organizations in San Francisco, including San Francisco General Hospital ("Ward 86"), City Clinic, Glide Memorial Church, and the San Francisco AIDS Foundation. I did not bring fliers to every HIV service organization in the city, but chose large organizations that draw a diverse range of patients from throughout the city and were accessible to clients from a broad range of socioeconomic groups. In keeping with the overall aim of my thesis, I did not use data from interviews to establish a cause and effect relationship but rather to explore how individual people living with HIV have been personally impacted by gentrification.

Sources of Bias and Error in Qualitative Data

One important source of bias in my qualitative data was my small sample size. For my interviews, I met with 9 PLWH. Interviewing a small number of PLWH limited my ability to draw broader generalizations. However, since my goal was to collect rich experiential information to help formulate hypotheses, I was less concerned about being unable to draw broader conclusions. My survey of service providers

reached a larger number of people, with 18 responses, but only 9 out of the 18 service providers completed the entire survey.

An additional source of potential error was respondent bias: people drawn to a study on gentrification may want to participate specifically because they have strong feelings on the subject or significant personal experiences with gentrification. This response bias may have impacted both my survey of providers and interviews of PLWH. The interviews of PLWH may have had an additional sampling bias related to participant incentives. I provided each interview participant \$25 in compensation for a 45 minute interview. This incentive was within the scope of my budget, not considered coercive by the IRB, and was consistent with compensation offered by similar studies. However, this in no way means the incentive did not introduce a bias. It is possible that the individuals who were interested in my study were those who especially needed the money. This may have made low-income individuals more likely to participate in my study.

Although response bias and sampling bias likely played a role in the qualitative component of my study, my objective here was not to gather information from an unbiased, representative sample of HIV service providers and HIV-positive San Franciscans. I anticipated that individuals who elected to participate in a study on gentrification could have strong feelings about the issue. If my study aimed to use the data to make broad generalizations, this bias and my small sample size would be problematic. However, for the purpose of generating hypotheses and laying

a foundation for future participatory action research, I envisioned that this bias might be beneficial by collecting perspectives from passionate individuals who are concerned about gentrification and community health.

Ethical Considerations in Qualitative Research Design

Throughout this study, I was mindful of ensuring that my approaches to qualitative research were ethical and that research participants were treated fairly. My ethical considerations for the service provider survey were twofold. First, I wanted to make sure respondents understood the goals of the research. Second, I was intent on protecting the confidential health status of patients with whom they worked. I developed consent forms and debriefing materials that aimed to minimize any risk to service providers and patients (see Appendix B).

For interview participants, I used an in-person informed consent process. I verbally described the purpose of the study and what the interview entailed, emphasizing to each informant that they could express concerns, ask questions, or leave at any time. I also provided each informant with a paper copy of the consent that had my contact information and that of my advisor. All of the information in the consent form was also explained verbally. When I had informants sign the consent form, I reminded them that their participation was voluntary, consent was not binding, and they could request to stop the interview at any time. Consenting materials are in Appendix B.

In an effort to protect participant confidentiality, I secured a private room at San Francisco State University's downtown campus and used a white noise machine for additional privacy. When transcribing interviews, I removed all identifying information from the transcripts, including names, dates, home addresses, places of work, etc. Participants who were part of this study are not named in the study results for this thesis.

As I have identified earlier, one primary goal for this thesis was to generate hypotheses and provide direction for future research into gentrification's impact on HIV epidemiology. I was also mindful of creating a study that was participatory and responsive to the perspectives of participants. My study procedure integrated a process of debriefing interview participants, offering them an opportunity to share to their concerns and feedback. At the end of each interview, I also reminded participants of the goal of the study and gave them the opportunity to ask questions, voice concerns, and provide feedback. If an interview participant disclosed that they lacked medical care or other resources, I provided relevant referrals and resources. I relied on resources I know from my experience as an HIV linkage counselor at the Berkeley Free Clinic. During the debriefing process, I provided additional information about the study and my contact information.

Participatory Action Research and Researcher Accountability

A broader ethical issue that influenced my qualitative research design included the desire to ground my research in an understanding of social determinants of health, which I discussed in Chapter 3. I relied on a mixed-methods approach in an effort to highlight the experiences of people living with HIV. I felt a mixed methods approach that incorporated interviews would enable me to best emphasize the needs and wants of the research participants. There were two main ways my research design ensured that participants voices were at the forefront of my study. I was careful to avoid adopting the paternalistic role as the "expert" while interacting with participants. I was mindful of work conducted by health geographers, where study participants have been treated as "observations" rather than as autonomous individuals (Kearns and Moon, 2002). For this reason, I was intent on emphasizing how research participants contributions reflected complex lived experiences, an approach emphasized by Brown (1995). Rather than over-interpreting qualitative data, I made every effort to let individual voices speak for themselves.

Second, I attempted to do work that was relevant and potentially useful to marginalized communities. The research participants who contributed to my thesis are largely people whose voices have been marginalized and ignored. As a community health activist, I came to this work with the conviction that research participants have a right to shape and be present in this research. As such, my research design is influenced by ideas from participatory action research (PAR). In health

fields, participatory action research uses a mutually consensual relationship between researchers and the communities they study to co-create knowledge and health interventions that can directly benefit the involved population (Baum et al., 2006). As I designed and conducted this thesis myself, it was not strictly a PAR project. However, elements of PAR do show up in my openness to receiving research feedback from participants, my positionality as a member of the HIV activist community, and my intention to use this thesis as a springboard for PAR in the future. The spirit of PAR is also present in my decision to not copyright my thesis and willingness to provide data and procedural support to any activist groups who wish to use this research.

4.3 Conclusion

My decision to use a mixed-methods, multi-scale research design was informed by the political ecology framework I discussed in Chapter 3 and allowed me to approach the issue of gentrification and HIV from a systems-based, ecological perspective. The mixed methods approach was also practical, offering an opportunity to approach an understudied issue from several perspectives, while also generating hypotheses to inform future research. By using quantitative methods to frame and contextualize a qualitative study on gentrification and HIV, I can tell a richer and more complete story than I could with either form of data alone. In the chapters that follow I let my data speak. My empirical chapters provide a detailed account of my research

findings. Chapter 5 presents an analysis of gentrification in San Francisco. The chapter shows how evictions fit into the analysis of gentrification, and where in this gentrifying landscape HIV cases are found. Chapter 6, which provides the results of surveys and interviews of individuals located within San Francisco's intersecting landscapes of housing and HIV.

Chapter 5

Spatial Analysis of Gentrification, Evictions, and HIV

5.1 Introduction

This chapter provides an overview of the procedures and results for the quantitative component of my thesis. The overall aim of this analysis is to show where San Franciscans living with HIV are most likely impacted by gentrification and evictions. To accomplish this, I overlaid spatial analyses of gentrification, eviction, and HIV treatment outcomes.

This chapter is divided into two parts. Part 1 focuses on research procedures. In particular, I address how I mapped and analyzed data on gentrification, eviction notices, and HIV treatment outcomes in San Francisco. Then, I present how I utilized the information from these analyses to determine which neighborhoods may

have a large number of HIV cases impacted by housing instability. Part 2 presents the results and a brief interpretation of the analyses described in Part 1. A more thorough interpretation and discussion of the results and how they relate to the qualitative component of my thesis can be found in Chapter 7.

5.1.1 Research Procedures

Research Procedures Overview

In this section I address how I acquired and analyzed several types of secondary spatial and epidemiologic data. Part 1 explains the procedures for conducting a gentrification analysis of San Francisco based upon the work of Bates (2013). Although for the most part my procedures closely followed Bates', there were a few key ways in which my methods deviated. Part 2 covers my analysis of San Francisco eviction data, which I examined for evidence of spatial clustering. I also discuss my methods for testing for association between eviction density and gentrification. Finally, Part 3 presents my analysis of public HIV surveillance data, which was only partially spatial. I discuss how I mapped HIV prevalence and measures of HIV linkage and treatment outcomes and how I used this information in conjunction with the gentrification and eviction analyses to conduct a vulnerability analysis of gentrification-related housing insecurity among San Francisco PLWH. I also explain how I explored and analyzed the non-spatial surveillance data on homeless, lost-to-follow-up, and out-of-jurisdiction HIV cases to obtain additional information on

HIV treatment outcomes among insecurely housed PLWH.

Analysis of Gentrification in San Francisco

I began my spatial analysis of gentrification by applying Bates' (2013) gentrification typology to San Francisco. This is a census-tract classification system that provides an overlay analysis in GIS. Bates typology examines three census-tract level attributes: socioeconomic vulnerability, demographic change, and housing cost increases. Census tracts are "scored" based on how their current demographics, change in demographics, and housing markets compare to the city as a whole. These three scores are then added to obtain a gentrification classification, shown in Table 5.4.

All of the data required for this analysis are publicly available online from the United States Census Bureau's decennial censuses and the American Community Survey. The data I used in this analysis included a TIGER line shapefile of San Francisco 2010 census tracts, American Community Survey 5-year estimate data for the years 2011 and 2015 and decennial census data for 2000 (the specific datasets used are listed in Tables 5.1-5.3).

Measurement	Definition	Cutoff Value	ACS Dataset
Race	% of tract reporting race other than white non-Hispanic +MOE	58.9%	B01003
Education	% of tract over 25 years of age with less than a 4-year degree +MOE	54.3%	S1501
Tenure	% of tract that rents +MOE	64.3%	B25003
Income	tract median household income -MOE	\$82,393	S1903

Table 5.1: Variables in Vulnerability Analysis

Measurement	Definition	Cutoff Value
Change in Race	Growth in % white non-Hispanic residents +MOE	0.66%
Change in Education	Growth in % over 25 years of age with at least a 4-year degree +MOE	1.69%
Change in Tenure	Decrease in % of tract that rents -MOE	0.71%
Change in Income	Increase in median household income +MOE	\$7,319

Table 5.2: Cutoff values for gentrification-associated demographic change

Rent Type	2015 Rent	2000 Rent	Rent Change 2000-2015	Rent Change 2011-2015	Adjacent to high rent tract
adjacent	low	NA	NA	low	yes
accelerating	low	NA	NA	high	NA
appreciated	high	low	high	NA	NA

Table 5.3: Gentrification Associated Rent Increases

Vulnerable	Demographic Change	Rent Type	Gentrification Stage
yes	no	adjacent	Susceptible
yes	no	accelerating	Early 1
yes	yes	adjacent	Early 2
yes	yes	accelerating	Middle
yes	yes	appreciated	Late
no	increase in white and college educated population	appreciated	Continued Loss

Table 5.4: Classification system for gentrifying neighborhoods according to Bates 2013.

Working with American Community Survey Data

Except for the median gross rent data from the 2000 decennial census, all of datasets I worked with included margins of error. For cases where I needed to perform mathematical operations on the data (e.g., finding the percentage of rented households given the total number of households and number of rented households), I incorporated margins of error into my calculations using formulas from the American Community Survey General Handbook [citepuscensus2008](#) and the interactive spreadsheet American Community Survey Statistical Calculator (Oklahoma Department of Commerce, 2011). When incorporating error margins into my analysis, I erred on the side of a more sensitive, rather than specific, measurement. Handling of error margins is noted in Tables 5.1-5.3. To avoid issues with large margins of error, I excluded five census tracts with fewer than 50 individuals from my analysis.

As I discussed in my methodology section, all parts of the gentrification analysis relied on the use of relative measurements, since census tracts measurements are compared to citywide values. For example, a census tract would be considered relatively white if its percentage of white non-Hispanic residents exceeded the citywide percentage adjusted by the margin of error. These adjusted citywide measurements, called "cutoff values" are listed in Tables 5.1-5.3.

Data from the year 2000 was based on census tract boundaries from the 2000 decennial census and data from the years 2011 and 2015 was based on boundaries from the 2010 decennial census. I conducted my analysis using 2010 boundaries.

To convert data from the 2000 decennial census to 2010 tract boundaries, I used a census crosswalk file from the U.S. Census Bureau (United States Census Bureau, 2010), which indicated how to allocate 2000 census tract population estimates for a 2010 analysis. Additional notes on the crosswalk file can be found in Appendix A.

Conducting a Vulnerability Analysis for 2015

Bates (2013)' definition of vulnerability is based upon four measurements of socioeconomic status: race, education, housing tenure, and median household income. Vulnerability, as seen in Table 5.1 is scored on a scale of 0-4, with a census tract getting a point for each disproportionately represented category. If a census tract exceeds the cutoff value (defined as the citywide average for that measurement adjusted to the upper bound of the margin of error), the tract gets 1 point. Tracts with 3 or 4 points are considered vulnerable.

Bates (2013)' original definition of low-income populations was based on the Department of Housing and Urban Development's concept of the "home income limit", a definition of livable income that is adjusted based upon household size and county of residence (Bates, 2013). HUD defines a low-income household as one that makes less than 80% of the home income limit for that household's size and county. In my methodology section, I mentioned some of the limitations of using HUD data. Specifically, I addressed the large error margins and absence of recent data and why I sought an alternative estimate of low income populations.

To find an alternative, I compared data on San Francisco's 2015 median household income to the San Francisco low-income limit for the year 2015. For the year 2015, San Francisco's median household income was \$81,294 while HUD-adjusted low-income limit for a family of 4 (the measurement used by Bates) was \$81,500. Because these values were similar, I opted to use San Francisco's median household income data to estimate the percent of a population that was low-income. Unfortunately, using this value is a compromise that introduces an additional source of error. The average household size in San Francisco is not 4, but 2.6 (United States Census Bureau, 2016). The low-income range for this family size would be between \$65,200 and \$73,350 per year (United States Census Bureau, 2016) but data on the proportion of San Francisco residents who make less than this is unavailable. While using San Francisco's MFI as a measurement of income is less than ideal, the fact that this cutoff value is close to the HUD-derived cutoff used by Causa Justa allows me to compare my 2015 analysis of San Francisco to Causa Justa's 2011 analysis.

Analyzing Gentrification-Associated Demographic Change from 2011-2015

Bates (2013)'s gentrification typology examines gentrification-associated demographic change at the census tract level relative to the city level. A census tract receives a point for each measurement in which change towards being whiter, more affluent, more educated, and having more homeowners exceeded the citywide change. In keeping with Bates (2013)'s method, a census tract is classed as undergoing

gentrification-associated demographic change if it either A) experienced an increase in white non-Hispanic residents and residents over 25 with at least a 4-year degree or B) experienced an increase in at least 3 out of the above 4 categories. For calculating the difference between 2011 and 2015 demographics, I incorporated error margins into my calculations using the American Community Survey Statistical Calculator (Oklahoma Department of Commerce, 2011).

Between the years 2011 and 2015, the white non-Hispanic population and the percentage of homeowners decreased. For these two variables, a census tract gained a point for demographic change if it increased in the proportion of white non-Hispanic residents or homeowners OR if it decreases in these populations was less than the cutoff value. For education and income, a census tract had to increase by more than the cutoff value.

Analyzing Change in Median Gross Rent from 2000-2015, 2000-2011, and 2011-2015

My method here diverges from Bates (2013) in one primary way. Rather than estimating increased cost of living using property values, I used median gross rent (see Chapter 4 for further explanation). Otherwise, I followed the same method as Bates. I examined quintile distribution of median gross rent for the years 2000, 2011, and 2015. I then examined the percent by which rent increased during the periods from 2000-2015 and 2011-2015 and examined the quintile distribution for the two periods of rent increases. In keeping with Bates (2013)' method, I classified housing

market changes according to Table 5.3. To determine whether a tract touched the boundary of a track with high rent, I examined median gross rents of census tracts in ArcGIS. Tracts that did not fit into the above housing market typology were left unclassified.

Applying the Gentrification Typology

To create the gentrification map, I created a spreadsheet containing the census tract ID number of each tract along with its vulnerability score, demographic change score, and housing market classification. I created a map of San Francisco in ArcGIS using a TIGER line shapefile for 2010 census tract boundaries and joined my spreadsheet to the census tract shapefile. In ArcGIS, I assigned gentrification classification to tracts according to Bates (2013)' system, see Table 5.4. Tracts that did not fit this system were left unclassified.

5.1.2 Examining Eviction Density

After conducting the gentrification analysis (Figure 5.1), I was interested in seeing where eviction notices were clustered and whether clusters of eviction notices were found in census tracts at a particular stage of gentrification. My objective here was to get a better sense of where housing displacement was likely to be an issue and to assess the usefulness of the gentrification typology in predicting future displacement.

I used data from the San Francisco Rent Board on eviction notices, which is

publicly available from SF OpenData (San Francisco Rent Board, 2017). The eviction data are updated at the end of each month. Because my gentrification analysis was for the year 2015 and relied on the American Community Survey 5-year estimate (which is based on data collected between 2011 and 2015), I examined eviction notices from the same 5-year period.

Data on eviction notices were available in XY-coordinates down to the level of city block. I plotted the eviction notices in ArcGIS and experimented with several ways of representing eviction density. First, I tried two ways of showing absolute density of evictions in terms of area. I created a dot-density map using point data aggregated to census block group polygons. I also created a hot spot map of eviction notices in space by conducting an optimized hot spot analysis (Getis-Ord G_i^*) on the point data of eviction notices.

Examining clusters in space alone, however, does not account for differences in eviction density due to differences in housing density. To control for housing unit density as a potential confounding variable, I aggregated eviction notice points to census block group level and normalized the data by number of housing units per census block group (using 2010 decennial census data). Then, I ran a second optimized hot spot analysis (Getis-Ord G_i^*) at the census block group level. The output of this analysis (Figure 5.4) indicated where census block groups with high densities of evictions were clustered together.

Finally, I conducted a one-way ANOVA on ranks analysis (Kruskal-Wallis test) to

determine whether eviction density was correlated with gentrification stage. Using the statistical software R, I conducted the Kruskal-Wallis test for all-cause evictions, fault evictions, and no-fault evictions for the 5-year period concurrent with my gentrification analysis (2011-2015) and the 5-year period preceding my gentrification analysis (2006-2010). To increase the statistical power of the test, I collapsed my six gentrification stages into four: Early 1 and Early 2 became one stage called "Early"; Late and Continued Loss became one stage called "Late". If the Kruskal-Wallis test p-value was less than my alpha value of 0.05, I concluded that there was an association between gentrification stage and eviction density. To determine which stages were associated with an increase in eviction density, I ran a post-hoc test (Dunn's test) in R.

5.1.3 Incorporating HIV Data into Analysis

Whereas the first two parts of my research procedures aimed to develop a model for predicting gentrification-related housing insecurity and looked for an association between gentrification stage and eviction density, my analysis of HIV data was not designed to look for associations or determine cause and effect. Rather, the purpose here was to determine where PLWH might be especially vulnerable to evictions, especially those evictions associated with tracts undergoing gentrification. As such, the focus of this analysis is vulnerability and needs assessment.

To conduct the analysis, I used data from the SF DPH 2015 HIV Epidemiology

Report (San Francisco Department of Public Health, 2016) on HIV prevalence rate and rate of viral suppression (that is, the percentage of HIV cases whose infection was under control). HIV prevalence was defined as the number of PLWH in a given area who were alive as of the end of 2015. The viral suppression rate for the 2015 annual report is defined as the percentage of HIV cases in a given area who were alive as of the end of 2014 and had been virally suppressed as of their last viral load test. Viral suppression was defined as having a viral load of less than 200 viral copies/mL of blood and indicates that an individual is unlikely to either transmit their HIV to others or suffer health complications from their HIV infection.

SF DPH reports HIV prevalence by census tract and viral suppression by neighborhoods aggregated from census tract. Using an overlay analysis in GIS, I examined which census tracts in San Francisco were in the top two quintiles for HIV prevalence and overlapped at least 50% with eviction hot spots (both in terms of evictions in space and evictions per 1000 housing units). I conducted a similar analysis for viral suppression, examining which neighborhoods overlapped eviction hot spots by at least 50% and were in the bottom two quintiles for viral suppression rates.

Data on Homeless, Lost-to-Follow-Up, and Out-Migrated Cases

For the purposes of spatial analysis, I was unable to use data on HIV cases which were not assigned to geographic regions. For this data, I conducted relative risk estimates to show the likelihood of having a detectable viral load for homeless and

unknown address (lost-to-follow-up) cases relative to housed San Francisco HIV cases (e.g. cases with known addresses).

The final type of data I analyzed was out-migration. These data reflected the number of PLWH who formerly resided in San Francisco, but no longer do. For these data, I conducted cumulative out-migration estimates as a measurement of how many HIV positive San Franciscans had moved out of the city. I obtained my data from annual HIV epidemiology reports published by the San Francisco Department of Public Health's HIV Epidemiology Section from the years 2012-2016. The specific information provided by the SF DPH varied from year to year, and the annual report for 2011 was the first year where any information on out-migration was provided. A detailed description of how I obtained my estimates from the information in each year's report is given in Appendix A.

5.2 Results

5.2.1 Overlay Analysis of Gentrification in San Francisco

The results of applying the modified gentrification typology to San Francisco are shown in Figure 5.1. When viewing this map, keep in mind that the typology uses relative measurements over a specified period of time. Tract gentrification scores are relative to San Francisco as a whole, examine demographic change between 2011 and 2015 5-year ACS estimates, and examine changes in the rent market between

2000 and 2015. This method of classifying census tracts indicated gentrification throughout the eastern, southern, and western regions of the city as well as an area of "continued loss" to the west of Noe Valley. Red indicates that a census tract has a high proportion of vulnerable populations and is adjacent to at least one tract with median gross rent in the top 2 quintiles. Light orange indicates an accelerating rent market without an accompanying loss of vulnerable populations; dark orange indicates a loss of vulnerable populations and adjacency to tracts with a high rent market. These are named in Figure 5.1 as "Early: Rent" and "Early: Demographic" and correspond to Bates (2013)' "Early Type 1" and "Early Type 2", respectively. Yellow tracts ("Middle", corresponding to Bates "Dynamic") are experiencing an accelerating rent market in conjunction with a loss in vulnerable populations. Green tracts ("Late") have an appreciated rent market and have lost of vulnerable populations. Blue tracts ("Continued Loss") do not have a relatively high concentration of vulnerable populations but are becoming whiter and more educated and have an appreciated rent market.

5.2.2 Analysis of Eviction Notice Density

An analysis of absolute eviction notice density, that is, the density of eviction notices in a given area, are presented in Figure 5.2 and Figure 5.3. Figure 5.2 presents all-cause eviction notices from 2011-2015 as a dot density map. This map shows point data on eviction notices aggregated to the level of census block and symbolized

with points randomly assigned within each block, with each point representing one eviction. I used this method of symbology to give a clearer picture of eviction density given the large number of coincident data points. Note that because this is a dot density map, Figure 5.2 shows the density of eviction notices in space without giving the exact locations of eviction notices.

Visually, these evictions appear clustered in the northeast part of San Francisco (especially downtown, North Beach, SOMA, and the Mission District) and the Lakeshore neighborhood to the east of Lake Merced. Areas of "statistically significant" eviction notice clustering in space are shown in Figure 5.3, which displays the output of the optimized hot spot (Getis-Ord G_i^*) analysis. This analysis compares the actual pattern of points (where points are eviction notices) to randomly generated points and outputs the probability that areas of high and low point density did not occur by random chance. Red areas ("hot spots") indicate areas of "statistically significant" high eviction notice density while blue areas ("cold spots") indicate areas of "statistically significant" low eviction notice density. The shade gradients for both colors indicate confidence intervals. For an area that is dark red (hot spot with 99% confidence), the probability that the high density occurred by random chance is 1%. For the hot spot analysis, areas of statistically significant clustering are similar to the visually dense areas seen in Figure 5.3.

The blue areas in Figure 5.3 are areas where evictions were significantly absent. These include the sparsely populated Treasure Island and the former naval shipyard

in the southwest corner of San Francisco (Hunter's Point) as well as some consistently high-cost areas in the northeast and central part of San Francisco (Presidio, Twin Peaks), along with some neighborhoods along the eastern shore of the city.

For the purpose of analyzing the absolute number of eviction notices, the hot spot analysis in Figure 5.3 is sufficient. However, as I mentioned in the procedures above, housing density is a potential confounder of the relationship between gentrification stage and eviction density. I therefore conducted a second optimized hot spot analysis of evictions normalized by number of housing units, working at the census block group level. The output of this analysis is shown in Figure 5.4. In contrast to Figures 5.2 and 5.3, Figure 5.4 shows clusters of high eviction density only in the Tenderloin, Downtown, SOMA, and Mission neighborhoods (with the Mission District cluster having a wider confidence interval than the larger cluster to the northeast).

Table 5.5 shows the results of the Kruskal-Wallis analysis of census tract eviction density by gentrification stage, where eviction density is defined as eviction notices per 1000 housing units. All-cause evictions from 2011-2015 were associated with susceptible and early stage tracts, fault evictions from 2011-2015 were associated with susceptible, early, and middle stage tracts, and fault evictions from 2006-2010 were associated with middle stage tracts. Table 5.5 provides p-values for the Kruskal-Wallis test; p-values for each association tested in the post-hoc Dunn's test can be found in Appendix A.

Dependent Variable	p=	Post-Hoc Test Results
all-cause 2011-2015	0.02559	susceptible and early had more evictions
fault 2011-2015	0.006569	susceptible, early, and middle had more evictions
no-fault 2011-2015	0.3545	NA
all-cause 2006-2010	0.2144	NA
fault 2006-2010	0.02841	middle had more evictions
no-fault 2006-2010	0.103	NA

Table 5.5: Results of Kruskal-Wallis analyses of eviction density by 2015 gentrification stage

5.2.3 Results of Spatial HIV Surveillance Data Analysis

San Francisco HIV cases as of the end of 2015 were found primarily in the central part of San Francisco, including the Castro, Western Addition, Mission District, Tenderloin, Nob Hill, South of Market, and Downtown areas. The distribution of these cases is shown in Figure 5.5. Figure 5.6 shows viral suppression rates using a quintile distribution. Viral suppression here means patients who were alive as of December 31st, 2014, and had a viral load of less than 200 copies/mL at their last viral load test (San Francisco Department of Public Health, 2016). San Franciscos average rate of viral suppression at the end of 2014 was 72% (ibid.). The lowest rates of viral suppression were in the Tenderloin (65%) and Nob Hill (67%). The highest rates were in the Castro and Noe Valley (both 79%), Diamond Heights (81%), and

the Outer Mission (83%). Treasure Island had the highest rate of viral suppression at 86% but it should be noted that the island had only 50 cases as of 2015 and therefore its data may be skewed.

Homeless individuals and individuals with an unknown address had the lowest rates of viral suppression at 32% and 46%, respectively, while the average viral suppression rate for cases with known San Francisco addresses was 74%. Cases who were out of jurisdiction (meaning they resided outside of San Francisco at the time of diagnosis but receive care in the city) had a viral suppression rate of 52%. Using information on viral suppression rates, total numbers of homeless cases and cases with a known San Francisco address (excluding cases whose addresses was listed as unknown as it is not known whether they are homeless) shown in Table 5.6, I calculated the relative risks for having a detectable viral load if an individual was homeless or had an unknown address compared to if the individual had a known address. Clients whose address was unknown includes clients who are "lost to follow up", meaning they are no longer in contact with their care providers and do not respond to phone calls (San Francisco Department of Public Health, 2016). Compared to cases which had known San Francisco addresses (that is, compared to cases which were presumably housed), homeless HIV cases were 2.70 times likelier to have a viral load greater than 200 copies/mL. The relative risk for clients whose address was unknown was 1.82. There are potential confounding variables and effect modifiers, include mental illness and drug addiction. These are discussed further in

Chapter 7. If the relationship between homelessness and poor viral suppression is in fact a causal one, the number needed to treat as calculated from the information in Table 5.6 is 2.33. This is the number of homeless individuals with detectable viral loads who would need to be housed for one individual to become virally suppressed. In other words, if homelessness leads to a detectable viral load and 233 homeless PLWH were housed, 100 of them would become virally suppressed.

	Viral load > 200 copies/mL	Viral load <200 copies/mL	Total
Homeless	398	188	586
Address unknown	206	242	448
Known address	3231	9591	12822
Total	3835	10021	13856

Table 5.6: Viral suppression among San Francisco HIV Cases

Summary of Cumulative Out-Migration Data

Estimated out-migration data derived from the San Francisco Department of Public Health's HIV Epidemiology Annual Reports (San Francisco Department of Public Health, 2012, 2013, 2014, 2015, 2016) is tabulated in Table 5.7. The SF DPH's HIV Epidemiology Section only began reporting on out-migration in 2011, consequently, it is possible to have a cumulative estimate of how many HIV cases had left San Francisco as of the end of 2011, but without an end-count from 2010, it is not possible to determine how many people left during 2011.

The total cumulative out-migration shown in Table 5.7 (5158 individuals) rep-

Year	Total cumulative cases diagnosed in SF	Total cases still residing in SF	Cumulative estimated out-migration by year's end	Total out-migration for year
2015	15995	10837	5158	726
2014	15979	11547	4432	1329
2013	15514	11015	3103	718
2012	15243	11029	2385	528
2011	15489	13630	1857	null

Table 5.7: Estimated Out-Migration of San Francisco Residents Diagnosed With HIV

resents 33.2% of all living San Franciscans who were diagnosed with HIV. Approximately one third of HIV positive San Franciscans moved away from San Francisco as of December 31st 2015. Of these 5158 individuals, 3301 (or 20% of all living San Francisco cases) moved between the years 2012-2015. I discuss what this may mean for the epidemiology of HIV elsewhere in the Bay Area in Chapter 7.

5.3 Putting it All Together: Overlay Analysis of Gentrification, Eviction, and HIV Data

For the overlay analysis, "spatial eviction hot spot" refers to the hot spots shown in Figure 5.3, where I examined clusters of evictions in space. "Eviction density hot spot" refers to the hot spots shown in Figure 5.4, where I examined clusters of census block groups with high densities of evictions per housing units.

The Tenderloin, Nob Hill, and Downtown neighborhoods had the lowest rates of viral suppression of all neighborhoods. All three of these neighborhoods were located in spatial eviction hot spots. The Tenderloin and Downtown neighborhoods were also located in eviction density hot spots. Neighborhoods in the top quintile of HIV prevalence that are located in spatial eviction hot spots include the Castro, the Western Addition, the Mission District, the Tenderloin, Nob Hill, and South of Market. Of these neighborhoods, the Tenderloin and South of Market were located in an eviction density hot spot.

5.4 Conclusion

The analysis of gentrification and eviction suggest that tracts in the susceptible or early stages of gentrification tend to have higher densities of evictions. Tracts in susceptible and early gentrification stages with high eviction densities were found in the Western Addition, Mission District, Nob Hill, Tenderloin, and Downtown. Due to the high concentration of vulnerable populations as defined by Bates (Bates, 2013) and to the high number of evictions, gentrification-related displacement is likely high in these neighborhoods.

Not every susceptible or early stage census tract in San Francisco had a high density of evictions, however, and observing eviction trends over time is necessary to determine whether these tracts will eventually experience more evictions. The tracts that scored as susceptible or early stage gentrifying and did not have especially

high eviction densities were located in the Bayview/Hunter's Point, Outer Mission, Excelsior, Sunset, and Richmond neighborhoods. If the association between eviction density and gentrification stage is consistent, residents in these neighborhoods may be at risk for eviction-related displacement in the future. Of these neighborhoods, the Bayview/Hunter's Point, Sunset, and Excelsior areas have lower rates of viral suppression. These areas should be further assessed for supportive housing needs among PLWH.

Tracts located in spatial eviction hot spots that were in the top quintile of HIV prevalence were located in the Castro, Western Addition, Mission District, Tenderloin, Nob Hill, and South of Market neighborhoods. The disproportionately high rates of evictions in the Tenderloin and South of Market suggest that these neighborhoods are in especially urgent need of supportive housing for PLWH. The Tenderloin, Nob Hill, and Downtown, in addition to having large numbers of evictions, being in early stages of gentrification, and having high HIV prevalence, are also the neighborhoods with the lowest rates of viral suppression. These neighborhoods are likely home to a large number of insecurely housed PLWH whose infection is poorly controlled. The need for supportive housing is likely most urgent in the Tenderloin, which was present in eviction hot spots in both hot spot analyses and had both high HIV prevalence and low viral suppression rates.

The calculation of relative risks found that homeless and lost-to-follow-up individuals are at greater risk of having a detectable viral load than individuals with a

known address. Significantly, if the relationship between being homeless and having a detectable viral load is a causal relationship, the number needed to treat of 2.34 suggests that around 43% of PLWH who received housing would become virally suppressed. To determine whether the relationship between housing status and viral suppression is impacted by confounding and/or effect modification, I would need more detailed information on rates of other potential risk factors for detectable viral load, including substance use disorders and mental illness. A strong causal relationship between housing status and viral suppression would further support the need for supportive housing for PLWH.

Finally, the data on out-migration among PLWH is compelling. The SF DPH reports that 32% of all living HIV-positive individuals diagnosed while San Francisco residents have moved away from San Francisco (San Francisco Department of Public Health, 2016). Table 5.7 shows that 20% of all living San Francisco HIV cases moved away from the city in the 4 years from 2012-2015. That is, of those individuals who left the city, about 63% moved during that 4-year period, suggesting an increase in PLWH moving away from San Francisco. More importantly, the SF DPH reports that 14% of all San Francisco HIV cases (about 2199 individuals) have moved away from San Francisco and are believed to not be in care. This represents about 43% of all individuals who have moved away from San Francisco. While San Francisco has an excellent infrastructure for providing care to PLWH, the numbers above show that a large portion of HIV-positive San Franciscans are leaving the city and

potentially losing access to medical care. What is epidemiologically significant about this is the increased risk in HIV transmission from individuals who are not in care and virally suppressed. It is unknown how this human migration is impacting the epidemiology of HIV in San Francisco or in the communities where these individuals move. It is also unclear how much of a role gentrification plays in their decisions to move.

The next chapter does not resolve whether there is a causal relationship between gentrification and out-migration. However, by incorporating qualitative data on provider and patient experiences, I hope to learn more about how gentrification and eviction may impact both the migration of PLWH and whether or not they stay in medical care. Chapter 6 will describe the procedures I used to collect data from both providers and PLWH and provide the results of my qualitative analysis. In Chapter 7, I will explore the relationship between my qualitative data and the spatial analyses I presented in this chapter.

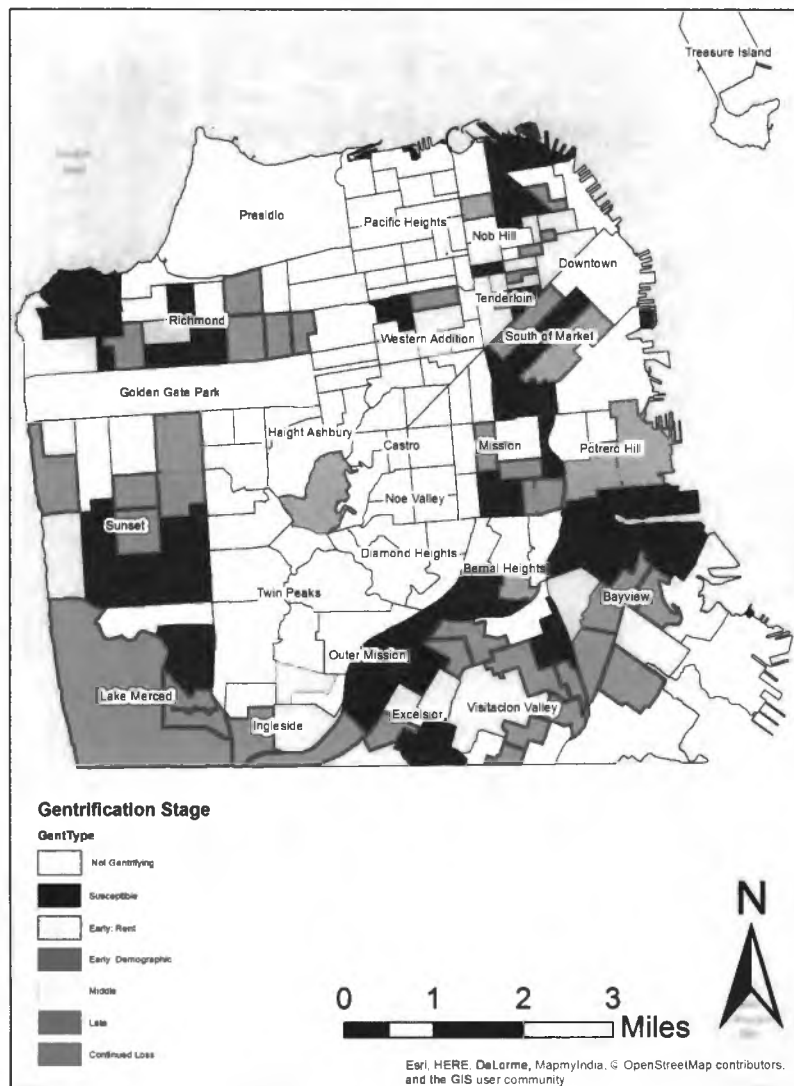


Figure 5.1: 2015 Gentrification Analysis for San Francisco Census Tracts



Figure 5.2: Dot Density Map of All-Cause San Francisco Evictions, 2011-2015

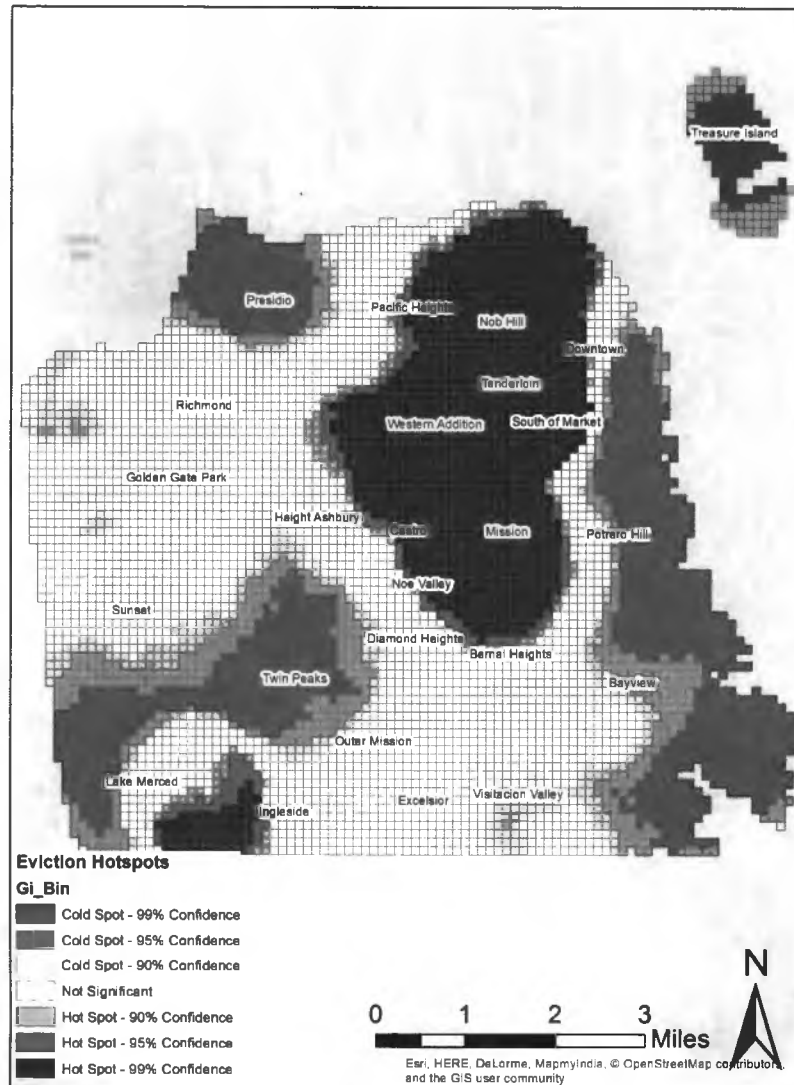


Figure 5.3: Hotspot Analysis of All-Cause San Francisco Evictions, 2011-2015



Figure 5.4: Hotspot Analysis of All-Cause San Francisco Evictions, 2011-2015, Normalized by Housing Unit Density

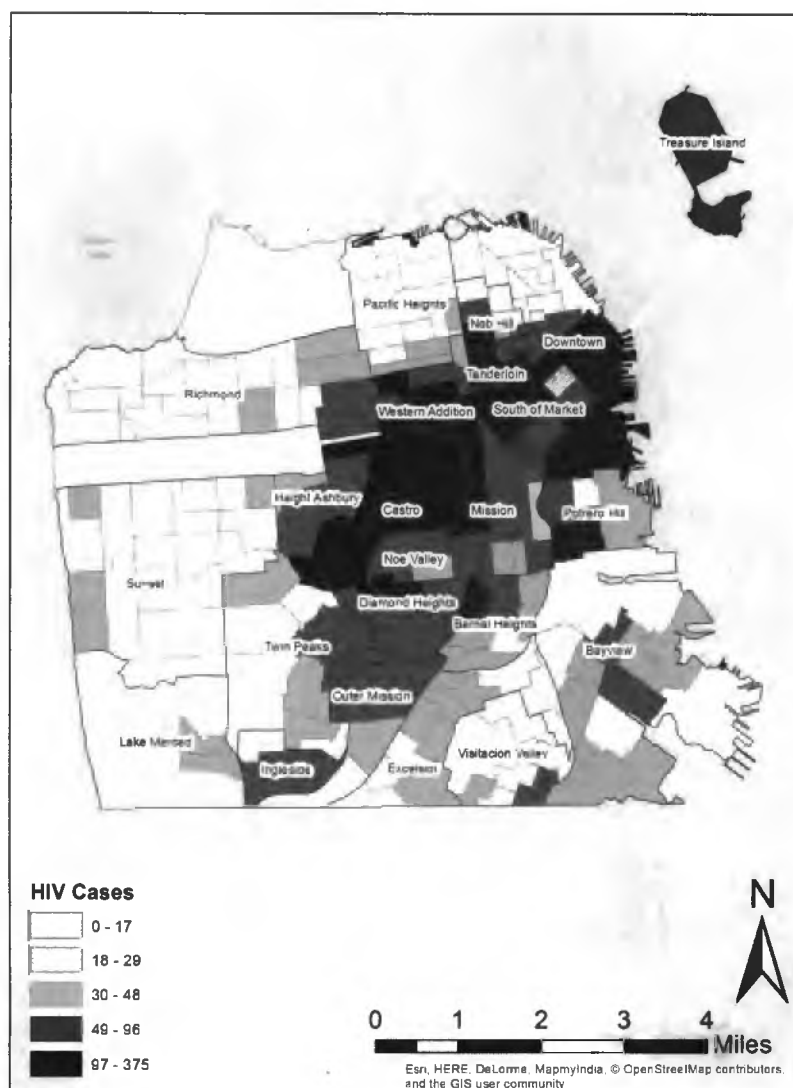


Figure 5.5: 2015 HIV Prevalence in San Francisco by Census Tract. SF DPH 2016.



Figure 5.6: Viral Suppression Rates in San Francisco Neighborhoods, All Living HIV Cases as of 2015. SF DPH 2016.

Chapter 6

Perspectives of HIV Service Providers and PLWH, Qualitative Methods and Results

6.1 Overview of Research Procedures

In the previous chapter, I presented a spatial analysis of socioeconomic and epidemiologic data. In this chapter, I present a qualitative analysis that uses grounded theory to identify emergent themes in my data and formulate hypotheses for further research. As I explained in Chapter 4 on methodology and research design, the methods I used for qualitative research were designed not to test a preexisting hypothesis or support a theory but rather to allow participant concerns and ideas to guide my plans for future research projects. In this Chapter, I explain the methods I used to conduct an open-ended survey of HIV service providers and a series of semi-structured interviews with people living with HIV (PLWH). After discussing

the research procedures for the surveys and interviews, I present my results and a brief analysis that compares the survey and interview data. A more thorough analysis is presented in the next chapter, where I triangulate my survey and interview data with my spatial analysis.

6.1.1 Procedures: Qualitative Survey of HIV Service Providers

The first part of my qualitative research consisted of an online qualitative survey of San Francisco HIV service providers, which I created using Qualtrics (see Appendix B for complete survey instrument). I sampled HIV service providers in San Francisco using the San Francisco HIV Frontline Workers e-mail list. This is an e-mail list for social workers, case managers, and clinicians who provide services to HIV-positive people in San Francisco. This list allowed me to reach a wide range of care providers at different types of service organizations. In my recruitment e-mail, I provided a description of my study, an invitation to participate, and a link to the survey. Since the Qualtrics survey was administered online, I used an implied consent process. Survey respondents had to agree to an implied consent statement explaining the purpose of the study before clicking through to the survey instrument. Non-consent consisted of closing the browser window. My survey went live on 27th January 2017, was available through 28th March 2017, and had 18 respondents when it closed.

The survey was designed to elicit the opinions of service providers regarding whether gentrification and evictions in San Francisco were impacting their clients.

Participants were asked to discuss barriers to care faced by their clients and provide anonymized anecdotes about clients who had struggled with housing costs or faced eviction. I identified themes within these responses and used grounded theory analysis to analyze the data.

6.1.2 Procedures: Semi-Structured Interviews with PLWH

For my semi-structured interviews, I used passive recruitment to sample San Francisco residents living with HIV. My participant pool consisted of PLWH who had lived in San Francisco for a period of at least 1 year. I recruited participants using an advertisement on the website Craigslist and by distributing tear sheets to HIV service organizations. For the Craigslist advertisement, I posted in the volunteer opportunities section once a week during my recruitment period from April 2nd, 2017 through April 20th, 2017. For the tear sheets, I provided fliers to 3 large HIV service organizations in San Francisco: Glide Memorial Church, The San Francisco AIDS Foundation, and the Positive Health Program at San Francisco General Hospital. I chose these three organizations because they have a broad range of programs that draw a diverse client body and because they provide low-barrier services that are accessible to clients of all income and housing statuses. The full text of the Craigslist ad and a copy of the recruitment flier can be found in Appendix B.

My sample of PLWH consisted of the first 9 individuals who responded to the recruitment materials, were eligible to participate, and completed the interview.

Interviews took place at the Center for Research and Education in Gender and Sexuality (CREGS) in downtown San Francisco. Interview times were based on participant availability. A copy of the consent forms used in the interviews as well as sample interview questions can be found in Appendix B.

Interview questions were designed to elicit responses regarding participant experiences with finding and keeping housing while managing HIV. Questions focused on whether participants had experienced any challenges regarding housing and moving from place to place and whether/how this interfered with their adherence to HIV treatment. Examples include, "What is it like for you to find housing in San Francisco?" and, "How did you take care of your HIV when you were homeless?". I did not conceal the goals of my research from participants and allowed them to provide feedback on my overall research questions and suggest future directions.

I used a laptop to transcribe the interviews as participants spoke, an accommodation for participants who were uncomfortable with being audio recorded. In most interviews, participants also wished to speak about matters unrelated to my research question, including stories about personal trauma, how they became infected, and other issues that I felt uncomfortable subjecting to academic gaze. I made a conscious decision to exclude this material from my transcripts and analysis. After each interview, I filled in my transcription notes, made observations on researcher-participant dynamics, and removed potentially identifying information from the transcripts. I then coded the transcripts and analyzed them for emergent

themes. The complete list of codes I used can be found in Appendix B.

6.2 Results

6.2.1 Qualitative Survey of HIV Service Providers

The survey of HIV service providers elicited responses from 18 individuals. All 18 respondents completed the short-answer questions, which asked providers how long they had worked in San Francisco, what role they played in HIV services, how many of their clients were homeless, and how many of their clients lived in single room occupancy (SRO) hotels. Not all respondents answered all of the open-ended, with each long-answer question getting 7-9 responses.

Description of survey respondents

The mean time for which respondents had worked as San Francisco HIV service providers was 7.5 years with a median of 4.5 years. The most common service roles reported were HIV case manager and HIV linkage coordinator; a list of all occupations reported is in Table 6.1. All of the respondents reported serving clients who were homeless and clients who lived in single resident occupancy (SRO) hotels. Respondents were asked to estimate the percentage of their clients who fell into these two housing categories, homelessness defined as living in a shelter, on the street, or out of a vehicle. Respondents reported a mean homelessness rate of 24% among

their clients (median 20%), and a mean SRO housing rate of 44% (median 30%).

Service Role	Count
HIV Test Counselor	1
Linkage Coordinator	5
Social Worker	3
Peer Advocate	3
Case Manager	7
Other	5

Table 6.1: Summary of Survey Respondents

Provider perceptions of barriers to care

Service providers were asked to describe the most common barriers to care faced by their clients. Nine respondents answered this question, all in the form of brief lists. The most common perceived barriers to care were mental health, lack of stable housing, and substance use. Six respondents listed the phrase "substance use as a barrier to care, with one of the six respondents specifying "especially meth". The other respondents simply listed "substance use". With respect to mental health, 5 respondents listed "mental health" or "mental illness" without further specification while one respondent listed "depression" and another listed "a lifetime of trauma". An additional respondent mentioned that many clients lacked "the cognitive or physical ability to pursue available services" but did not explain what exactly this meant. Respondents also listed barriers related to housing. These included homelessness, a lack of stable housing, and a lack of affordable housing.

While substance use, mental illness, and homelessness were the most common barriers mentioned, several respondents alluded to social and structural barriers to care. Two respondents mentioned social network factors as barriers to client care, with one respondent listing "HIV stigma" and another writing of a lack of "familial/friend support to encourage [clients] to follow up with services". Some respondents listed barriers related to the health care system itself. One respondent noted that "having services spread out around the city" was challenging for clients notably, this was the only response that made any reference to the spatial location of services. Two respondents mentioned a lack of cultural competency on the part of service providers, with one of the two noting a "lack of culturally relevant programs and intervention methods" and the other noting a lack of "inclusive environments to people of color, non-binary genders, or sexual orientations". Language barriers were mentioned by one respondent. These responses suggest that some HIV services in San Francisco are not fully accessible or welcoming to the patient populations they serve.

Housing security and access to care

Providers were asked to describe the relationship between housing insecurity and access to HIV care among their clients. Although housing insecurity was not explicitly defined in this question, respondents answered the question in terms of clients who were homeless or otherwise did not have permanent housing. The nine re-

sponses to this question ranged from single sentences to short paragraphs. Two main themes emerged in these responses: that housing insecurity was a source of instability in clients' lives and that housing insecurity caused clients to prioritize their daily survival over their longer-term health.

Several respondents identified housing insecurity as a source of chaos in their clients' daily lives. According to these respondents, clients facing housing insecurity often lose contact with their providers and miss medical appointments. One respondent wrote:

Housing insecurity is one of the most significant barriers. Without a stable living situation clients have difficulty maintaining contact with service providers. They are also less likely to be adherent to medication regimens which leads to more serious illness or hospitalization, which in turn leads to problems with linkage and retention.

This respondent identifies unstable housing as a barrier to retention in HIV care and suggests that clients who lack stable housing struggle to stay in contact with their providers and to adhere to HIV treatment. This respondent also explains that unstably housed patients are more likely to suffer HIV-related illnesses due to poor adherence to treatment. Although this particular survey response did not explicitly state why unstable housing leads to problems with retention in care, other respondent provided more explanation. For example, a respondent who discussed homeless clients who are lost-to-follow-up stressed the problem of theft. This respondent explained that clients who become homeless often have their personal belongings

stolen, including cell phones, IDs, and transit passes. They went on to explain that losing such items results in a client who is unable to contact their provider, access services that require proof of identification, or use public transportation, all of which impacts their ability to remain in care.

An additional source of chaos in the lives of unstably housed individuals is exposure to drug culture and drug relapses. Two respondents discussed the challenges faced by individuals who lose their housing while recovering from drug addiction. One provider noted that clients in recovery struggle to "avoid drug culture" when their housing is lost, leading to relapses and further destabilization in a client's life. A person who loses their housing no longer has control over their living environment, which makes it difficult to avoid people who are actively using substances. Another provider explained that wait lists for subsidized housing are very strict and if a patient who becomes homeless has a drug relapse, this will jeopardize their position on the housing wait list. In other words, a client who becomes homeless and relapses is likely to stay homeless.

The takeaway message from these responses is that unstably housed individuals face a chaotic living environment. Whether due to substance use, theft, or the daily stresses of living on the street, PLWH who become homeless find it hard to get appointment reminders, stay in touch with their health care providers, or attend medical appointments.

Another recurring theme that emerged from the question of stable housing and

treatment access was that homeless clients need to prioritize their daily survival and basic needs over managing their HIV. Several respondents explained that PLWH who lose stable housing must prioritize their safety and basic needs over their longer-term well-being. This shift in priorities often causes homeless patients to fall out of medical care. For example, one provider wrote, "When needing to choose between the struggles of being marginally housed and health care, my clients will mostly choose to work on finding safe housing / food / shelter instead of attending doctor's appointments." Similarly, another provider explained, "HIV and physical health are not the priority when someone has to focus on where they are going to be sleeping and where their next meal is coming from." Two providers wrote of housing as integral to patient care, with one asserting, "Housing is health care for our clients," and another stating, "Housing is the most fundamental aspect impacting my clients' ability to access care." These service providers argue that for people living with HIV, housing is a prerequisite for retention in medical care and integral to patient health.

Provider experiences with clients facing eviction

Next, I asked respondents to discuss whether their clients had faced eviction and what had happened to evicted clients' engagement in medical care. Of the nine providers who responded to this question, all reported having experiences with HIV-positive clients being evicted. Three respondents specifically mentioned that evictions were common among their clients. For example, one respondent wrote, "Many

of our patients lose housing for one reason or another whether due to eviction, intimate partner violence, or other factors.” Two responses from attorneys who work for HIV service organizations included, “I have seen way too many clients evicted despite our best efforts to keep them housed,” and “Evictions are the single largest legal issue that my clients face.”

In addition to all respondents who answered this question reporting evictions among their clients, all respondents mentioned a decline in client engagement in care following eviction. Only one response did not include a direct reference to clients being lost-to-follow-up: “some [clients] switched clinics, some just commuted farther to us, which made it harder for them to attend appointments and get specialist care”. While this response suggests that the need to travel further to a service provider after eviction constituted a barrier to care, there was no direct reference to clients falling out of care entirely. All of the other responses included references to evicted clients being lost-to-follow-up. For example, one service provider wrote, “HIV medications were stopped for all my clients. Mostly, they would either sporadically attend or stop attending doctor’s appointments.” A housing rights lawyer noted that most of their clients were able to stay housed but that “those who lose housing fall completely off my map”.

Several respondents offered explanations for clients falling out of care after eviction. One respondent discussed the challenge faced by clients with public insurance (e.g. Medi-Cal), which is county-specific. “Moving to a different county or state can

create a huge barrier to accessing care quickly if a patient has Medi-Cal (Medicaid) insurance. Because the insurance is county-bound there is often a delay in the insurance transferring quickly; thus patients at times cannot access care or medications.” This same respondent noted that some clients moved to areas that also had fewer resources for HIV treatment, which added an additional barrier to finding a new health care provider. The perception that areas outside of San Francisco have HIV resources was a recurring theme. One provider stated that, ”Many clients have had to leave the city and go places where the HIV care isn’t as accessible, or isn’t of as high as caliber. There is little to no psychosocial support outside of SF.” Another respondent mentioned that after being evicted, clients must choose to either ”leave San Francisco (and lose access to their providers), or bounce around between SROs that are barely habitable. Either way, their health suffers greatly as a result of the eviction.”

The theme of clients reordering their priorities, which appeared repeatedly in respondent discussions on housing insecurity, also appeared in the responses to my eviction question. Two respondents noted that after being evicted, clients were forced to prioritize their search for housing over medical care. One respondent emphasized, ”When working with clients who are faced with eviction their main concern is finding/keeping housing. HIV care is put in back burner. Housing is essential in HIV care.”

Provider experiences with client out-migration

Related to the question of post-eviction engagement in care, providers were asked about their experiences with clients moving outside of San Francisco. Eight respondents answered this question. Of these eight responses, two suggested positive outcomes for individuals who leave San Francisco, with one respondent reporting that most of their clients were retained in care and the other emphasizing the effort they made to ensure that clients had "everything that they need to stay in care in their new place." The remaining responses were mixed in terms of how often respondents had clients leave San Francisco and whether they perceived those clients to be in care, but a theme that emerged from these responses was of clients being lost to follow up. In other words, respondents were unable to get in touch with the client to ensure that they were in care. Most respondents did not remain in contact with their clients who left the city, which made it difficult to determine whether those clients had been retained in care. One respondent explained, "We have many patients who move out of SF because they simply cannot afford to live here. Some connect to care elsewhere but with many others, we have no way of keeping in touch with them because they do not have a working phone number." Two other respondents reported that having clients leave the city was rare, but also mentioned the issue of not knowing what happened to the clients who did leave. For example, one respondent stated, "Very few of my clients move from San Francisco. I typically have not heard back from any that do, so I'm not aware of what services they have

access to after they leave.” These quotes illustrate how quickly providers can lose contact with clients who leave San Francisco, especially individuals who lack access to communication such as phones.

Respondents expressed a variety of opinions regarding whether it was better or worse for clients to remain in San Francisco. One respondent expressed that leaving San Francisco could have a negative impact on client health, explaining, “Many folks lose the community they have used to support them in their health challenges for decades. Sometimes their health deteriorates because they lose all of those community supports.” In contrast, another respondent stated, “I don’t often have contact with my clients that left San Francisco due to housing scarcity. Very rarely have clients chosen to leave San Francisco and instead suffer from compromised HIV care as a result.” These responses suggest two sets of health challenges faced by PLWH who remain in San Francisco and who leave the city. According to the survey respondents, there are numerous PLWH who are forced to choose between housing and healthcare. Some individuals leave San Francisco and may struggle with discontinuity of medical care and access to fewer services for HIV, while others remain in the area and continue to see their health providers but face homelessness. Being forced to choose between two basic necessities—housing and healthcare—can have serious health consequences regardless of which necessity an individual prioritizes.

Addressing housing insecurity

Respondents were asked how their agencies were attempting to address housing insecurity among their HIV-positive clients. Of the nine respondents who answered this question, only one reported that their agency did not have the capacity to support clients facing housing insecurity. The remaining eight respondents mentioned providing direct advocacy (e.g. speaking to landlords), legal support, case management, and referrals to resources including housing subsidies and legal support. Two respondents worked in housing law and specifically focused on providing support to HIV-positive people facing eviction while three other respondents mentioned legal referrals. One respondent mentioned helping clients consider housing options including leaving San Francisco as well as "preparing [clients] psychiatrically for living on the streets". This example shows that in some cases, helping a client cope with becoming homeless is the most a service provider can do, which illustrates the grim reality of San Francisco's affordable housing crisis.

Final contributions from respondents

I closed my survey by asking respondents to add any additional thoughts they believed were important. Seven respondents answered this question, providing a variety of opinions and ideas that were not directly elicited by my other survey questions.

Some responses offered insight into the state of affordable housing in San Fran-

cisco. One respondent noted that affordable housing units in San Francisco "often have minimum income requirements of over \$2000 per month" while individuals who depend on general assistance or disability payments make "between \$500 and \$900 in most cases". Another respondent asserted that, "Although it is illegal to evict someone in order to bring a rent-controlled apartment up to market rate, it is very hard to prove a bad motive in court, meaning that landlords get away with it all the time." A third respondent suggested, "Clinics should collaborate closely with specifically trained housing case managers and eviction lawyers."

Other responses focused on the link between HIV treatment and housing. One respondent asserted a relationship between housing insecurity and HIV epidemiology: "Lack of affordable housing directly impacts HIV retention and HIV transmission. People who are not retained in care are the primary link to transmission. PLWH need housing in order to stay adherent to medication...Rising rents in the Bay Area affect vulnerable communities and those communities happen to be priority populations for HIV retention and prevention." Another respondent stated, "There is no housing in San Francisco for low income people which affects health care on a societal level. For HIV impacted people, the damage is far greater than other illnesses."

Other respondents provided additional reflection on the rising cost of housing in San Francisco. One respondent ended their survey by stating, "If a patients' basic needs are not met then achieving engagement in HIV care is challenging."

Gentrification has created more poverty, more stigma against folks who are homeless and people of color.” Another respondent emphasized the need for more affordable housing in San Francisco and believed that support for such housing would not come from private corporations or the federal government: ”The pressure for evictions in SF is unprecedented. Housing is so expensive that our clients can not afford to live here without a housing subsidy. The private sector will never develop housing affordable to folks at the very lowest income level. In the absence of federal support for housing we are going to have to come up with local solutions. There is so much money in San Francisco. We have to come up with progressive revenue measures that will fund affordable housing to folks at the very lowest income levels.”

6.2.2 Results: Semi-Structured Interviews with People Living With HIV

The survey of HIV service providers was designed to elicit provider perspectives on the challenges faced by PLWH in San Francisco. I invited survey participants to make broad observations backed up by anecdotal evidence. For the semi-structured interviews, I spoke to San Francisco PLWH and collected in-depth information. These interviews focused on participant experiences with finding housing in San Francisco while managing their HIV. From the information collected in these interviews, I identified the following broad themes in participant responses: the high quality of HIV care in San Francisco, the difficulty of finding housing in San Fran-

cisco, housing and HIV management, migration of residents within and outside of San Francisco, and changes to San Francisco's social environment. For each of these themes, I identified one or two major codes and several subcodes during my analysis; these are listed in detail in Appendix B. In the following sections of this chapter, I discuss each of the themes listed above and the patterns I noted in participant responses. Note that when quoting and discussing participants, I refer to them using pseudonyms.

Description of Interview Participants

Nine people living with HIV participated in the semi-structured interviews, which ranged from 15-45 minutes in length. All nine participants were cis gender men who were current residents of San Francisco. Six participants self-identified as long-term HIV survivors and had been diagnosed with HIV during the 1980s and 1990s. The remaining three participants had been living with HIV for "a couple" to "several" years. Five of the participants self-identified as black, two as white, one as Latino, and one as Asian. One of the participants was homeless and living in a shelter, six were living in subsidized housing, one was living in HIV-specific subsidized housing, and one rented his home without receiving a subsidy.

Most of the interview participants were long-term residents of San Francisco and had lived in several neighborhoods. The number of years participants had lived in San Francisco ranged from 2 to 51 years (mean and median were both 25). Seven out

of the nine participants discussed where they lived in San Francisco. Neighborhoods of current residence included Bayview, Twin Peaks, Tenderloin, Fillmore, Outer Sunset, and Diamond Heights.

HIV Care in San Francisco

When asked about their experiences finding and receiving HIV care in San Francisco, all nine participants made positive statements about the care they received. Two participants noted that care was easily accessible and eight participants used terms such as "wonderful" or "really good" when discussing the quality of medical care they received. When asked for details, participants explained that they appreciated the wide range of resources available, the empathy of their care providers, and the integration of emotional support services (such as support groups) into their medical care. While there was a general consensus among participants that San Francisco has a wealth of resources for PLWH, some participants also stressed that San Francisco's resources were superior to those found in other cities. Notably, four participants expressed that San Francisco was either the best or one of the best places in the United States for HIV-positive people to live. Kenneth, a recent transplant to San Francisco who had been homeless for his entire time in the city, explained it this way:

Of the many other cities and states I've lived in, San Francisco seems to be the safest retreat to go to if you do have HIV. You can get taken care of just like that [snaps fingers]. It's not just one major hospital doing

that, it's the whole city. They're reachable and obtainable, you can get to them just like that or they can get to you. As opposed to living in the South! And the staff are more, basically, the staff are always professional and courteous. That's always a plus. As opposed to other places I've lived. Your provider is all business, they act like they care about you. It's more attractive here, getting help. I don't think a lot of people leave San Francisco because I think San Francisco has got a lot of resources. And right now it's not in my best interest to leave the city. I've heard some say they made plans to live here and die. For some of us, San Francisco is a cool place, a good place. I would recommend it, to anyone similar in my situation.

Despite being homeless, Kenneth believed that remaining in San Francisco and having access to quality care was better than trying to find housing elsewhere. He stressed collaboration between HIV service agencies, accessibility of care, and the welcoming attitudes of care providers as reasons for wanting to stay in the city. A similar story was told by another participant, Daryl. Daryl had been homeless for almost a decade and then had lived in a series of single resident occupancy hotels (SROs). After moving indoors for the first time, he lost his housing twice to fire and suffered from recurring periods of homelessness. Despite this hardship, Daryl felt fortunate to live in San Francisco:

I feel, being HIV-positive, fortunate living in the city cause we have such good care. I don't think a person could ask for better medical care than we have. I don't know too many cities that would come close. Here I got medical, support groups, if I go to the doctors I can tell them whatever I gotta tell them like about [my drug use]. I can't imagine going to another city.

For both of these individuals, the quality of medical care, attitudes of care providers, and accessibility of resources were benefits that outweighed the challenges of living in San Francisco. Furthermore, participants expressed a willingness to travel outside their own neighborhoods to receive care for their HIV. None of the interview participants were receiving HIV-related medical care within their own neighborhoods. Two participants specifically mentioned that traveling further to access services when they moved from one neighborhood to another was not problematic.

Finding and Keeping Housing in San Francisco

All interview participants had experienced challenges with finding and keeping housing in San Francisco, which ranged from not being able to find any housing at all to having housing but finding it difficult to afford the rent. Importantly, all nine participants mentioned that San Francisco rent was not affordable. Participants discussed a variety of barriers to finding and keeping housing in San Francisco. Three participants expressed that competition for housing, especially with "tech workers" who could offer more money for rent, made it challenging to find a place to live. Two participants discussed the lack of affordable apartments in new housing developments in San Francisco. Four participants mentioned long wait lists for subsidized housing and challenges filling out housing applications correctly. Notably, two participants did mention that finding housing was easier once they were diagnosed with HIV

due to the existence of HIV-specific housing assistance programs. As will become apparent below, however, these programs do not appear adequate to meet the need of all San Francisco PLWH.

Longer-term residents of San Francisco reflected on the rent increases they had experience while living in the city. Anthony, a middle-aged Latino man, is both a long-term HIV survivor and a long-term resident of San Francisco. He discussed how his rent had more than quadrupled over the past decade despite his apartment having had no repairs or improvements: "It's the same carpet, the same walls, they don't make it look any better!" He had been without a functional stove for a week and without a functional heater for over a month. Without his housing voucher, the studio apartment would cost \$1500 a month. Brian is a middle-age man who identifies as middle-class and has lived in San Francisco for almost his entire life. Even though he shares a home with his partner and both of them work, they find it hard to afford their home.

From the time I came here until now, obviously housing prices are just ridiculous. I remember [my family's] first apartment was \$500 a month. I don't think you can get that now for less than \$4000. My partner and I rent [a converted garage] and it's \$3700 a month. I have friends with one bedrooms that are \$5000. It's like super super expensive! I'm thinking when my partner and I get a home-home we're gonna have to move down the Peninsula or to the East Bay.

Brian's observation of an eightfold rent increase is a stark example of the cost of living in San Francisco. Two emergent themes related to the rent increase that Brian

and other participants observed include new housing projects that do not incorporate affordable units and fierce competition for apartments attributed to newly arrived "tech workers". Anthony, who discussed his rent quadrupling above, mentioned the inability of low income residents to compete with wealthy new residents for apartments:

In the Mission I've seen a lot of people who are gay, who are being thrown out of places where they lived for years and they hear that their building is going to be torn down and converted into condos. And like I understand that they wanna build but like, at least make some of it for poor people! It seems like it's just going in a bad way, in terms of the rents and what they're asking for. Where I live at, most people that live there, who are coming there to look for apartments, they work in technology. So if the apartment is \$1500 a month they offer double to make sure they get it. So for finding the right place, now that I have Section 8 and I'm there [in his current neighborhood] I'm gonna stay there and deal with what happens.

According to Anthony, affluent new residents will sometimes offer to pay extra rent to ensure the landlord offers them the apartment. Older San Francisco residents who can barely afford market rate rent are unable to compete, making it even harder for them to find housing. Even though he has no internal heat or working kitchen, Anthony explained that he is going to stay in his current apartment because he could not compete with wealthy tech workers for a new place. For low-income PLWH, finding housing involves not only competition for apartments, but competition for a short-supply of housing assistance programs as well. Like Anthony, the majority of interview participants relied on subsidized housing or housing vouchers ("Section

8") to pay their high rents. Although the housing vouchers made it possible for participants to live in apartments that would otherwise be unaffordable, participants noted that qualifying for housing programs involved navigating multiple housing applications and being put on wait lists. Kenneth summed up his housing search as "wait lists, applications, wait lists, applications" and was still homeless after two years of searching. Daryl, who had been homeless off and on during his time in San Francisco, explained that he had just "filed 50 housing applications" and that with his health issues, "...the last thing I need or want to be concerned about is housing." While some participants were struggling to find subsidized housing despite putting tremendous energy into the application process, other participants managed to find housing due to their HIV status. James, an older black man and a long-term survivor, believed that his HIV status had helped him in his housing search:

At first I had trouble finding housing but once I got diagnosed positive, it helped me find a place. [My social worker] referred me to people to talk to at the AIDS Foundation and they'll really help you. Otherwise housing in the city is horrible, the rent is high, and if I hadn't gotten diagnosed with HIV I probably would be homeless. But they do need to have more housing for people with my condition, housing in the city is tight period.

James believed that his HIV status had eased his housing search process and had prevented him from becoming homeless. Thomas, who had been recently diagnosed with HIV and was relatively new to San Francisco, likewise believed that his HIV

diagnosis had helped him avoid homelessness. He had been staying at friends' houses before his diagnosis, but afterwards was referred to resources that helped him with "...getting housing, a job, a car, everything, it's crazy!" Although housing programs for PLWH clearly benefited some of the interview participants, others were seriously struggling with challenges at the intersection of housing and HIV. These challenges are described in the following section.

Housing and HIV

When I asked participants whether they believed housing searches and housing costs impacted their health, I received answers that mirrored the survey responses from HIV service providers. For example, Kenneth, who is currently homeless, discussed how homelessness had shifted his priorities away from medical care and made it harder for him to stay in touch with his care providers:

Looking for housing is another added stress. You're more concerned about looking for housing than taking your meds. Now, when I first came here, using myself as an example, I didn't stay on my meds a lot...I wasn't listening to doctors and my situation became worse...I was in emergency housing last year, and I was sick, and I got so sick that I couldn't call anybody. A nurse at UCSF tried to get in contact with me but couldn't. That's the example, there needs to be someone in the medical circle who can contact you. After that happened they made it clear that they was worried about me, couldn't get in contact with me.

There are two important themes that arise in the above quote. The first is that the stress of being homeless posed a challenge to adherence. Kenneth's priorities

were on day-to-day survival rather than medical care. The second is that while homeless, it was hard for Kenneth to stay in touch with his health care providers. Daryl also discussed the impact of homelessness on his ability to stay engaged in medical care but added that aging with HIV posed an additional challenge:

The homelessness [in San Francisco] is only growing, and us HIV-positive folks, long term survivors, we're all baby boomers and we're all aging and the mental thing is changing. Like when I was homeless, keeping my appointments, I mean it's nerve wracking just having an apartment and eating every day. Like when I was homeless the worst part was regardless of how much sleep I got I never felt rested. [Emphatically.] I never felt rested. And being older, I can understand someone with HIV just turning in the towel.

Daryl draws attention to a growing problem for PLWH in San Francisco. Individuals who survived the early years of the epidemic are now aging with HIV. Two participants in the interviews mentioned having symptoms of HIV-related dementia and feeling concerned about the challenges they would face as they got older. Health problems related to growing older, whether HIV-related or not, understandably make managing HIV as an unstably housed person even harder. Daniel, an older white man, discussed his concerns about housing for HIV-positive elders and stressed how his own experience with moving indoors improved his health:

When I was homeless I had a lot of health consequences and made a lot of bad choices. I can tell you with confidence that today people becoming homeless from eviction, whether they're using [drugs] or not, they're struggling to make health care requirements. I tell you when I

was homeless I was walking down the street thinking, if I'm not using or not I want a better quality of life. So I started practicing harm reduction, got an SRO, and just having my own room with a bathroom relieved a lot of stress for me.

Simple things like a private bathroom can improve an individual's sense of dignity and reduce stress in their daily lives. Here, Daniel explained that moving indoors relieved him from the stress of day to day survival he had faced while homeless, which made it easier for him to focus on managing his HIV.

Not every participant spoke about the struggles of managing HIV while unstably housed. While eight out of the nine participants had experienced homelessness or living in subsidized housing, Brian, the one participant who rented an unsubsidized home, had his own challenges managing his healthcare:

I don't see a situation where housing gets any cheaper, where medical costs get any cheaper. I don't want for the rest of my life to choose between housing and healthcare. But they aren't building new housing, just luxury condos and luxury apartments. So it's like do I live in a hovel to pay for medication and food? The medication that I'm on is only partially covered by my insurance. It's under 100 we have for the month after rent and food and healthcare. If my partner or I become unemployed we're screwed after a month or two, homeless if we don't get another job. We don't have a rainy day fund. And I think the majority of people in San Francisco don't have that, are just 2 or 3 paychecks away from being homeless.

Brian is in a difficult position where his income is too high to qualify him for housing or healthcare subsidies, but not high enough for him to easily afford the

costs of housing and healthcare. Because his insurance only pays 50% the costs of his HIV medication, his monthly pharmacy costs are over \$1000. Brian's situation highlights a major problem for San Francisco's middle-class individuals who are employed and stably housed but could easily become homeless from the loss of a job or other financial emergency.

Regardless of social class or housing situation, participants agreed that affordable housing was a badly needed resource for San Francisco PLWH. Three participants framed housing as an integral part of health care: as with the HIV service providers, variations on the phrase "housing is health care" were repeated by multiple interview participants. Four participants stressed that San Francisco needed to develop affordable housing and specifically needed to set aside affordable housing for PLWH, a perspective shared by public health researchers and backed-up by an increasingly large body of evidence (Aidala et al., 2007; ACT-UP Philadelphia, 2010; Chambers et al., 2007; Surratt et al., 2015; Aidala et al., 2016).

Human Migration

I followed my conversations with regarding housing security with the question of whether participants planned to stay in San Francisco or try to find cheaper housing elsewhere. Only one participant expressed a definite intention to move away from San Francisco while Brian, who was the only participant who rented unsubsidized housing, was weighing the pros and cons of leaving the city. As a follow-up question,

I asked participants if they knew people with HIV who were leaving San Francisco and if they believed specific communities (HIV-positive or not) were leaving the city. In this section, I explore three major themes that arose from their answers. The first is of migration of participants within San Francisco: although most participants had moved within the city multiple times, several expressed that rising rents made them feel trapped in their current homes with nowhere to go if they faced eviction. The second theme I explore is the migration of PLWH outside of San Francisco, focusing on whether participants believed this was a common event and where individuals seemed to be moving to. Finally, I discuss the displacement of entire communities from San Francisco.

As mentioned above, most interview participants were not planning to leave San Francisco. However, four participants discussed what they would do if they lost their current homes and worried that they would be unable to find another affordable place to live in San Francisco or surrounding areas. Anthony, who lived in a subsidized apartment that was \$1500 a month, explained that in his neighborhood, "A studio goes for \$3000. And so I think, I better not move because that's it, if I move I might not ever be able to find a place." Daryl, Kenneth, and Brian all mentioned that if they lost their homes in San Francisco, even moving to an adjacent county (e.g. Alameda, San Mateo) seemed impossible due to rising rents. Being "stranded" on "rent-controlled islands" is a concept that critical urban geographer DeVerteuil (2011) discussed with respect to the entrapment of social service agencies

in gentrifying neighborhoods. In my analysis chapter, I revisit the relevance of this concept to geographies of marginalized populations.

Although some participants felt trapped in their current apartments, the displacement of PLWH from San Francisco was a recurring theme in the interviews. Daryl, who had been living with HIV for several years, focused on the high turnover in his HIV-positive support group due to people moving from San Francisco: "Yeah people I know personally, people in my [HIV-positive support group], quite a few people come through the group have to go home or leave the city because they can't get or keep an apartment." Long-term survivor Charles noted that, "A lot of my HIV-positive friends have left the city because they couldn't afford to live here." The contributions of long-term HIV survivors were especially valuable in understanding potential trends in the movement of HIV-positive populations. Charles noted that many PLWH had left the city, and the other long-term survivors, Anthony, James, and Daniel, provided narratives that enrich and complicate this story of movement. Speaking of long-term HIV survivors, Anthony stressed, "We are still here. We just keep a low profile because of stigma."

James explained that some PLWH were staying and some were leaving:

People in the HIV-positive community are just leaving or grouping together cause you can't make it by yourself. San Francisco is the best city in the world for people like us, with the care, with neighborhoods like the Castro and Polk, but shit is getting so high that motherfuckers have to leave!

James elaborated that he knew of PLWH who were sharing the cost of rent or helping each other find resources, emphasizing that without strong support networks, many PLWH were unable to stay in San Francisco. Daniel's take on the migration of HIV-positive communities revealed two complex, parallel narratives regarding PLWH who stay in San Francisco and those who move elsewhere:

Friends of mine are not only living in fear of eviction but it's happened to them. I have a few friends over the years who have become homeless after being evicted but they stay in the city because they have nowhere to go. And just because I have family doesn't mean I can run to them. Several people I have known have relapsed, so of course that affects you know, housing is health care. If you're homeless, HIV-positive or not, it's going to affect your health. Like showing up for appointments if you can even make appointments. One of my friends that's my age or around my age, he moved out of the city. He had to move but he lost his sense of community, his friends, the culture he loved. He's had to get used to a new way of life. He has more money, doesn't have to pay his whole check for rent, but the sense of community he had is not so much there. So it's just him and his cats. So I've had a lot of friends like that. Not all of them I know where they go or where they end up. I had a friend, him and his partner had HIV and they moved back to Tennessee. So I'm sure people who leave the city face stigma and the resources are more limited.

Daniel's story about his friends who have moved from San Francisco illustrates the importance of place in HIV treatment outcomes. Although Daniel reports that his friends who have moved away from San Francisco had more money and were able to pay their rent, those people are not necessarily healthier. By leaving San Francisco, Daniel's friends lost access to their communities and the HIV service

organizations they had relied on.

Two important stories emerge from the responses of long-term survivors like Daniel. One is the story of PLWH who remain in San Francisco and find ways to survive and support each other, despite battling unstable housing and homelessness. These individuals strive to stay close to the communities and health care that sustain them. The second story tells of those PLWH who leave San Francisco, potentially moving to areas that lack support networks, community, and adequate resources and where there is more stigma towards PLWH.

The supportive communities that participants mentioned, such as queer communities and communities of color, are also facing displacement from San Francisco. Four participants discussed the loss of low-income communities, one participant mentioned the displacement of immigrants and Latinos, and one participant discussed San Francisco's loss of its Black community. Daniel spoke of the loss of these communities as San Francisco losing "the heart of the city", and believed that the city did not provide for its residents the way it once did:

This city is known for change, it's a transient city and always has been, but there's a difference between this change and past changes. There's always been a heart of this city, people coming here on a Greyhound bus like I did with some change in their pocket. If you're sincere and need help the city lifts you up or it did. People are drawn to the city because of the openness and diversity of the city, the acceptance they get whether we're gay or lesbian or transgender. But it's changed with the phenomenon we're going through now. So I'll give you an example of the heart of the city and what it's being replaced with. Like homelessness,

a young tech worker tweeting last year complaining about the riff raff he has to walk past to get to work. Back in the 90s we had the Dotcom boom and Dotcom crash, the city was lit up with everyone getting rich, and then all of the sudden it crashed. I've been wishing for the bubble to pop on this stuff. I think eventually it might but it doesn't seem like it'll stop soon. And it all comes down to greed, [Mayor] Ed Lee and [Senator] Scott Wiener. Scott Wiener is working for the young tech worker who doesn't want to see people like me on the way to work.

According to Daniel, the people in power in San Francisco including the technology industry and the local and state governments do not see low income people as part of their vision for San Francisco. Daniel observed a shift in San Francisco from a supportive and accepting city that lifted up its "heart" - individuals who came to the city seeking an accepting and creative environment to a more cold, self-serving city of individuals. Long-term resident Charles had observed a similar trend and discussed San Francisco's loss of its family-like atmosphere:

I think a lot of folks are leaving San Francisco, especially African Americans. When I first came here we were 17% of the population and now we're like 3%. [Mayor] Ed Lee needs to go. He's got all these messes going on. He's in it for the rich people, the Dotcom people. It's hurting San Francisco. San Francisco, it'll lose its authenticity. Make it hard for people to live here. San Francisco used to be a beautiful city to live in, but the beauty of San Francisco has gone. The family structure of San Francisco has gone. Also the communities are no longer here. You know you have the Bayview. It used to be only African American, now it's not. Even the Castro now, it used to be for gay people, now it's families and kids and stuff like that. [Tech workers] think they're better than us, they look down on gay people and even African Americans, and they're not friendly. They pushing all the poor people out of San Francisco, out of their neighborhoods, out of their homes.

Like Daniel, Charles noted that San Francisco was suffering from the loss of communities that helped provide the defining characteristics of the city and believed that the technology industry and the local government were largely to blame for the changes. Importantly, Charles identified the Bayview as a neighborhood where displacement of the Black community is currently happening, a trend identified by three interview participants.

Another recurring theme of displacement described homeless people being removed from downtown San Francisco by the police. Kenneth, who had lived in downtown San Francisco while homeless, observed an increase in police presence that led him to move to a different neighborhood. He suggested that an influx of new residents in the downtown area was to blame for the heightened police presence:

Law enforcement in San Francisco, considering where I'm coming from [in my hometown], law enforcement is pretty straight out here. It's like how come ya'll wasn't out like this before? When I first moved out here ya'll motherfuckers wasn't out in the Tenderloin before. They don't even be like that in the Bayview/Hunter's Point. But Downtown, mainly in areas around St. Anthony's. On Market Street that strip between 7th and 8th. I see them on Eddy, like near where they have the arts exhibit. I think there's more cops because there's more people [moving in].

Here, Kenneth notes that the police were harassing homeless and poor residents in the downtown area and that their arrival to these neighborhoods was recent. His frustration at the new police presence underscores trends in San Francisco neighborhoods where poor people are physically removed by the police to make areas friendlier towards affluent new arrivals.

Anthony, a long-term survivor, identified the tech industry and the local government as driving factors in the displacement of poor and homeless residents from gentrifying neighborhoods. Anthony also focused on San Francisco's loss of immigrant communities in the Mission District:

Everyone in the Mission is going to leave like during the Dotcom era. Back then it was the Mexicans leaving and now it's the immigrants, and they just want to be left alone and live their lives, and it's like, "We gotta make some noise and make you dissident". Because gentrification is a nice word to use for a bad thing they're doing, that hurts poor people the most. And now they're just building apartments everywhere, over every inch of the city. It's all about building and making money. And there's this movement to sweep the homeless from downtown and make downtown for the rich. And it's like, here is a city that has all kinds of races and it's going to become a city where you can only come if you have money.

Here, Anthony emphasizes the importance of resisting gentrification and the displacement of oppressed communities. Anthony's focus on the need to make residents "dissident" is part of a larger theme that emerged from my conversations with long-term HIV survivors regarding changes to San Francisco's social environment. Themes of activism and complacency came up repeatedly in conversations with older San Francisco residents and receive more detailed consideration below.

Changes in San Francisco's Social Environment

When I asked interview participants to discuss how they believed San Francisco was changing as a whole, I expected to get answers relating to housing costs and the

displacement of low-income populations. These responses were certainly common and I addressed them in the above sections on housing and human migration. However, while discussing changes in San Francisco, several participants also brought up changes in the attitudes of San Francisco residents, focusing on themes of complacency around HIV activism and increased social stigma towards homelessness. Anthony and Daniel, both long-term HIV survivors and long-term San Francisco residents, were especially concerned about the need for community activism around gentrification and HIV. Both participants believed that HIV activism, especially from within the queer community, was not as prevalent or influential in San Francisco as it had been during the 1980s and 1990s.

Anthony had experienced numerous instances of anti-HIV stigma and housing discrimination. Much of his social analysis of San Francisco concerned changing attitudes and beliefs towards HIV. Anthony believed that the changing shape of the HIV epidemic in San Francisco was contributing to increased social stigma and stereotypes about PLWH. He explained that since HIV-positive people are leading healthy lives, many people may not realize that HIV still exists and that people they know are HIV-positive:

Now that people are surviving people don't realize what HIV looks like, don't think about it. Especially all the new gay people that are coming in. They don't know they know people with the virus. And sometimes being a person of color [with HIV] it's a lot harder, you have to double up, present yourself in a better way so they don't just see a player from the ghetto. Yeah, I think that people don't care as much as they used

to. Back in the 1990s when all the girls were coming out and getting organized, and you used to see people in the Castro talking about HIV, passing out condoms, and now they all act like HIV is gone. But it's still here, we're still here.

Daniel also believed that improved HIV prognoses contributed to changing attitudes towards HIV. While Anthony discussed stigma, Daniel focused on complacency among HIV negative people, especially within the queer community. He believed that queer communities, having lost their sense of a shared struggle against a life-threatening disease, were becoming socially complacent:

Back in the days before Stonewall, we had a purpose, we were literally fighting for our survival, from Stonewall through the sexual revolution and the AIDS crisis. I'm concerned about young gay people becoming complacent, and the lack of purpose that I think so many feel. It's not just young people, I think older gay guys are getting complacent, too. Complacent and with a false sense of security and reality now that HIV isn't a death sentence. I would just like to see a fire lit in the youth, I'd like to see them find something to fight for.

6.2.3 The Interview Process as Data

While most of the data that emerged from my interviews came from the participant responses, there were challenges that emerged from the recruitment and interviewing process that are important pieces of data in and of themselves. In this section, I consider information generated by the research process and reflect upon how my own identities and positionalities impacted the interviews.

One of the most striking things that arose from the recruitment process for this study was how many phone calls I received given the small amount of effort I put into recruitment. After posting five fliers at three locations and posting a single Craigslist Ad twice, I received about 20 phone calls and five e-mails. It is important to note here is that most of these phone calls and two of the e-mails did not result in interviews. I received numerous phone calls from a specific public phone line at one of the HIV service organizations where I recruited. Several of the calls from this phone line were from individuals who lacked access to cell phones and e-mail. In cases where there was a voice mail, participants did not have a phone number to leave and I had no way to contact them. In cases where I spoke to individuals who lacked personal phones and scheduled an interview I had no way of reaching these individuals again to send an appointment reminder. I consider this an example of how homeless and unstably housed individuals often fall out of medical care lacking a way to communicate with one's health provider and get appointment reminders can lead to clients being lost to follow up.

A second important piece of information that arose from the recruitment process was the urgency of the voice mails and e-mails I received from some participants, some of whom very much wanted an immediate interview appointment. Only one participant had full-time employment and about half of the participants reported regularly participating in HIV studies to make money. For one participant, who struggled with mental illness in addition to HIV, medical studies were his only

source of income aside from state benefits. Although \$25 may seem like a modest amount of money in San Francisco, this cash incentive was clearly important to some study participants. This serves to highlight the economically unstable position of most of the people who participated in my research. It also leads me to question whether other HIV studies in San Francisco are mainly drawing from socioeconomically vulnerable demographics.

Important information also emerged from the interview process itself. In conducting the semi-structured interviews, I observed racial and age dynamics that I believe played an important role in my data collection. My youth, queer identity, and background as an HIV activist likely impacted my interactions with certain research participants. Anthony and Daniel, the two long-term survivors who were especially passionate about social activism, were very excited about my project and seemed to enjoy participating. They both expressed that they were happy to see young people taking an interest in HIV and we were able to relate to each other over shared experiences as HIV activists. The rapport I established with these two participants likely affected the types of information they were comfortable sharing with me.

In contrast, my whiteness and my positionality as a researcher may have impacted my ability to build rapport with some of my interview participants. James, an older Black man, was skeptical of whether my project was going to benefit anyone (a skepticism I certainly share) and questioned if this work was only going to benefit

me. Although I welcomed James' criticism, he only provided very brief answers to my interview. I also struggled in my interview with Thomas, a young Black man who had been recently diagnosed with HIV. Thomas expressed that he had never met anyone else who was HIV-positive and did not want to. His reluctance to speak to me may have related to his own struggles with HIV stigma, but my whiteness may certainly have played a role in this as well. In Chapter 8, where I discuss frameworks for future research and the lessons I learned from this preliminary research, I revisit these dynamics and suggest how I would proceed from here.

6.3 Conclusion

The narratives that emerged from my survey and interview data told provider and patient perspectives on the same story. That story involves changing land-use patterns, human migration, and two parallel narratives of the PLWH who stay in San Francisco and the ones who leave.

The theme of land-use changes was present in provider and patient discussions of affordable housing. That San Francisco is no longer an affordable place to live was a sentiment echoed by everyone who participated in the surveys and interviews. Long-term San Francisco residents emphasized that housing costs rose during the Dotcom Boom of the 1990s and the current growth of the technology industry, noting that their first San Francisco homes cost a fraction of what they currently paid. Both survey and interview participants discussed San Francisco's lack of affordable

housing, with interview participants focusing on new luxury housing developments that seem intended for wealthy new residents. Although subsidized housing exists, it appears to be very scarce, with long waiting lists and strict eligibility criteria.

The theme of human migration as it emerged from this data paints a complex picture of communities moving into and out of San Francisco. Interview participants were especially focused on the displacement of vulnerable communities from San Francisco. Participants discussed the loss of queer communities, communities of color, and low-income communities. According to participants, these communities are being replaced by wealthy individuals emphasis on individuals. Participants who discussed the changing character of San Francisco described a city that was shifting from a family-like environment where people knew and cared for each other to an environment that is increasingly driven by complacency, greed, and self-interest.

Service providers and patients alike discussed the movement of PLWH within and outside of San Francisco. Where unstably housed PLWH move was framed as a question of choosing between housing and health care. Providers and participants repeatedly described cases of PLWH struggling to remain in San Francisco despite facing homelessness because of the city's excellent HIV resources. Providers and participants also repeatedly discussed PLWH leaving San Francisco due to the cost of living and struggling to find community and healthcare in their new homes. Populations of low-income PLWH who remain in or leave San Francisco both seem to face significant health consequences, making a strong case for further investigation.

There was one noteworthy point of contradiction between the surveys and interviews. While service providers discussed unstably housed PLWH falling out of medical care, the unstably housed PLWH who I interviewed were engaged in care and feeling good about their health, although some reported past experiences with falling out of care. One reason for this may be that the people who participated in my interviews were by necessity people who had access to a phone or computer and could respond to my recruitment materials, schedule an interview appointment, and show up on time for the appointment. There was an important population missing from my interviews the numerous individuals who tried to get in touch with me, but who had inconsistent access to phones. For every participant who completed an interview, I had at least two participants who either no-showed or left voice mails from phone lines that were public or later disconnected. I suspect my requirement that participants contact me and come to an appointment biased my sample and excluded individuals whose lives were more chaotic. Noticing this potential sample bias is important for designing future studies, and in my final conclusions in Chapter 8, I suggest ways to mitigate this bias in further research.

The qualitative data I described in this chapter becomes even more interesting when discussed in the context of my quantitative analyses. In the next chapter, I triangulate my quantitative and qualitative findings, examining my data for internal contradictions and presenting a deeper analysis and interpretation of my quantitative and qualitative results. Using this analysis, I generate several research

hypothesis that can guide further studies, which I will present frameworks for in Chapter 8.

Chapter 7

Triangulation of Analyses

7.1 Introduction

In this chapter, I triangulate the results of my spatial data analyses from Chapter 5 and the survey data and interview analyses from Chapter 6, comparing the information obtained from these three analyses. I begin by revisiting the high-risk areas I identified in Chapter 5 and examine how interview participants described those areas, considering how the landscapes of gentrification, eviction, and HIV overlap. Next, I examine the potential role of gentrification in homelessness among PLWH who remain in San Francisco, and how homelessness and HIV treatment adherence relate to each other. Finally, I explore the movement of PLWH outside of San Francisco, using information from the spatial analysis, surveys, and interviews to formulate hypotheses about the migration of San Francisco PLWH. The information and ideas I present in this chapter form the basis for the research frameworks and

hypotheses I propose in Chapter 8.

7.2 Gentrification and displacement: neighborhoods of concern

In Chapter 5, I discussed how the gentrification typology identified gentrifying census tracts in the southern, western, and eastern "edges" of San Francisco (Figure 5.1). I also discussed how fault evictions (where the tenant was blamed for the eviction) were associated with census tracts in the earlier stages of gentrification (Table 5.5). My analysis did not establish a temporal relationship that might suggest a cause-and-effect relationship. I can only say that the number of fault evictions per housing units was higher in census tracts identified as undergoing early stage gentrification. Additional tracts classified as earlier in gentrification that did not show eviction clusters in Figure 5.3 included in the Bayview/Hunter's Point, Excelsior, Sunset, and Richmond neighborhoods. These census tracts suggest the association between evictions and earlier stages of gentrification may not always occur.

As I explained towards the end of Chapter 5, census tracts with large numbers of evictions and large numbers of HIV cases were located in the Castro, Western Addition, Mission District, Tenderloin, Nob Hill, and South of Market neighborhoods. Eviction rates were highest in the Tenderloin and South of Market neighborhoods. The Tenderloin, Nob Hill, and Downtown had high numbers of evictions, were in the

early stages of gentrification, had high HIV prevalence, and had the lowest rates of viral suppression. The Bayview/Hunter's Point, Sunset, and Excelsior neighborhoods had poor rates of viral suppression and were in the early stages of gentrification, but had average eviction rates.

My interviews with PLWH supplement this spatial analysis of gentrification, evictions, and HIV data with anecdotal evidence. Three participants mentioned that the Bayview is beginning to gentrify, with single resident occupancy (SRO) hotels being demolished and new high-rise apartment buildings under construction. Participants also noted that the Bayview is becoming whiter and that Black residents are leaving the Bayview. This information is interesting with respect to the spatial analysis because tracts in the Bayview were mostly in the susceptible to early stages of gentrification but had not yet had high numbers of evictions in the 2011-2015 period I analyzed. The observations of interview participants suggest that the Bayview might now be undergoing displacement of low-income communities.

The other areas that participants mentioned when discussing signs of gentrification include the Downtown, Tenderloin, and Mission District neighborhoods. Participants observed new boutique businesses, new luxury housing developments, and more white residents in these areas. Expensive new stores and luxury housing developments do not directly relate to the variables I measured in my spatial analysis but do suggest that these neighborhoods are catering to affluent new residents.

Interestingly, two participants observed signs of gentrification in neighborhoods

that the spatial analysis classed as "not gentrifying". Charles, who lived in Diamond Heights mentioned seeing "the writing on the wall" in his neighborhood, where his apartment in subsidized housing was slated for demolition to make way for a luxury condo. Diamond Heights, visible in the middle of San Francisco in Figure 5.1, is classified as "not gentrifying" but, Anthony mentioned that his Twin Peaks apartment had undergone an almost five-fold-increase in the past two decades. He also noted an influx of "tech workers" who were offering to pay extra rent for new apartments and that some one-bedroom apartments in his neighborhood were being rented for \$3000 a month. Again, Twin Peaks was scored as "not gentrifying"; these contradictory anecdotal observations highlight the limitations of examining gentrification in strictly quantitative terms. There may be important gentrification-related changes occurring in areas that were not classed as gentrifying by the quantitative metric. Attempting to conduct a thorough mixed-methods spatial analysis of gentrification in San Francisco is not within the scope of my thesis. However, my findings illustrate the usefulness of mixed-methods in gentrification mapping, using the experiences and observations of residents to supplement socioeconomic and housing data.

7.3 The role of gentrification in homelessness

While a deeper survey of gentrification in San Francisco would have distracted from the main goals of my thesis, the information I collected from using mixed-methods

was especially useful for exploring the relationship between gentrification and homelessness. While my spatial analysis suggested an association between early stages of gentrification and fault evictions, the information shared by service providers and PLWH provided possible explanations for this association.

As I explained in Chapter 5, evictions attributed to tenant faults (e.g. late rent payments) were associated with gentrifying census tracts while "no-fault" evictions (e.g. demolition, condo conversion) were not. I had expected that evictions served in order to construct new housing developments would be associated with gentrification. However, the insights of survey and interview participants provide a possible explanation for the association between gentrification and fault evictions. One interview participant, Kenneth, discussed his observations of PLWH being evicted:

I've witnessed people getting evicted with HIV, I see them being evicted, but their eviction was not necessarily because of them, but maybe from miscommunication. You know, like this person may not have told the landlord, "I'm a little crazy and sometimes I take meds for it, you can talk to my physician".

Kenneth believed that some evictions of PLWH were due to the tenants having co-occurring mental health problems that their landlords either did not understand or were unsympathetic to. The responses of service providers agree with Kenneth's observation. One provider explained:

I have seen way too many clients evicted, despite our best efforts to keep them housed. Many clients have serious mental health and substance use issues which prevent them from complying with lease agreements.

As I explained in the previous chapter, most of the service providers who responded to my survey discussed mental health and substance use as major barriers to retention of their clients. In addition to interfering with patient care, these issues may also lead to evictions and homelessness as clients struggle to make payments on time and comply with the terms of their leases. The response of one service provider, who is an HIV housing defense attorney, suggests why these fault evictions may be more likely to occur in gentrifying neighborhoods:

Although it is illegal to evict someone in order to bring a rent-controlled apartment up to market rate, it is very hard to prove a bad motive in court, meaning that landlords get away with it. All. The. Time.

This attorney works with unstably housed PLWH who are facing eviction, often from rent controlled and/or subsidized apartments. According to this participant, it is very hard to prove that a landlord is using a fault eviction as a cover for renting apartments out at market rate. This suggests that landlords may use fault evictions to remove tenants who pay below market rate rent, thus making apartments available for affluent new residents who can afford market rates. In the previous chapter, I quoted interview participant Anthony, who explained that young tech workers were offering to pay more than market rate to ensure securing an apartment. In gentrifying neighborhoods, the possibility of offers from new residents may provide an additional incentive to evict vulnerable residents. Individuals struggling with substance use and mental illness may already struggle to pay their rent or maintain

their apartment, which may make it especially easy for landlords to find cause for fault evictions.

As of 2015, San Francisco had 586 homeless PLWH, about 5% of the city's HIV cases are homeless (San Francisco Department of Public Health, 2016). In contrast, the citywide homeless rate is about 0.8% (City of San Francisco, 2016). The data from the surveys and interviews suggest that many PLWH who are evicted end up homeless. A common theme that arose in my interviews was that of individuals feeling trapped in their current homes, with no affordable place to go if something happened to their housing. These participants feared becoming homeless if they did lose their housing, which is most likely a realistic possibility: in the analysis of survey data, several service providers mentioned that it was common for their clients to become homeless due to evictions.

Although low-income PLWH are often eligible for free or low-cost health care, Brian, the sole middle-class interview participant, spoke to the challenge of balancing housing costs with health insurance payments. He explained that although he was employed full-time, the combined costs of his medication co-pays, insurance premiums, and rent left him unable to save money. He considered how easily he could become homeless if he suffered a medical emergency or lost his job and stressed that regardless of HIV status, "The majority of people in San Francisco are just 2 or 3 paychecks away from being homeless". Although Brian did not believe his tenuous housing situation was unique to PLWH, his 50% monthly medication co-pay

was almost \$2000, adding a significant expense to his already high cost of living. Brian's case illustrates that even middle-class PLWH may be struggling to stay in San Francisco.

7.4 The role of housing in HIV retention

The qualitative survey data makes a strong case for the role of stable housing in helping PLWH manage their HIV. One provider explained:

Lack of affordable housing directly impacts HIV retention and HIV transmission. People who are not retained in care are the primary link to transmission. PLWHA need housing in order to stay adherent to medication, but there are alternatives (it's just that the system is not made to handle such a heavy lift-provide care on the streets) to that theory. Rising rents in the Bay Area affect vulnerable communities and those communities happen to be priority populations for HIV retention and prevention.

There are three important pieces of information to take away from this service providers input. First, individuals who are not retained in HIV care (and who therefore have higher viral loads) are the individuals most likely to transmit HIV to others. Second, housing is an essential component of retention in HIV care. Finally, the individuals who are most vulnerable to losing their housing to gentrification in San Francisco are often the same people who tend to be vulnerable to HIV infection (e.g. people who inject drugs). This is not merely the opinion of an individual: this service providers assessment is informed by their own experiences working with

homeless PLWH and their analysis is confirmed by the SF DPH (2016) data on disproportionate rates of homelessness among PLWH and higher viral loads among the homeless. As stated in the previous section, HIV-positive San Franciscans are more likely than other residents to be homeless, with a homelessness rate six times higher than the citywide rate (City of San Francisco 2016, San Francisco Department of Public Health 2016). Based on the data on viral suppression rates from the SF DPH (2016), homeless PLWH are 2.7 times likelier than housed PLWH to have a detectable viral load (where detectable means greater than 200 viral copies per mL of blood).

These figures, supplemented by the qualitative data, make a strong case for housing as an integral component of HIV treatment. Without any health benefits, one could make a strong ethical argument that housing is a human right and a necessity for living with dignity. For the sake of policy argument, it is also useful to understand why providing housing to PLWH would be an efficient strategy for reducing community viral load.

If there is a direct causal relationship between housing status and viral suppression, we can estimate the efficacy of a housing-based intervention using the concept of number needed to treat (NNT). Using data on viral suppression among homeless and housed San Francisco PLWH to calculate the NNT yields 2.33 (for the formula for NNT, see Appendix A). The number needed to treat is a prediction of the number of people with a given condition who need to receive a given health intervention

before one person benefits. In other words, for every two to three homeless HIV patients with a detectable viral load who received housing, we could expect one of them to become adherent enough to reach viral suppression. To give some perspective, 2.33 is a very small NNT when compared to HIV prevention interventions like pre-exposure prophylaxis (PrEP), which have a NNT of around 67 (Chen and Dowdy, 2014). When the condition being prevented is relatively rare, a health intervention must be provided to a larger population before someone benefits. The NNT for housing PLWH is low because most homeless PLWH in San Francisco 68% - have viral loads greater than 200 copies per mL (San Francisco Department of Public Health 2016). Although this number may seem surprising, a study of a harm-reduction based housing intervention for homeless PLWH in Pennsylvania found that 69% of participants were able to achieve viral suppression compared to 13-32% in non-housed populations (Hawk and Davis, 2012). In terms of viral suppression, most homeless PLWH would greatly benefit from housing.

It is important to note here, however, that the figure of $NNT = 2.33$ assumes a direct causal relationship between housing and HIV treatment adherence. The relationship is likely more complex. Both service providers and PLWH discussed the complex interplay between homelessness, substance use, mental illness, and HIV treatment adherence. There may be confounding and/or effect modification (interaction) between these variables and the actual NNT may be different. I did not have access to the data needed to assess confounding and effect modification

but these variables should be taken into account in assessments of housing and HIV treatment outcome. For the purposes of influencing housing and health policy, there is likely a strong argument to be made in terms of the effectiveness of housing as an HIV intervention.

7.5 Gentrification and movement of people living with HIV

Homelessness among San Francisco PLWH is clearly an important issue that needs to be addressed. A second important issue but with more unknowns is the migration of PLWH outside of San Francisco. As I explained in Chapter 5, I used data from five years of SF DPH HIV Epidemiology Annual Reports to determine how many PLWH had left San Francisco (San Francisco Department of Public Health 2012-2016). The total proportion of living San Francisco cases that is, people who were San Francisco residents at the time of diagnosis who had left the city was 32%. Because of limited data on patient out-migration, I was only able to examine the yearly out-migration totals for the years 2012-2015. I determined that between the years 2012 and 2015, roughly 20% of all living San Francisco HIV cases (3,130 people) left San Francisco. In other words, of the one-third of cases who left the city, most of them left quite recently.

The most recent data available on the care status of out-migrated HIV cases that is, people who lived in San Francisco when they were diagnosed with HIV and then later left the city is for 2014 (San Francisco Department of Public Health

2015). As of the end of 2014, about 46% of out-migrated HIV cases were not known to be receiving medical care. Losing contact with a provider indicates that a patient has not transferred prescriptions or medical records and has not responded to a provider's attempt to check in. In the HIV field, where patients are closely monitored, losing contact with a care provider strongly suggests that a patient is not in care (San Francisco Department of Public Health, 2015). In comparison, only 14% of HIV cases who still reside in San Francisco are not known to be in care. To summarize, almost one third of San Francisco HIV cases have left the city and almost half of those people may not be receiving medical care. Important questions that arise from these figures are where these individuals are moving to, why they are falling out of care, and what can be done to support them.

Determining where PLWH are moving would require highly sensitive patient-level data that I cannot access. However, by examining data from my interviews and information on where displaced San Franciscans in general move, I can develop some hypotheses. From my own casual observations and conversations with colleagues, as an HIV service provider in Alameda County, there seem to be a number of PLWH moving from San Francisco to Oakland. The responses of interview participants suggest that PLWH may be moving outside of the Bay Area as well. Five interview participants discussed where they would move if they left San Francisco or where their friends with HIV had moved. Three participants had considered moving to Alameda or San Mateo County, though two participants added that these areas

were becoming less affordable. Two participants had friends with HIV who had moved to the Central Valley, one participant had friends with HIV who had moved to Southern California, and one had friends with HIV who had moved out of state.

Casual observations and responses from a small sample size are compelling, but do not provide enough information to answer the question of where PLWH displaced from San Francisco may be moving. Information derived from a larger sample of displaced San Franciscans is available from the Anti-Eviction Mapping Project (AEMP), a collective that conducts research on gentrification and evictions in the San Francisco Bay Area. Their research is not specific to PLWH but does focus on the displacement of individual and communities from San Francisco. In a recent study, the AEMP conducted extensive follow-up with 485 Eviction Defense Collaborative clients who had been evicted from their homes in San Francisco in 2012 (Anti-Eviction Mapping Project, 2016). The AEMP found that two thirds of these individuals were able to find new homes in San Francisco while the remaining third were displaced from the city. Within San Francisco, the most common neighborhoods that evicted residents relocated to were the Bayview, Excelsior, and Tenderloin. Among evicted residents who left San Francisco, roughly half relocated to San Mateo, Alameda, and Contra Costa counties. Individuals who left the San Francisco Bay Area primarily moved to areas near Sacramento or Los Angeles. Only about 7% of the people in the AEMP's study moved out of California entirely. If these patterns of movement are similar to where PLWH are moving, a large number

of displaced San Francisco PLWH may still be in the San Francisco Bay Area and the majority may still be in California. Collaboration between county and state public health departments may be necessary to follow-up with PLWH who leave San Francisco and ensure that they are still in care. This is a policy implication I discuss further in Chapter 8.

7.6 Conclusion

The triangulation of my spatial analysis, survey of HIV service providers, and interviews with PLWH strongly suggests that stable housing is important for retention in HIV care and achieving viral suppression. This supports the literature on the association between homelessness and poor viral suppression in PLWH (Holtgrave et al., 2013; Thakarar et al., 2017). Furthermore, the qualitative component of my thesis strongly supports the role of evictions in housing instability and poor HIV treatment adherence among San Francisco PLWH. This finding mirrors results from two recent studies on evictions among HIV-positive people who use drugs in Vancouver, BC., which found that evictions and housing transitions negatively impacted HIV treatment adherence (Small et al., 2016; Kennedy et al., 2017).

My investigation of evictions and HIV treatment outcomes in San Francisco identified two important trends among PLWH. The first is that San Francisco PLWH suffer disproportionate rates of homelessness, at least some of which is likely related to rising housing costs and evictions. These individuals also have poor rates of HIV

treatment adherence and need to be prioritized by health care and housing agencies in San Francisco. The second trend is that a large number of PLWH are leaving San Francisco and potentially falling out of medical care. There are numerous unknowns with respect to where these individuals move, how many of them maintain viral suppression, why some fall out of care, and whether lack of adherence leads to more HIV transmission in their new communities. I address these unknowns in my next chapter, where I propose hypotheses and frameworks for further research.

Chapter 8

Further Work and Conclusions

8.1 Introduction

As I stated in my introduction, it was my intention to conclude this thesis by proposing, rather than answering, hypotheses. In this chapter, I begin that process by reflecting on my research procedures and how I might modify them for future research. Then, I discuss questions and frameworks for further research that builds upon my thesis. Finally, I conclude by restating what I learned from my triangulation of data and proposing testable hypotheses for the research questions that emerged from this work.

8.2 Reflections on research procedures

In this section, I reflect on the methods I used in my thesis research and consider which procedures I would continue to use in further research and which procedures I

would modify. Specifically, I consider the value of the gentrification metric in future research and revisit the procedures I used for my qualitative surveys and interviews.

Despite finding some association between early stages of gentrification and fault evictions, the numerous sources of error in the gentrification metric, lack of a consistent association between gentrification stage and evictions, and small magnitude of difference in eviction densities between different gentrification stages all lead me to doubt the usefulness of the gentrification metric as a predictor of displacement. It is difficult to determine which evictions are actually a result of gentrification. The association I found is useful for the purpose of this exploratory study as it can direct further research but the gentrification metric requires further scrutiny if it is going to be used to make predictions or argue for policy changes.

My study was a small, exploratory project with a small sample size. Since my future research projects will likely involve a larger number of surveys and/or interviews, it is important to reflect on the feasibility of scaling up my qualitative methods. Although the survey of HIV service providers provided a wealth of useful information, only half of the participants answered the open-ended questions, which impacted the quality of the research data. One possibility for improving qualitative data quality in future research is to provide a monetary incentive for participants to complete the entire survey. This might increase the number of responses and encourage respondents to answer the open-ended questions. Alternatively, interviewing service providers would provide opportunities for follow-up questions and

might elicit more in-depth answers than the survey did. Providing incentives and/or conducting interviews would require more resources than I had access to for this thesis but would be feasible for funded research.

The recruitment and interviewing process I used would likely be feasible for a study with a larger sample size. Although my sample size was small and I only collected interview data for three weeks with minimal recruitment, I was surprised at the diversity of participants in terms of socioeconomic background and neighborhood of residence. Given more time and funding, I think it would be feasible to sample a much larger cross-section of San Francisco's HIV-positive population. However, there are some possible sources of sampling bias that would need to be resolved before conducting a larger study. As I noted in Chapter 6, I received numerous phone calls from participants who were using public phones. For interviewing marginally housed and homeless PLWH, scheduling, remembering, and arriving at interview appointments may be too high a barrier. One way to lower this barrier is to partner with HIV/AIDS service organizations to conduct interviews in-house rather than scheduling locations for a different location and time. This might work especially well for reaching participants waiting to attend a medical appointment or support group. In general, flexibility in the scheduling and location of interviews and a variety of passive and active recruitment strategies would make the study accessible to a larger segment of the HIV-positive population.

Several techniques I used in the interviews helped facilitate the research pro-

cess, including anonymity and participant-directed interviewing. Participants expressed appreciation for my not recording the interviews and for allowing them to remain anonymous. Although participants signed consent forms, I immediately placed these forms in a folder. The only time I examined these forms was to ensure the pseudonyms I used for participants did not include any participants' actual names. I also respected participants' privacy by only transcribing interview data that was directly related to my research question. Interactions including small-talk, resource referrals, and side conversations about sensitive personal information were not transcribed as research data.

In addition to respecting participant privacy, I allowed participants to direct the interview process and focus on what they thought was most important. For the purpose of an exploratory study, this interview method elicited a broad range of rich information that did not totally depend on my asking the correct interview questions. For future studies that aim to test rather than generate hypotheses, I would continue using a semi-structured interview format. As future studies would have a more specific research goal, I anticipate having some structured questions aimed at answering the research question rather than broadly exploring an issue. However, I would want to include some participant-directed conversation in the interviews to ensure participants could provide the information that they think is important for answering my research questions.

A final consideration for future interviews is the role race played in researcher-

participant dynamics. Although I was intentional in conducting myself with humility, self-awareness, and respect, I did not succeed in building rapport with every interview participant. As I stated in Chapter 6, my position as a white academic likely influenced my conversations with participants and may have been a barrier to rapport. For future studies, I believe it would be valuable to conduct this research as part of a team with multiple interviewers from different backgrounds.

8.3 Ideas for further research

I plan to use what I learned from this exploratory research to further investigate the potential impact of evictions and displacement on HIV treatment outcomes. Numerous questions and ideas arose from this research process and investigating all of them is beyond my capacity as an individual researcher. In laying out questions and frameworks for further research, my intention is not only to inspire myself but to invite others to consider the role of evictions in HIV epidemiology.

8.3.1 Retention in care among out-migrated PLWH

A major unknown that arose from my data concerns those PLWH who leave San Francisco. From my examination of HIV epidemiology reports, it was clear that a large number of PLWH are leaving San Francisco and that as many as half of these individuals may be falling out of medical care (San Francisco Department of Public

Health, 2016). Service providers and PLWH both speculated as to where PLWH are moving to and why they may fall out of care, but no participant provided detailed anecdotes. Although the San Francisco DPH has data on out-migration numbers and retention in care, there are several important unknowns, including how many PLWH leave due to evictions and/or the rising cost of living in San Francisco, why individuals fall out of care, and whether patterns of retention in care exhibit spatial associations.

As a framework for further research, I propose following up with San Francisco PLWH who have left the city, asking why they left San Francisco, where they went, whether they were retained in care, and any barriers to care they encountered. Conducting this type of patient follow-up would require address-level patient data monitored by the SF DPH. Former addresses of PLWH who have left San Francisco could be matched with address-level data on San Francisco evictions from the San Francisco Rent Board. Data from the SF DPH's Medical Monitoring Project, which is part of the CDC's nationwide Medical Monitoring Project (Centers for Disease Control and Prevention, 2015b) could answer the questions of where PLWH are moving and the locations of individuals who fall out of care. Here, the primary barrier to research is access to patient-level data, which is highly sensitive and thus only available to certain individuals. Because of these restrictions, an ideal scenario may be a collaboration between researchers and public health departments to conduct an investigation of retention among evicted San Francisco PLWH.

As with my thesis research, mixed methods would be useful for understanding patient experiences that would be lost in a solely quantitative and spatial analysis. Analysis of Medical Monitoring Project and eviction data could be supplemented with qualitative field research with PLWH in the counties surrounding San Francisco, including Alameda and San Mateo counties. If a large number of PLWH are moving to these areas, it may be possible to find them through extensive passive recruitment. To allow for the possibility of individuals who have moved but are not in care at HIV service organizations, recruitment would need to be broad, perhaps including housing assistance and harm reduction programs.

8.3.2 Assessing feasibility of housing-based HIV interventions

Assessing retention in care for PLWH who leave San Francisco requires extensive background research into where individuals have gone and why they have fallen out of care. My thesis strongly suggests that housing insecurity is a barrier to retention in HIV care for PLWH who remain in San Francisco. With respect to housing and HIV retention, there are immediate research needs that may have implications for public health policy.

The service providers and PLWH who participated in my thesis emphasized the importance of affordable housing for PLWH. Advocacy for HIV-specific housing would benefit from a strong evidence base. A cost-effectiveness analysis of housing as an HIV-prevention intervention in San Francisco could be useful for advocacy.

There is already evidence that providing housing to homeless PLWH is a relatively inexpensive way to reduce community viral load and thus improve patient outcomes while reducing new infections (Holtgrave et al., 2013). Holtgrave et al. conducted analyses for Baltimore, MD, Chicago, IL, and Los Angeles, CA. Similar work should be done in San Francisco, where providing housing may be more expensive. If housing homeless PLWH is proven to be cost-effective despite San Francisco's high cost of living, a strong argument can be made for funding housing-based interventions.

8.3.3 HIV-risk behaviors among displaced populations

Finally, more research should be directed towards evictions and migration among HIV-prevention priority populations including men-who-have-sex-with-men (MSM) of color and people who inject drugs. In my research, both service providers and PLWH discussed the relationship between unstable housing and injection drug use and the complex interrelationships between housing, health, drug use, and systemic oppression (such as police harassment of homeless people) repeatedly appeared in my research data. Notably, unstably housed MSM of color made up the majority of the interview sample and frequently spoke about the displacement of communities of color and their struggles with substance use and loss of community. Service providers discussed how unstable housing often interrupted HIV treatment while leading to more substance use. A question that emerges from this is how evictions impact HIV risk behaviors such as drug use. If evictions negatively impact retention

in HIV care, evicted PLWH may be more likely to have high viral loads. If evictions also increase risk behaviors such as injection drug use, these individuals may be at greater risk for transmitting HIV to others. In this way, eviction in San Francisco may be a driving force of the HIV epidemic in the San Francisco Bay Area.

A compelling idea related to this interplay between eviction, substance use, and HIV risk is the concept of HIV "refugia" (Wallace, 2003). Wallace and Robert postulated that land-use changes and evictions in urban areas could lead to microepidemics due to displaced PLWH falling out of care or engaging in more risk behaviors such as injection drug use. The intersection between evictions and the landscape of HIV risk is something that researchers are just beginning to explore (Kennedy et al., 2017). As more researchers become interested in this issue, it is important for to avoid the over-simplification of HIV epidemiology that geographers like Brown (1995) have warned against. A strong understanding of social determinants is as essential to understanding HIV epidemiology as an understanding of incidence and prevalence.

8.4 Conclusion

Key to the gentrification mentality is the replacement of complex realities with simplistic ones...AIDS, which emerged as gentrification was underway, is an arena where simple answers to complex questions have ruled...Easy to blame AIDS on the infected, and much more difficult to take in all of the social, economic, epidemiological, sexual, emotional,

and political questions.

Schulman (2012), *The Gentrification of the Mind*

When public health researchers think of HIV at the level of pathogens and individual bodies, they disregard the complex nature of the HIV determinants, which are closely intertwined with social, political, and economic factors. Moving forward, research and advocacy regarding solutions to gentrification-related displacement will need to be highly collaborative and cross-disciplinary. The individuals who work in the HIV service and research fields already form a close-knit network of service providers, academics, medical professionals, activists, and patients. As someone who is part of this network, I often reflect on how it feels like everyone knows each other, how we've shared friendships and experiences for years and sometimes decades. Something that needs to be shared more, however, is critical analysis and an understanding of social determinants: things that activists and service providers may grasp much more deeply than academic researchers. As someone who moves throughout activist, service provider, and academic spheres, this thesis is an attempt to share a critical analysis across disciplines. Understanding the complex biomedical and social etiology of HIV necessitates cross-pollination between medical and social sciences. It is not enough to look at who is at risk for HIV, who is or is not taking medication, or where incidence rates are high. We also must consider changes in the urban environment and the structural oppression and political economic processes that drive them.

In conducting cross-disciplinary HIV research, the relationships between HIV service providers, researchers, and activists will prove useful. Close collaboration between health departments, academic institutions, and community-based organizations will be advantageous for addressing challenging questions, such as the fate of displaced PLWH. Following up with patients who move outside of San Francisco will require data sharing between county-level public health departments, and further research into the movement of PLWH may require partnerships between public health departments and researchers. Meanwhile, housing advocacy research conducted by volunteer activist collectives like ACT-UP and the Anti-Eviction Mapping Project may hold promise for future collaborations between academic and activist communities.

San Francisco has long served as a safe haven for marginalized groups, including people living with HIV. Even as it becomes more expensive and hostile to the communities it once sheltered, the city retains an amazing wealth of social service and medical resources. As the future of federally funded health insurance programs comes into question under the new Trump administration, the movement of PLWH away from San Francisco-based safety nets may become even more problematic for retention in care. This grim reality was not lost on interview participants, many of who feared losing their health care in the coming years. The current political climate in the United States set a tone of urgency to my research and to the words of participants.

Housing is an essential component of retention in HIV care. Gentrification in San Francisco jeopardizes the housing status of many PLWH. If San Francisco wants to meet its goal of "getting to zero" new HIV infections, it will need to address poor retention in care among its homeless HIV-positive population (Newman, 2016c). Providing housing to homeless PLWH shows promise as an effective way to improve treatment outcomes. However, HIV researchers need to move beyond evaluating health interventions at the scale of individual patients. While there is an immediate need for affordable housing for PLWH, providing housing to some patients will not address the root causes of homelessness or evictions. HIV research often focuses on specific HIV risk behaviors and health interventions at the level of the individual (Brown, 1995, 2006). However, the PLWH who participated in my interviews did not only talk about their own behaviors: they discussed processes that occur at the levels of communities and cities. Providing housing to PLWH who lose their homes may help those individuals become virally suppressed, but it will not stop San Francisco from becoming more expensive nor will it prevent future evictions. Likewise, individual-level interventions cannot stop the displacement of the communities that PLWH rely on for social support. Although assessing systemic causes of retention in HIV care is much more complicated than studying individual risk behaviors, it is necessary to understand the social, political, and economic forces that drive disparities in HIV treatment outcomes. If "getting to zero" is a goal that extends beyond San Francisco, researchers and policy makers have to address all determinants of

HIV social, political, economic, and biomedical and work towards solutions that address health disparities at their root.

Appendix A: Notes on Quantitative Analysis

Notes on Census Crosswalk Files

For converting between 2000 and 2010 census tract boundaries, I used a crosswalk file from the U.S. Census Bureau (United States Census Bureau, 2010). For San Francisco, tract splits and merges between 2000-2010 were roughly even. To handle splits and merges, I followed the direction of Philips et al. (2008). If two census tracts were merged, their populations were added together. If one census tract was split into two, its population was evenly allocated between the two new tracts.

Out-Migration Estimates

Estimation of yearly cumulative out-migration from SF DPH HIV Epidemiology Annual Reports was carried out as follows.

Values for the year 2015 were obtained on page 7, Table 1.4 ("Characteristics of persons living with HIV as of December 2015 by residence status, San Francisco") of the 2015 HIV Epidemiology Annual Report (San Francisco Department of Public Health, 2016).

Values for the year 2014 were obtained on page 7, Table 1.4 ("Characteristics of persons living with HIV as of December 2014 by residence status, San Francisco") of the 2014 HIV Epidemiology Annual Report (San Francisco Department of Public Health, 2015).

Values for the year 2013 were obtained on page 23, Figure 3.5 ("Living San Francisco HIV cases by care and current residence status, 2013") of the 2013 HIV Epidemiology Annual Report (San Francisco Department of Public Health, 2014).

Values for the year 2012 were on page 16 of the 2012 HIV Epidemiology Annual Report (San Francisco Department of Public Health, 2013). Finally, values for the year 2011 were on page 89 of the 2011 HIV Epidemiology Annual Report (San Francisco Department of Public Health, 2012).

P-values for Dunn's Post-Hoc Test

For Kruskal-Wallis tests that output a p-value of greater than 0.05, I conducted a post-hoc test (Dunn's test) to determine which gentrification stages had different mean eviction densities. All calculations were conducted in R. To conduct the post-hoc test, I used the R package PMCMR (Pohlert, 2014).

Test 1: 2011-2015 all cause evictions

	Early	Late	Middle	Not Gentrifying
Late	0.3122	-	-	-
Middle	0.8594	0.3642	-	-
Not Gentrifying	0.0215	0.7792	0.1543	-
Susceptible	0.4523	0.1412	0.7550	0.0052

Test 2: 2011-2015 fault evictions

	Early	Late	Middle	Not Gentrifying
Late	0.0948	-	-	-
Middle	0.5611	0.0828	-	-
Not Gentrifying	0.0063	0.8727	0.0374	-
Susceptible	0.7846	0.0769	0.7045	0.0084

Test 3: Fault evictions for 2006-2010

	Early	Late	Middle	Not Gentrifying
Late	0.1446	-	-	-
Middle	0.1140	0.0170	-	-

Not Gentrifying	0.0502	0.6956	0.0068	-
Susceptible	0.7214	0.2553	0.0826	0.2024

Calculation of Number Needed to Treat

The number needed to treat is equal to the inverse of the relative risk (Szklo and Nieto, 2014). Relative risk is a ratio of proportions. The numerator is the proportion of individuals with a risk factor (e.g. homelessness) who developed a given health condition. The denominator is the proportion of individuals without the risk factor who developed that health condition.

Appendix B: Notes on Qualitative Analysis

Text of Informed Consent Form for Interviews

A. PURPOSE AND BACKGROUND The purpose of this research is to learn what it's like to find housing and pay rent in San Francisco for people who are living with HIV.

The researcher, Finn Black, is a graduate student at San Francisco State University conducting research for a master's degree in geography. You are being asked to participate in this study because you are HIV+ and live in San Francisco.

B. PROCEDURES

If you agree to participate in this research, the following will occur: You will be interviewed for about an hour about how your neighborhood is changing, what it's like to find and keep housing, and whether this affects what it's like to live with

HIV. The interview will be audio recorded to ensure accuracy in reporting your statements. The interview will take place at the Center for Research and Education on Gender and Sexuality at a time that works well for you. Total time commitment will be 1 hour.

C. RISKS

There is a risk of loss of privacy. However, no names or identities will be used in any published reports of the research. Only the researcher and the faculty advisor will have access to the research data.

Some of the subjects talked about in the research may make you uncomfortable. You only have to answer questions you choose to answer and you can leave the research for any reason at any time.

D. CONFIDENTIALITY

The research data will be kept in the researcher's office. All research data will be stored in an encrypted document on a password protected computer in the researcher's office. The audio recorder and any hand-written notes will be kept in a locked filing cabinet in the researcher's office. Audio recordings will be destroyed after transcription, but the transcripts might be used for future research. If they are used for research in the future, it will only be for projects with the same goal as this project (learning how housing affects living with HIV). If you do not want your information used in future research, it will be destroyed after it is stored for the mandatory minimum of 3 years.

E. DIRECT BENEFITS There will be no direct benefits to you.

F. COSTS There will be no cost to you for participating in this research, unless you pay for transportation to the research site.

G. COMPENSATION Compensation for participating in this research will be \$25.00.

H. ALTERNATIVES The alternative is not to participate in the research.

I. QUESTIONS You have spoken with Finn Black about this study and have had your questions answered.

Questions about your rights as a study participant, or comments or complaints about the study, may also be addressed to the Human and Animal Protections at 415-338-1093 or protocol@sfsu.edu.

J. CONSENT You have been given a copy of this consent form to keep. PARTICIPATION IN THIS RESEARCH IS VOLUNTARY. You are free to decline to participate in this research, or to withdraw your participation at any point, without penalty. Your decision whether or not to participate in this research will have no influence on your present or future status at San Francisco State University.

Text of Implied Consent Form for Interviews

This online survey is part of a master's thesis that investigates how gentrification, eviction, and housing insecurity in San Francisco impacts people living with HIV. You have been asked to participate in this survey because you are an HIV service provider in San Francisco. Data collected from this confidential survey will be used

for completion of a masters degree in geography at San Francisco State University.

The survey questions will be about your experience in helping clients with unstable housing access services for HIV. You must be 18 years of age or older to participate. There are no risks or benefits to you in participating in this survey. You may choose to participate or not. You may answer only the questions you feel comfortable answering, and you may stop at any time. If you do not wish to participate, you may simply close your browser window, with no penalty to yourself. If you do participate, completing and submitting the survey indicates your consent to the above conditions. Your decision whether or not to participate in this research will have no influence on your present or future status at San Francisco State University.

Please do not put your name on this survey. The survey should take approximately 30 minutes to complete.

Recruiting Materials

Recruitment E-mails

Sample E-mail to colleagues at San Francisco HIV Frontline Workers Google Group:

Subject line: Interview study on gentrification and HIV care access

Body: I am a graduate student at San Francisco State University and my thesis research is an investigation of how gentrification (and related evictions and housing issues) impact access to care for HIV patients in San Francisco. Part of this study

involves an online survey of HIV care providers on their experiences serving clients who are unstably housed. This is a 30 minute, unpaid, online survey: [insert link to Qualtrics]

Text from Craigslist Ad and Flier

HIV+ Volunteers Needed for Study on Gentrification and Living With HIV

I am a graduate student at San Francisco State University conducting research on how gentrification and evictions impact access to HIV care.

You may be eligible to participate if you are 18 or older and HIV+ AND have lived in San Francisco for 1 year or more.

The study will involve a 1-hour, one-on-one, confidential interview. The interview will take place at the Center for Research and Education on Gender and Sexuality (CREGS) in downtown San Francisco and can be scheduled whenever is convenient for you. Snacks will be provided and you will be compensated \$25 for time and travel.

Online Survey Instrument

This survey is part of a larger study that investigates how gentrification, eviction, and housing insecurity in San Francisco impacts linkage and retention among people

with HIV. As a HIV service provider in San Francisco, you may have helped clients who struggle with homelessness or unstable housing. The goal of this survey is to learn what you have observed and experienced in your work with clients who lack stable housing.

As you answer these questions, please do not provide any information that could identify your clients. This includes name, street address, contact information, date of birth, or any other information that might identify your clients.

These first two questions determine your eligibility to participate in this survey. If you are ineligible, you will be redirected to another screen.

Ineligibility question if respondent answers no, their survey will be redirected to a different screen.

1. Do you provide services to the HIV+ community in San Francisco? Yes or no question.

These next five questions ask about your role as a service provider and who you serve.

Survey body:

2. What role/s do you play as a service provider? Check all that apply: HIV Test Counselor Peer Advocate Linkage Coordinator Outreach Worker Retention Worker Partner Services Therapist Medical Case Manager Clinician: Primary Care Clinician: Specialist Other

3. How many years have you worked in the HIV field in San Francisco?

4. If your services are targeted towards specific demographics (e.g. MSM, Latina women, etc.) describe those demographics here.
5. Approximately what percentage of your clients are presently homeless? If you don't know, leave blank. This study uses the San Francisco Department of Public Health's definition of homelessness, which includes anyone living on the streets or in a shelter but not people living with friends/family or in a SRO.
6. Approximately what percentage of your clients live in SRO hotels? If you don't know, leave this blank.

These last six questions ask you about your observations, experiences, and opinions on HIV and housing insecurity. There are many ways to answer these questions you might share a story about specific clients, make general observations, or provide your personal opinion but please do not share any information that could identify a client.

7. In terms of linkage and retention, what do you believe are the biggest barriers to care for your clients?
8. Based on your experience and observations, how would you describe the relationship between housing insecurity and access to care among your clients?
9. What are your experiences with clients facing eviction? If you have clients who have been evicted or otherwise lost their housing, what happened to their HIV care when this happened?
10. What are your experiences with clients moving away from San Francisco? If

you have clients who have left San Francisco, what happened to their medical care?

11. How is your organization addressing housing insecurity among your clients?

If you know of other organizations that are addressing housing insecurity among people living with HIV, what strategies are those organizations using?

12. Is there anything else you'd like to add about gentrification, housing insecurity, and HIV linkage to care?

Interview Questions

Note: Interviews were semi-structured and I did not always ask all of these questions or ask them in a specific order.

How long have you lived in San Francisco?

During what years did you live in San Francisco?

During [insert appropriate time period, depending on respondent's answer to previous question] tell me about where you've lived in San Francisco, and how long you've lived in each place.

Have you ever faced eviction? Tell me about your experiences.

What types of changes have you noticed in San Francisco?

What types of changes have you noticed in the HIV-positive community?

What are your experiences with finding a place to live in San Francisco?

What is your current living situation?

What other types of living situations have you had in San Francisco?

Tell me about your experiences getting care for your HIV.

In the years that you've lived in San Francisco, what, if anything, has changed in how you get your care?

Do you face any challenges managing your HIV?

Tell me about challenges faced by other HIV-positive people you know.

(If participant has moved.) What happened with your medical care after you moved?

Where did you go for medical care?

How did you get your medications after you moved?

What do you think is most important to know about housing and HIV?

What do you think people in power should know about living with HIV?

Codes Used in Grounded Theory Analysis

HIV Care in San Francisco

easy to get care (n=2)

SF is best city for PLWH (n=4)

high quality care in SF (n=6)

Finding Housing in San Francisco

wait lists/applications/paperwork (n=3)

ID documentation (n=1)

new housing is not affordable (n=2)

too much competition (n=3)

housing is not affordable (n=3)

too expensive to move anywhere (n=4)

easier to find housing once diagnosed (n=2)

losing housing due to poor health/life skills (n=2)

Changes in San Francisco

new housing developments (n=2)

bayview is gentrifying (n=3)

rent increases (n=2)

stigma towards homelessness (n=2)

cops harass homeless (n=2)

entitled attitudes of new residents (n=2)

complacency (n=2)

basic character of city is gone (n=3)

Migration

people moving to so-cal, inland, out of state (n=3)

moving within sf because of drugs, noise, rent (n=2)

displacement of poor (n=4)

poz folks leaving (n=3)

planning to leave (n=2)

trade-offs for those who leave (n=3)

Challenges Faced by PLWH

priorities harder to focus on health when homeless (n=2)

increase in SSI does not meet increase in cost of living, rent (n=2)

hiv medication is really expensive (n=2)

choosing what to spend money on (n=3)

aging with HIV (n=2)

not enough space in SF to meet demand (n=2)

stigma (n=2)

Systemic Causes

fear of Trump administration (n=3)

greed (n=3)

local politics (n=3)

same dynamic as Dotcom Boom (n=3)

Glossary

AIDS - Acquired immune deficiency syndrome, the immunocompromised condition caused by HIV. The term AIDS has begun to fall out of favor with both activists and clinicians and is increasingly known as Stage 3 HIV Disease (Centers for Disease Control and Prevention, 2014; Newman, 2016a).

ART Antiretroviral therapy, the combinations of medications used to treat HIV.

Community viral load The total amount of HIV in a given population. The concept of community viral load is used to illustrate how just a few individuals with high viral loads can increase the potential for HIV transmission within a community.

HIV - Human immunodeficiency virus, the pathogen that causes AIDS.

HIV-positive The state of being infected with HIV.

MSM - Men who have sex with men. This term is used to refer to sexual behavior rather than identity. Where identity is the emphasis rather than behavior, I instead use words such as queer, gay, etc.

PLWH People living with HIV.

PWID People who use injection drugs.

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