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Los Angeles

Health on Main Streets: Evaluating the Impact of Los Angeles's Retail Environment on Community & Public Health

A thesis submitted in partial satisfaction of

the requirements for the degree Master of Urban & Regional Planning

by

Anissa Serene Raja

2020

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ABSTRACT OF THE THESIS

Health on Main Streets: Evaluating the Impact of
Los Angeles's Retail Environment on Community & Public Health

by

Anissa Serene Raja
Master of Urban & Regional Planning
University of California, Los Angeles, 2020
Professor Anastasia Loukaitou-Sideris, Chair

While the slow death of retail is unraveling in cities nationwide, some local shopping areas still serve an important community value. Main street retail areas are venues for commercial activity and anchor the neighborhood's economic environment (Mehta & Bosson, 2010). The types of businesses that are found in these spaces indicate sociodemographic aspects of their nearby neighborhoods. Main streets can be homes to a variety of businesses. From a health perspective, businesses that are considered to be "health-harming" are often concentrated in underprivileged neighborhoods and are associated with higher rates of chronic disease (Cummins et al., 2007). Planning tools and policies permit such retail businesses to exist in these spaces, potentially causing adverse health impacts to the residents. Pinpointing the specific mechanisms that create health-promoting or health-harming conditions in these retail corridors s is crucial to understanding retail's impact on communities' health. Developing a scale for scoring

business types helps us understand community-specific health outcomes for the neighborhoods near retail corridors; it could also reveal the disparate quality of life impacts that exist in different commercial corridors. With this in mind, the research that follows will examine health disparities within the broader scope of planning and policy practices.

To this end, this project aims to explore the extent to which the concentration of healthy and unhealthy establishments along Los Angeles's Main streets and retail corridors relate to the sociodemographic characteristics of their adjacent neighborhoods. Questions that frame this research are: Do high ranking businesses appear around places where people tend to be healthier because of socio-economic status? Do high ranking businesses relate to better health for the adjacent population? Methods used in this research include the mapping of Main street retail areas, deploying an index that scores the extent to which the businesses encourage health-promoting behavior, and the analysis of Main street community health outcomes. From the scoring of Main streets across the city, four sites are chosen (based on their median household income and the overall score of their retail environments) to provide a more detailed scope of the built and social environment of these streets. As seen in the research that follows, businesses in areas with higher ranking scores are tied to healthier outcomes. Deliverables of this project include the use of an instrument that measures retail's association with health outcomes and built environment characteristics in the hopes that it can be used for future planning. This research can be used to inform policies surrounding more inclusive built environments and public spaces.

The thesis of Anissa Serene Raja is approved.

Kian Goh

Michael Jerrett

Paul Ong

Anastasia Loukaitou-Sideris, Committee Chair

University of California, Los Angeles

2020

Acknowledgments

This project will always hold a special place both in my academic and professional career. Having worked on the larger, national project that inspired this thesis, “Health on Main Streets”, for the past two years, I have grown to fully understand the importance of these public spaces. With an educational background in policy and public health while at Occidental College, my aim with this thesis is to underline the pivotal role that planning has on public health. Today, despite the rise of online shopping, Main street shopping areas still have a function in public space and life. The necessity of understanding the health impacts of the businesses on their consumers and neighbors cannot be understated. With this project, I have been able to explore these important topics that combine my passions for urban planning and public health.

I would like to thank my professors and advisors who worked patiently with me during this research. A special thank you goes out to Drs. Michael Jerrett and Brian Cole, who served as my supervisors for my graduate student research position on the national “Health on Main Streets” project. I especially want to thank Christina Batteate who provided invaluable guidance and time for this project. I would like to show my gratitude to Paul Ong, Kian Goh, and Paavo Monkkonen for their instrumental role on this thesis committee. Last, but not least by any means least, I would like to thank Anastasia Loukaitou-Sideris, the chair of the committee, for her resources, creativity, and inspiration that has helped throughout this past year. It is whole-heartedly appreciated that your great advice for my study proved monumental towards the success of this study. I could not have completed this thesis without the aid of my peers as well as my family and friends for always supporting me in my endeavors.

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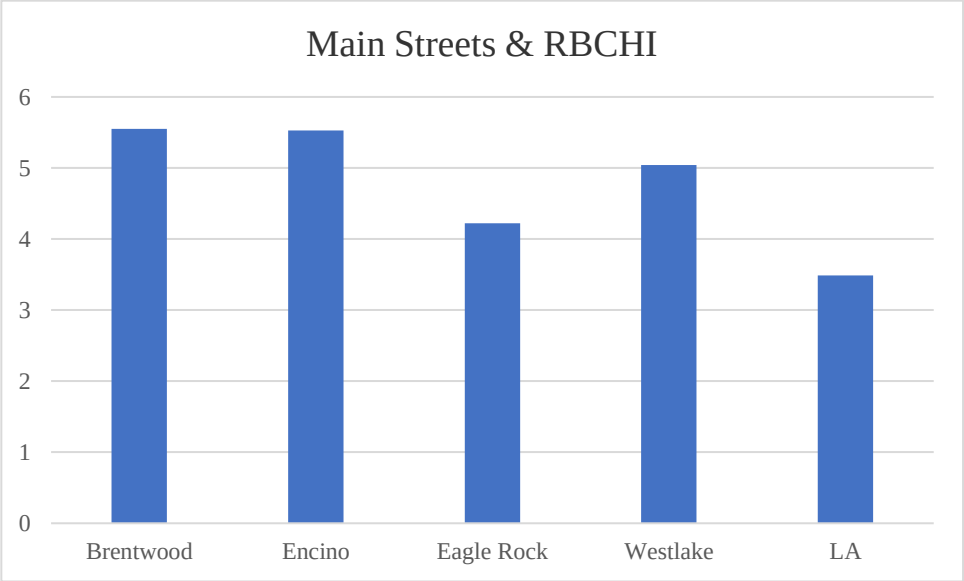
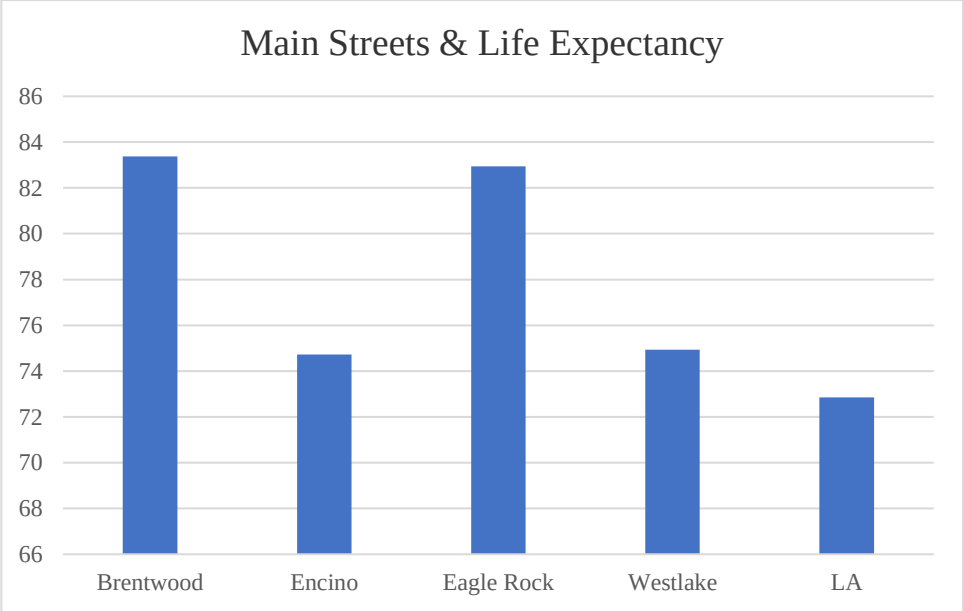
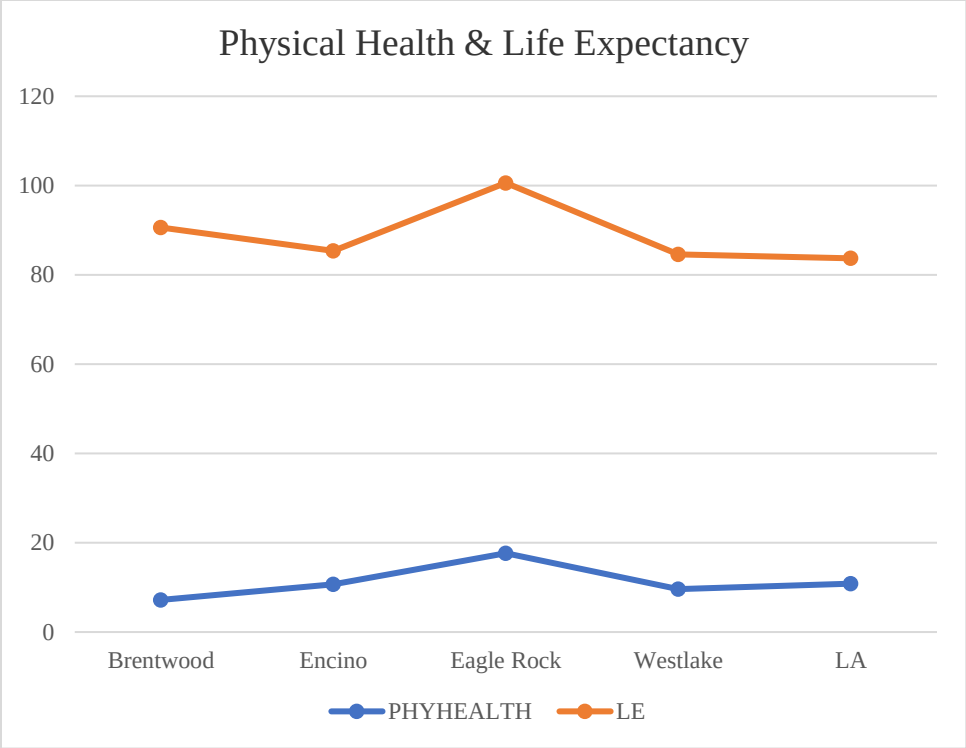


Findings VI. B. Health Outcomes




Physical Health & Life Expectancy
120
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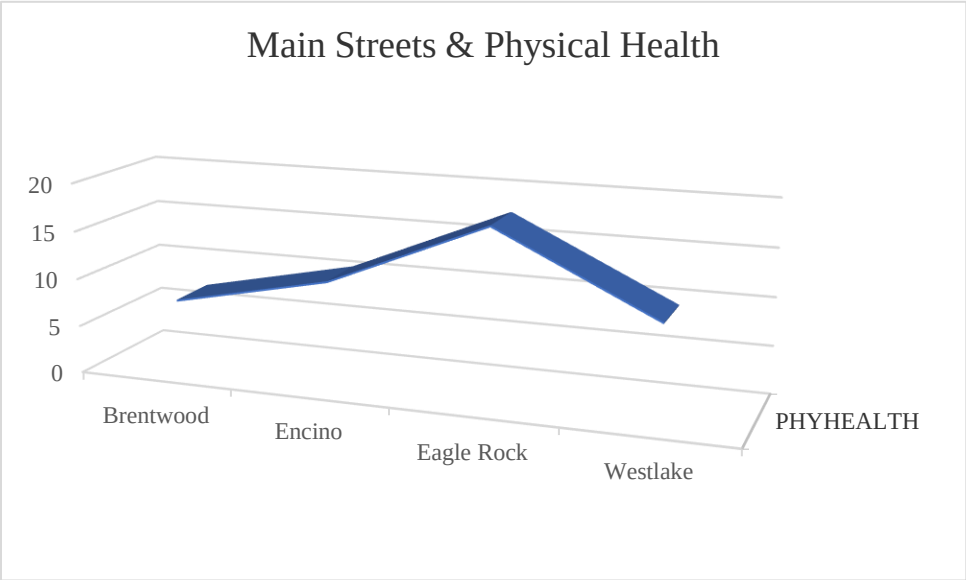
80
60
40
20
0
Brentwood
Encino
Eagle Rock
Westlake
LA
PHYHEALTH
LE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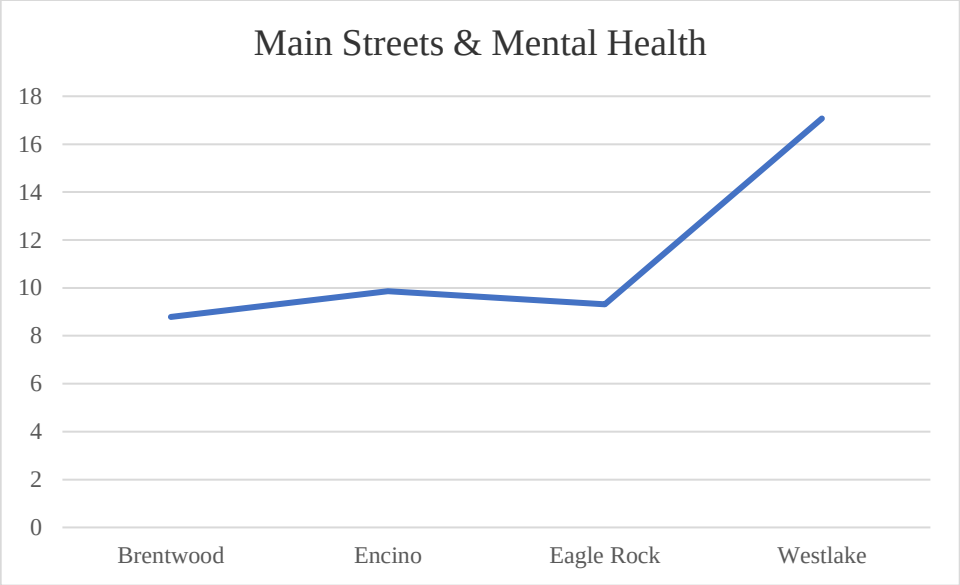
15
10
5
0
Brentwood
Encino
Eagle Rock
Westlake
PHYHEALTH


Main Streets & Mental Health
18
16
14
12
10
8
6
4
2
0
Brentwood
Encino
Eagle Rock
Westlake

Main Streets & Obesity
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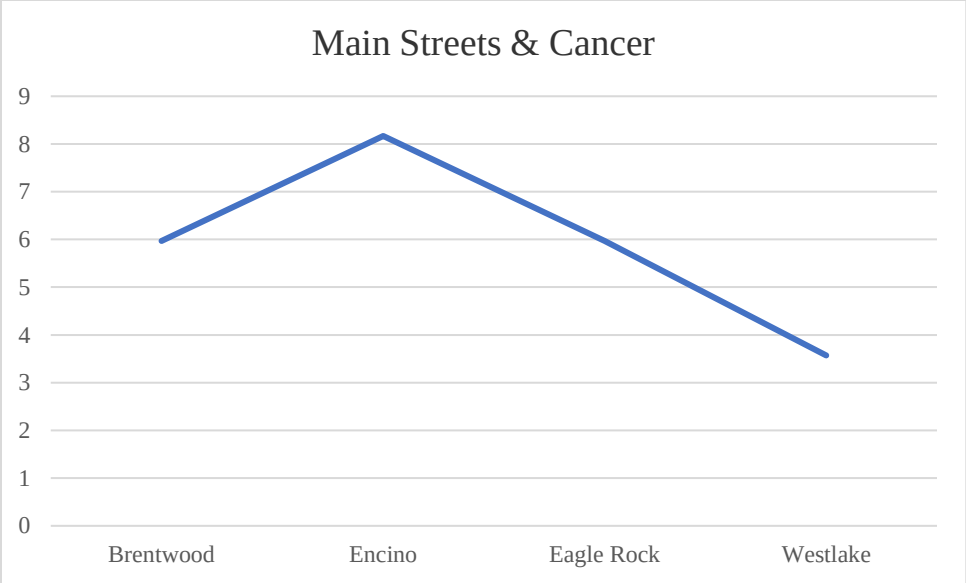
25
20
15
10
5
0
Brentwood
Encino
Eagle Rock
Westlake
LA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Encino
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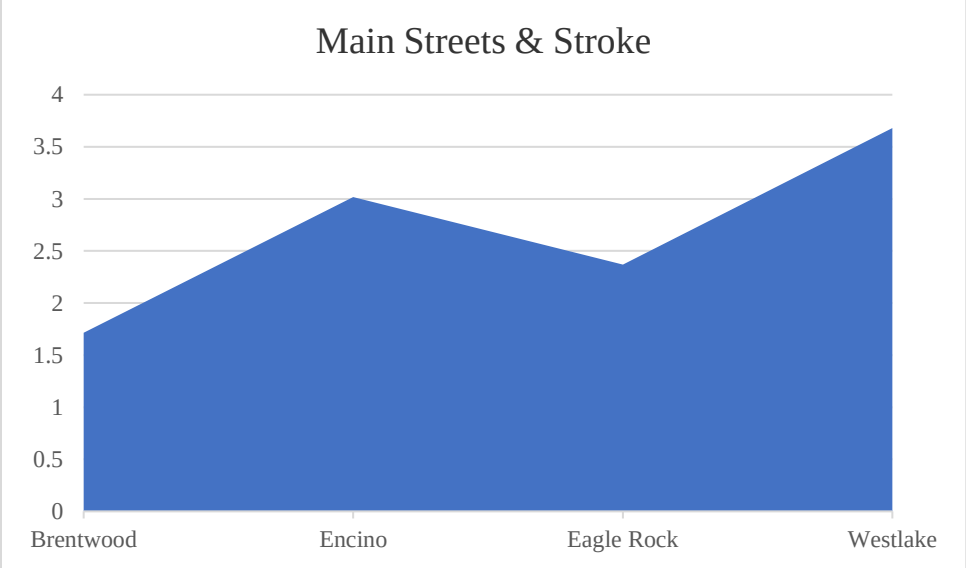
Main Streets & Stroke
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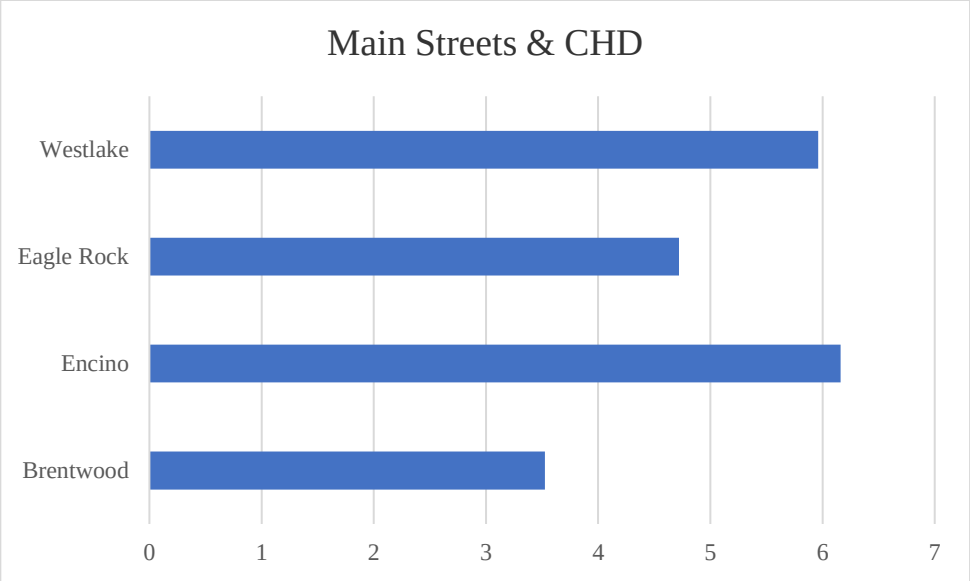
3.5
3
2.5
2
1.5
1
0.5
0
Brentwood
Encino
Eagle Rock
Westlake



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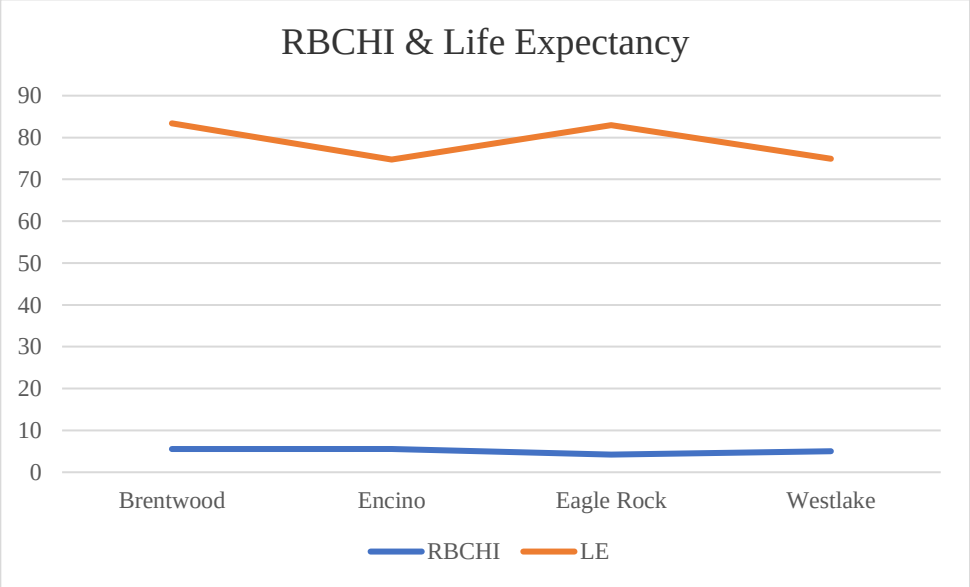
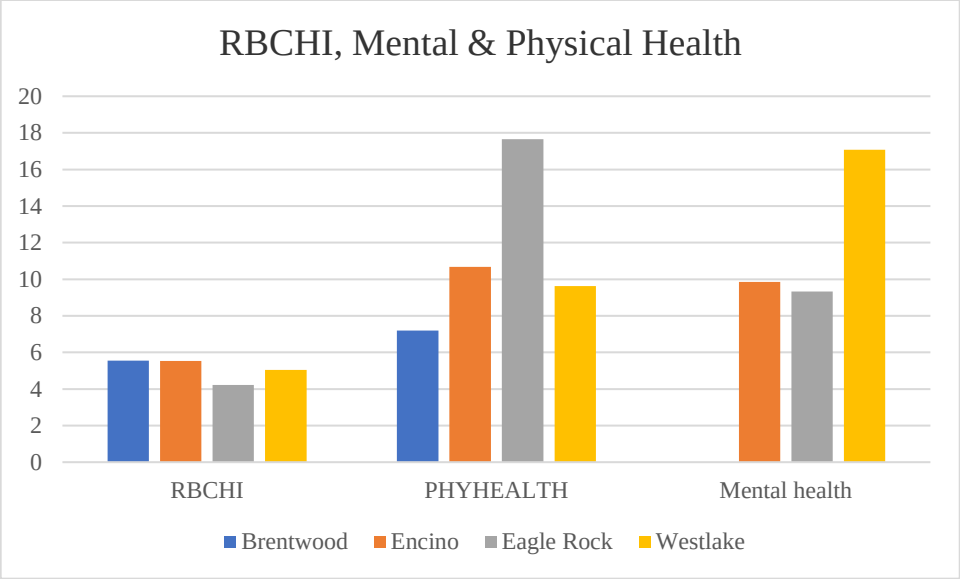
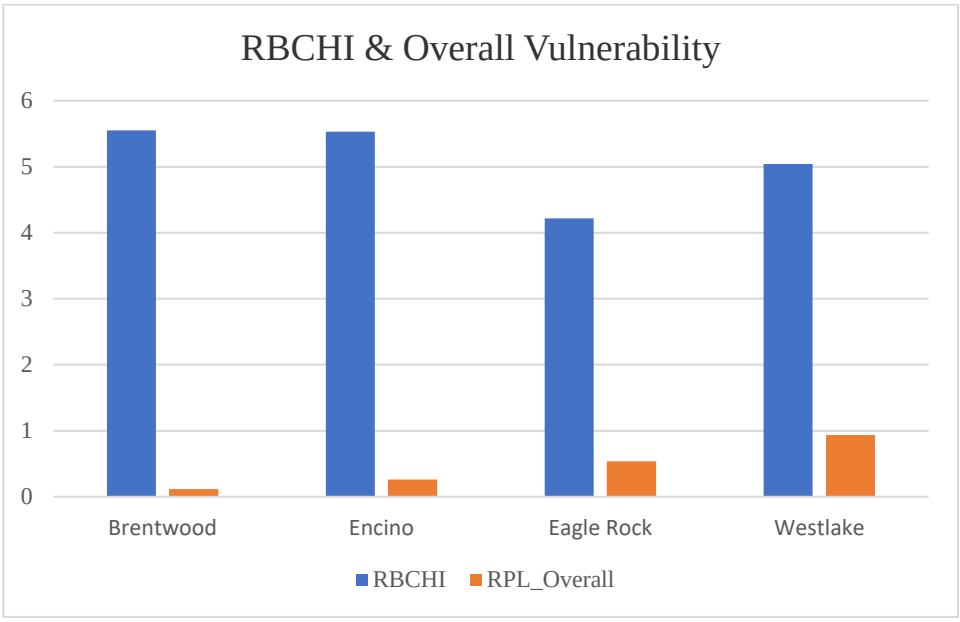
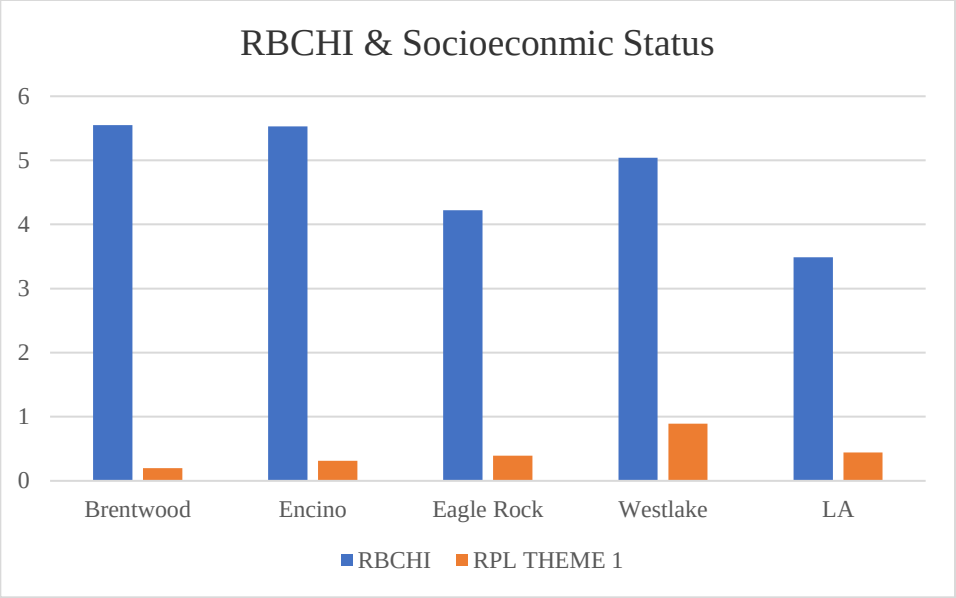
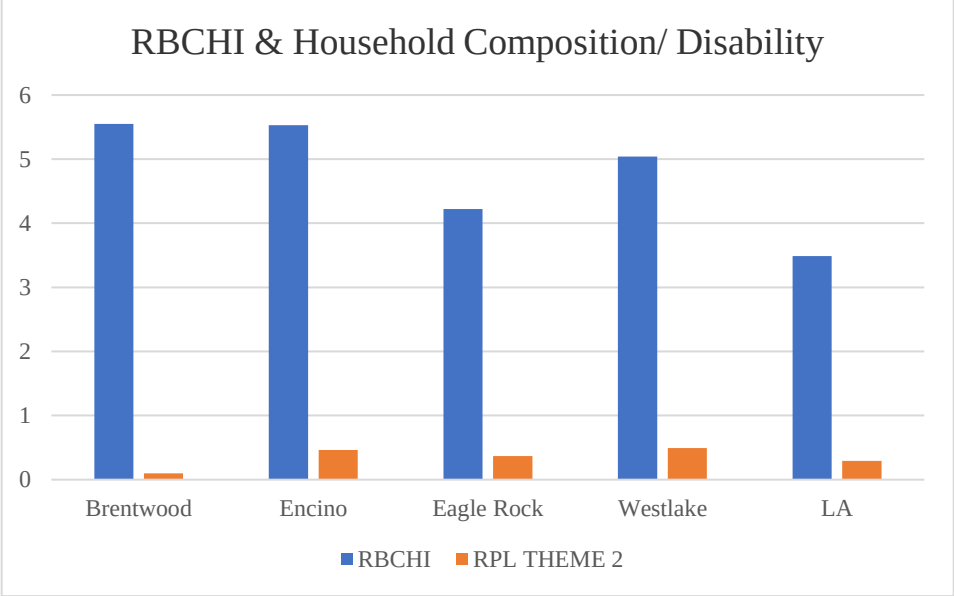




VII. C. Analysis. Main Street RBCHI & SVI




RBCHI & Socioeconmic Status
6
5
4
3
2
1
0
Brentwood
Encino
Eagle Rock
Westlake
LA
RBCHI
RPL THEME 1


RBCHI & Household Composition/ Disability
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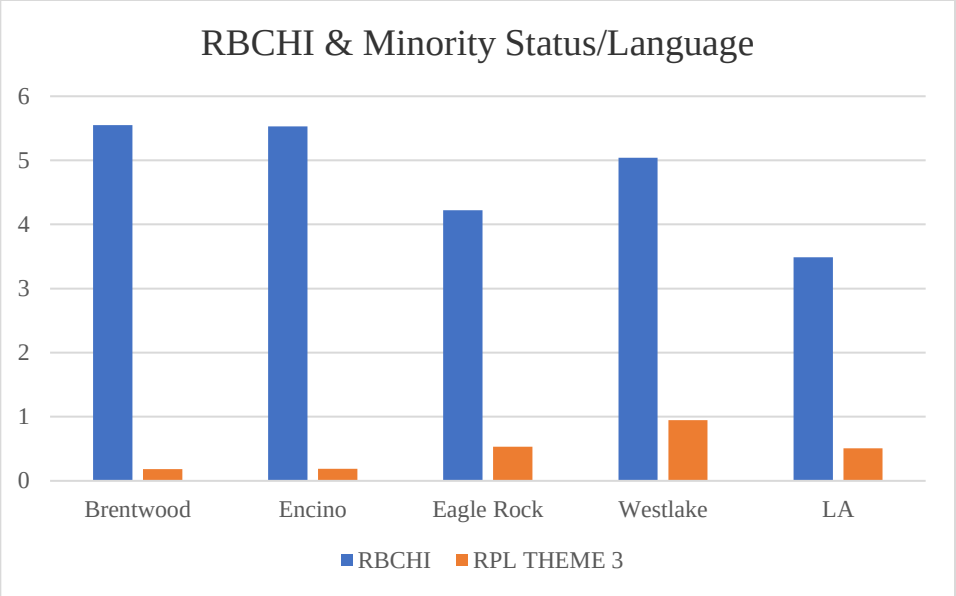
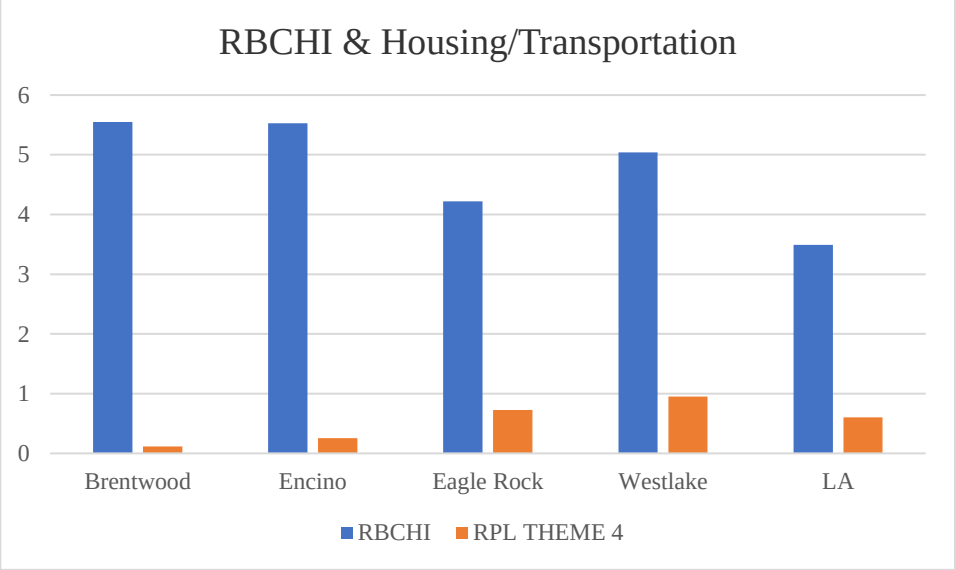
5
4
3
2
1
0
Brentwood
Encino
Eagle Rock
Westlake
LA
RBCHI
RPL THEME 2


RBCHI & Minority Status/Language
6
5
4
3
2
1
0
Brentwood
Encino
Eagle Rock
Westlake
LA
RBCHI
RPL THEME 3


RBCHI & Housing/Transportation
6
5
4
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0
Brentwood
Encino
Eagle Rock
Westlake
LA
RBCHI
RPL THEME 4

I. Introduction

The built and social environment of a neighborhood impacts the health and behavior of the people living there. Public spaces, specifically Main streets, provide opportunities for health-harming or health-promoting behaviors for residents and consumers. The density and clustering of health-harming retail outlets (such as fast-food restaurants and stores that sell alcohol or tobacco) can have lasting health impacts on residents, as living near a high concentration of these establishments is linked to higher levels of obesity, substance use, and smoking rates (*CDC*, 2019). This situation can ultimately exacerbate health inequalities and lead to poorer health outcomes for people living in more economically deprived areas.

Urban planning influences public health—yet, tools and techniques implemented by planners often overlook the health and human impact that these instruments pose to the public. The most developed and prevalent example of research in these spaces involves food deserts and food swamps—where the former describes a neighborhood with little access to affordable food, while the latter is an area where an abundance of fast-food, convenience stores and liquor stores outnumber healthy food options (Blue Zones, 2018). Insight from these fields has shown that the worlds of planning and public health can join forces to implement measurable change.

However, research on the impacts of all types of businesses on a Main street, defined as pedestrian-oriented local shopping streets, is sparse. Understanding the larger patterns of how businesses are impacting our communities is crucial to preventing further chronic diseases and disparate health outcomes for certain communities. This research highlights the often-neglected impacts that both planning and businesses can have on the physical, environmental and social health of an area. Tools and practices of planning and policy, such as zoning and Community Plans, influence health-related planning in Los Angeles's neighborhoods. An advocacy lens that

holds the public's health at the core of policy and planning actions can help re-envision retail environments and “third places”, defined as areas that encourage prosocial behavior (Mehta & Bosson, 2010). Incorporating a framework that intersects public health approaches with urban design in retail environments can promote a healthier Main street.

My project aims to respond to the following question: How does the concentration of health-promoting and health-harming establishments along Main streets relate to the sociodemographic characteristics of their adjacent neighborhoods? To answer this question, I will map the city of Los Angeles’s Main streets and their business types and the nearby neighborhood sociodemographic census data. I will also undertake observational ground-truthing of selected sites to explore the physical and social elements of these Main streets. I expect to find that neighborhoods adjacent to Main streets with lower socioeconomic status are more likely to have retail environments with higher concentrations of health-harming businesses. My research will lead to policy recommendations as well as the validation of a tool that can measure the health of retail establishments on Main streets.

II. Background

A. “Health on Main Streets” National Project

A “High Street” in the U.K. is a street that serves as the road network feeding into a city center (Mehta & Bosson, 2010). Generally, it is home to local businesses, mom-and-pop shops, and other retail chain establishments that are anchors for placemaking in the community. Comparatively, a Main street in the U.S. serves a similar function in the American retail and social context. The overarching aim of these projects is to raise awareness of the extent to which businesses on this influence the health and wellness of the local population. For this reason,

recent research on the business types found on high streets provides a comparative framework as to which types of businesses are found in these spaces and the extent to which they impact social and physical health. In the UK, it was found that the most health-promoting businesses included health services, pharmacies, leisure activities/health clubs, libraries, museums and art galleries, and pubs and bars (*RSPH*, 2015). The least health-promoting businesses include tanning shops, fast food takeaways, and payday lenders (*RSPH*). Interestingly enough, pubs and bars are highly valued for their ability to produce social interactions as one-third of those surveyed believed that they encouraged positive mental wellbeing, whereas, in the U.S., this form of pub culture is not as widespread in its promotion of prosocial behaviors (*UCLA Fielding School of Public Health, 2019*).

The areas of health incorporated into the "Richter Scale of Health" included the extent to which the business encourages healthy lifestyle choices, promotes social interaction, allows greater access to health care services and/or health advice, and promotes mental wellbeing (*RSPH*). Other businesses that did not score positively, such as fast food takeaway restaurants are found internationally to posit similar health-harming elements (*RSPH*). This finding suggests that retail establishments' externalities generally represent a broader, more systemic concern in the manner through which businesses interact with public space and community health. Utilizing the health score of businesses based on its substance and impacts on a community through a Richter Scale (RBCHI), I will evaluate this instrument as a way to bridge the field of public health and planning and will aim to uncover the mechanisms through which businesses are health-promoting or harming in retail areas of Los Angeles.

B. Main Street, USA

Main Street USA has been hailed as an idealized vision of what public space should encapsulate. As co-opted by the *Walt Disney Company*, the "Main Street USA" found in their amusement parks portrays an antebellum scene, displayed through the ice cream parlors, salons, and barber-shop quartets that line the perfectly manicured path. However, this version of Main street drastically diverges from the present state of these spaces across America. "Classic" Main streets—characterized by their walkability, good maintenance, adequate lighting, accessible seating, and mom-and-pop shops—have been suffering over the past few decades (Talen & Jeong, 2019). In recent years, the trend towards "revitalizing" or creating new Main streets has been an attempt to ignite economic activity, while also creating a city center or commons for residents (Wolshon & Wahl, 1999).

The definition of a Main street is somewhat vague but has been generally understood as a "street whose adjacent land uses require accommodation of pedestrians and bicyclists, serious consideration of street aesthetics, and a degree of traffic calming" (Ewing et al., 2005). Because this project will focus on streetscapes, urban design, and retail types, as well as built environment factors impacting mental and physical health, it will deploy the definition of Main street as a "pedestrian-oriented shopping street, fronted by buildings typically less than three stories in height, that serves as the principal commercial corridor of a small town" (Francaviglia, 1996). Main streets are utilitarian— serving administrative, civic, and social functions by acting as a center stage for rallies, parades, schools, and libraries, etc.— while the commercial presence, most noticeably through retail centers, plays a critical role in this space's impact on local economic vitality (Francaviglia).

Contemporary planning guides focused on Main street development prioritize the pedestrian experience, by selecting certain elements of urban design that provide for accessibility and comfort. Technical adjustments such as providing public seating or benches, adding tree wells, and installing attractive lighting have been thought to "encourage people to linger," and enhance the opportunity for social interaction (Robertson, 1999). These elements are widely accepted as aiding in the creation or reinvigoration of these spaces. Few cities in the US engage in innovative planning strategies that would holistically stimulate Main streets by both encouraging local businesses while promoting health. But some cities, such as San Francisco, have enacted neighborhood-serving zones that aim to "sustain small, local businesses" by limiting both the size and type of retail stores in specified districts (Botwinick et al, 2010). Using place-making strategies and maintaining traditional built forms, some business districts aim to capture the relic of classic Main street, USA.

C. Main Street, USA Example: Northampton, Massachusetts

"There's a sense of place, walkability, and an eclectic mix of architectural styles. This isn't a homogeneous place" (*APA*, 2007). The *American Planning Association* designates "Great Places in America" and "Great Streets" by recognizing neighborhoods, streets, and public spaces that "make communities stronger and bring people together through good planning" (*APA*, 2019). Northampton, Massachusetts is a small city in the eastern part of the state that has been designated with Great Street recognition. The Main street in this city is characterized with 19th-century buildings that are zoned for mixed uses— boutiques, galleries, coffee houses, and restaurants— that "create visual interest and encourage people to walk, gather, and interact" (*APA*). A zoning law in the 1980s banned eight-story buildings in the downtown area and since then, the allowable height has been reduced to five stories.

Mobility and accessibility are a vital aspect of this Great Main street. City planners helped design a parking structure that is connected to a commercial building that contains shops, restaurants, galleries, studios, and other businesses (*APA*, 2007). This garage allowed the Main street building owners to expand or modify without the cost of having to provide additional parking. Planners encouraged active engagement with the streetscape by discouraging business types that "generate heavy vehicle traffic", including automobile shops or autobody services, and take-out restaurants (which require a special use permit) (*APA*). By regulating business types based on their health-harming presence on Main street, planners incorporated principles of health promotion.

Northampton's local economic vitality is evidenced in the low vacancy rates along its Main street. Recent planning initiatives, such as a reduction in minimum required lot dimensions, has spurred new development on small, narrow lots to fill the gaps of services or space on Main street (that would otherwise not be allowed). Local officials also supported the city's public investment for affordable housing which has augmented the redevelopment of empty public buildings back into "productive use" and has dovetailed efforts to jumpstart brownfield revitalization of contaminated sites (*APA*, 2007). All of these changes have generated new activity on and around Main street. With proactive planning programs and public policy backed development, residents and workers can enjoy a vibrant Main street.

D. Main Street, Los Angeles & Spatial Segregation

Los Angeles presents a case study in which its neighborhood-specific Main streets reveal larger insights regarding the association of business types and the overall health of the people and places they serve. This city has a wide variety in the difference of life expectancy, which is an indicator used widely in the public health field to provide a more comprehensive story of

livability. Lower life expectancy, with varying causes, can be tied to environmental factors. Communities with higher levels of economic hardship tend to have lower life expectancies (*Los Angeles County Department of Public Health*, 2014). Businesses that serve areas of lower life expectancy and higher economic hardship are sparse in their distribution and diversity, meaning that the wealth and poverty of regions have an impact on the types of businesses found in the area (Vias, 2010). In Los Angeles, these disparities are visible in residential, retail and public spaces.

For the context and geographical focus of this research, it is crucial to acknowledge that persistent disparities are present in historically disinvested neighborhoods. The history of entrenched income and race disparities in Los Angeles is noticeable in retail districts and the health outcomes of nearby neighborhoods. As Los Angeles developed, it grew in a relatively dispersed pattern unlike older cities in the U.S. This sprawled formation in part was attributed to the city's lack of a central significant industrial core as well as the transportation innovations of the railways ("interurban electric lines") that helped spread out housing development (Wachs, 1984). While public space in certain neighborhoods was desegregated, avenues that increase upward social mobility, such as homeownership, were inaccessible to certain racial groups due to redlining, racial covenants, and other restrictions (De Graaf, 1970). Zoning ordinances were also used to maintain the character of a neighborhood and to "protect districts from perceived 'nuisances'", which was a method of indirectly barring the right to the city for non-white, non-homeowning populations (Kurashige).

The legacy of class and race-based zoning means that segregation's impacts are cemented in neighborhoods and result in subsequent health and social implications. It is firmly held that this form of zoning from previous decades "indirectly promoted racial segregation" (Kurashige,

2010). With the rise of housing development in the post-World War II era, white residential developments became increasingly dispersed with the advent of automobiles, while the high proportion of car ownership aided in the building of "new housing in suburban areas" and enabled "shoppers [to] travel easily to outlying areas" (Shaffer, 2002). Retail areas developed in "largely homogeneous, white, middle- and upper-class suburban neighborhoods," which severely limited access to African American populations through codified restrictive covenants, redlining, and housing discrimination (Shaffer). Other types of businesses sprouted around these neighborhoods and neighborhood centers, continuing the cycle of social and economic inequities that manifests through detrimental health outcomes. Scarcity in access to food, grocery stores, and other forms of retail is not coincidental, but rather a product of years of disinvestment and economic devaluation from government policies. The availability, type, and diversity of retail concentrations in a neighborhood speak to the sociodemographic characteristics of a community and the potential of commercial activity to shape health.

E. History of Planning & Public Health

Exploring the relationship between land use and planning tools such as zoning and Community Plans can highlight how these systems work to promote or detract community health and wellbeing. Zoning's roots are inherently invested in public health, as it promoted the general welfare and safety of a community through adjudicating land-use regulations (Fulton, 1992). Around the turn of the twentieth century, cities and their production of "inhumane living conditions" brought upon by diseases, congestion, and pollution, ran counter to these goals (Barton, 2009). But today, for most planning departments, zoning for public health is relegated to the food environment and perceived public nuisances (Rossen, 2012). However, when viewed through a built environment lens, "outdated and archaic" zoning codes act as impediments to

healthy communities by promoting "automobile-dependent lifestyles" and resulting in diminished access to healthy food or opportunities for physical activity, particularly in low-income or disadvantaged neighborhoods (Rossen). Conceptualizing zoning as a tool for coalescing the goals of planning and public health for Main street is a critical praxis that should be supported by future planning approaches.

III. Literature Review

A. Introduction

While much has been researched about the built environment and its effect on public health, the specific impact of retail corridors (Main streets) and their influence on public health outcomes has yet to be fully documented. The sections that follow, provide an overview of the literature on planning for healthy Main streets (using the built environment as a proxy for Main streets due to the lack of literature on the latter), examining the mechanisms and regulations that guide these areas, and the implications of the relationship between planning tools and their impact on health. By bridging the planning and public health literature, this review aims to underscore the necessity of further incorporation of these two bodies of research and action-oriented advocacy on the topic of Main streets and their health outcomes.

B. Planning Healthy Main Streets

The domains of the retail and built environment, local economic vitality, and urban design theory tend to be siloed from their intersections within public health. Drawing connections between these fields within the framework of "living" Main streets provides a lens that is lacking when thinking of retail and its health outcomes on Main street. Planning literature has pushed towards revitalizing the classic Main street with an emphasis on walkability,

serviceability, and support of local businesses (Kunstler, 1994). While more traditional brick and mortar stores have suffered due to the economic recession and the advent of online shopping, current consumer preferences have shown a proclivity for urban settings as the migration back to cities marks a shift from past generations (Moos, 2014; Myers, 2016). The shift back to the city reveals the function and impact that cities, public spaces, and streets can have on society (Loukaitou-Sideris & Ehrenfeucht, 2009; Shiffman et al., 2012). Currently, urban areas are experiencing a renewed interest with an emphasis on urbanity as evidenced in the multiplying mixed-use spaces and the resurgence of investments in infrastructure related to public transportation (Mehta & Bosson, 2018). The extent to which all neighborhoods and regions receive equitable attention and resources is questionable.

Main streets and retail areas generally provide space, safety, and opportunity to actively engage with the environment. Physical activity and walkability as forms of engagement on Main streets are associated with a range of built environment attributes, such as street connectivity, access to green space and recreational facilities, safety from crime and traffic, aesthetics, and access to public transportation (Ding et al., 2018). Given the potential for walking to increase total physical activity levels, efforts to implement environment-changing interventions make sense, as they may have an immediate impact at the neighborhood level. Business establishments and planners can incorporate these outlined design elements to allow for increased time on the street, which benefits the local economy as well as the social vibrancy of the street. Policies and community engagement aligned with these design and public space goals are crucial for fostering commercial and pedestrian activity.

Reinvestment plans for business districts can allow for leisure-time walking ("LTW") in previously underused areas. In some instances, urban regeneration could drive LTW among

adults in these areas by “creating a more ambient and safer area to walk in” which in turn can increase physical activity and social engagement in these spaces (Kramer et al., 2017). Public health-driven approaches can enable more opportunities for social interaction while experiencing Main streets.

1. Urban Design & Physical Activity on Main Street

As established in food environment studies, walkability can be an indicator of other neighborhood sociodemographic factors (Liu et al., 2015). Within different urban areas nationwide, the average distance between food establishments and residences is approximately 2.6 miles (Liu et al.). Interestingly enough, only about a third of those visiting these establishments find them to be located within their neighborhood census tract; this reveals what is often missed when studying food environments: the commute to the site and what these destinations provide. Neighborhood food environments are often outside the range of a standard neighborhood walk (which is about 400-meters, a 10-minute walk) (James et al., 2014). Individuals and households that have access to a car have more options for food and retail exposure (Levasseur et al., 2015).

Walkability is a gauge for the effects of the built environment on health by cross cutting the domains of physical activity, food environments, retail environments, and perceived community safety. Neighborhood environments, defined by residential travel activity, provide more insight into how the food environment influences dietary and food shopping choices. Physical activity that results from a neighborhood with walkable areas is tied to the impacts of the Main street design and the retail environment.

a. Fitness & Recreation Spaces

Spaces that allow for physical activity promote a culture of healthy lifestyle behaviors (Davies, 2013). While Main street areas may contain businesses such as gymnasiums or private fitness centers, public spaces and community recreation centers remain as valuable assets for residents' physical activity levels and pro-social experiences. Recreation centers can come in a variety of forms in different communities (i.e. gymnasiums, public parks, public swimming pools, etc.). Absences of these businesses in communities represent an unmet basic need and can contribute to both increased risk of many chronic diseases and "staggering economic consequences" on the healthcare industry (Roux et al., 2008). "Proactive" land use policies can encourage physical activity in these nontraditional recreation spaces through a variety of means, such as maintaining public uses for vacant spaces on Main street or by contracting with local vendors to sell healthy foods in these areas (Wexler, 2004). Public and private fitness spaces serve as venues for health-promoting behavior, but the populations that they serve and their differing impacts in the social and economic activity on Main street is an understudied research topic.

2. Urban Design & Third Places on Main Street

"Third places" as defined by urban sociologist Ray Oldenburg, are places for "refuge other than the home or workplace" where people "regularly visit and commune with friends, neighbors, coworkers and even strangers" (Mehta & Bosson, 2010). These destinations are not easily generalizable nor quantifiable as they represent a social environment that is realized and experienced through urban design and businesses that support these behaviors. Main street businesses can provide avenues for this form of social interaction, dependent on the businesses that are found here as well as the impact that they have on the community. The business types

that allow for this experience generally are coffee shops, restaurants, convenience stores, deli or local supermarkets, ice-cream shops, book shops and thrift stores (Mehta & Bosson). In contrast, users of these spaces generally do not consider movie rental stores, hair salons, banks, office lobbies, electronics stores, fast food/carryout restaurants, and dry cleaners as attaining qualities that contribute to third places (Mehta & Bosson). These business types tend to be franchises that do not support interactive behavior nor lingering in these spaces. Local businesses that cater more towards the community, create opportunities that provide health-promoting mechanisms on Main streets. With this in mind, third places are shown to have a significant effect on individual and community level health (Bassett, 2018).

Design plays an overt role in shaping the social health of public spaces. Street characteristics that contribute to third places are sourced from the personalization of the business to the street, the quantity and quality of seating as provided by the business, and the number of canopies and awnings that provide shade (Mehta & Bosson). These attributes echo arguments put forth by Jane Jacobs of a form of urban ecology that is both welcoming and non-hostile for all users of public space (Talen & Jeong, 2019). Framing these ideals through planning practices could provide insight into how businesses enable non-existent third place Main street environments. While urban design theory focuses on the physical streetscape characteristics that contribute to place-making, and by extension mental and social health, the connections to businesses' impact on community health and urban design are lacking. The link of social capital to mental health is found in built environment research— but is not directly tied to retail environments nor planning and its impact on health in retail environments. The ability of planners to incorporate these elements is apparent through New Urbanism and other schools of thought that advocate for mixed-use designs that are aimed at enhancing the experience of the

user. However, how this goal is incorporated when up against zoning, and the systemic disparities between neighborhoods, has yet to be contextualized in the case of Main streets.

a. Public Facilities

Public facilities provide a range of resources that support formal and informal education (Falk, 2011). Facilities such as libraries, museums, nature centers, and community and health organizations are important spaces that provide third places and encourage social cohesion and interaction (Falk). In less urban areas, rural public libraries are anchors in the community and hold "economic, cultural, and social capital assets in trust" which promote healthy lifestyles (Miller, 2019). More broadly, public libraries can play a major role in improving health literacy of community members through their resources (Mirialam et al., 2019). In a previous study, diabetic patients' access to information and health literacy levels improved through the dissemination of health information due to the presence of libraries (Mirialam et al.). Public facilities can provide well-being and safe spaces for communities when they promote policies of inclusion for all members of society. By integrating and supporting these educational establishments in the larger neighborhood and retail environment, community health can improve.

C. Land Uses & Policies in Retail Environments

The extent to which Main streets can be proactively planned to promote healthy initiatives is guided by land use regulations and policies. Zoning and business licensing have been shown to effectively regulate spaces of "unhealthy" business such as alcohol and tobacco stores when pressured by public health and consumer advocates, but this has not been analyzed in the context of Main street spaces or other businesses that may not directly impact public health (Ashe et al., 2011). In Community Plans, both zoning and licensing can be directed at retail food

outlets to achieve distinct public health goals such as limiting the location or density of retailers, regulating the mix and types of products sold by retailers, enforcing federal and state laws, and introducing incentives that encourage store owners to adopt additional measures to improve health (Wooten et al., 2013). However, in regard to other retail establishments such as clothing stores, electronics stores, office buildings, and nail salons, land use regulations have yet to be prescribed under specific health standards (Wooten et al.).

Establishments that may not appear to have a direct health impact are present in Main streets but go largely unnoticed in research. The "Retail Built and Community Health Index" (RBCHI) is an index that captures retail, built, and commercial environment measurements that could bridge together planning theory and practice (land use regulations) with its direct health impacts (mental, physical, and social wellbeing) of these retail environments (*UCLA Fielding School of Public Health,* 2019). While zoning is the regulatory tool that guides land use and development, little is known about its variance in Main street retail areas and the impact that it has on the disparate health outcomes of nearby neighborhoods.

1. Business Domain: Foodscape

a. Grocery Stores & Convenience Stores

Food environments have an extensive presence in Main streets. Defined broadly as the physical and socio-cultural spaces that shape the availability, accessibility, and adequacy of food within communities, these multidimensional establishments can include grocery stores, fast food restaurants, and street vendors (Polsky et al., 2016). In different communities and food environments, grocery stores can also come in the form of a corner store, mom-n-pop shop or dollar store. It is widely held that grocery stores sell healthier food items at affordable prices when compared to convenience stores and fast-food outlets (Abeykoon et al., 2017). At the

neighborhood level, access to these establishments is unequal through spatial and socioeconomic means, which can play a role in the increased prevalence of chronic diseases (Abeykoon et al., 2017). Access that is hampered by these more systemic, broader issues such as racial, economic, and social inequality can be linked to health equity concerns.

Convenience stores serve as a one-stop-shop for community members. While they aim to be "convenient", these smaller, non-traditional stores generally "offer an abundance of less nutritious foods" such as sugar-sweetened beverages, salty snacks, and candy which contain poor nutritional quality and are associated with adverse health outcomes, such as increased obesity and cardiovascular disease (Caspi et al., 2017). While more common in urban areas, these stores tend to attract loyal customers who make food and beverage purchases daily or multiple times a week (Caspi at el.). More specifically, these food stores are common in high-minority and low-income neighborhoods, which are also less likely to have supermarkets (Caspi et al.). In these settings, healthy food marketing may be overwhelmed by ubiquitous marketing for less healthy options (Caspi et al.). The abundance of these understudied establishments (i.e. gas-marts, bodegas, dollar stores, etc.) in Main street retail areas signal pathways for improving customer purchases that move beyond marketing and point-of-sale tactics.

b. Fast-Food Restaurants & Full-Service Restaurants

Restaurants are an important aspect of food environments. Research has shown that living near a greater number of restaurants is related to lower body weight (Polsky et al., 2016). The exception to this is when areas have higher volumes of restaurants paired with decreased LTW, which encourages more car usage for food-based travel. For example, fast-food restaurants may receive more customers that travel by car (and remain in their car for food purchasing) when compared to full-service restaurants (Polsky et al.). As seen in the convenience

store “consumerscape”, behavior is influenced by the advertising and appeal of easier service and access to these establishments. For individuals that live near a higher density of fast-food restaurants, there is a link with higher body weight outcomes, with the adult population having the highest gain (Polsky et al.).

For public health policy, research, and advocacy, it is important to distinguish the “relative dimension” and the “absolute dimension” of retail food environments for weight-related outcomes (Polsky et al., 2016). Relative dimensions are pinpointed with tools such as zoning, and licensing, as well as funding community resilience of health-promoting plans (i.e. increased active transportation funding, funding green spaces, supporting farmers’ markets, etc.) (Polsky et al.). Absolute dimensions are more amorphous in their source and are harder for policymakers to orient financial support. However, absolute dimensions of food environments are arguably more significant in their impact on community health. Health-promoting interventions must target both the relative volume of certain retail food outlets and encourage other forms of absolute aspects of healthy lifestyle behaviors in these environments.

c. Cafes & Coffee Shops

Cafes and coffee shops serve as third places for individuals to meet, socialize, express themselves, and support one another (Finlay et al., 2019). While there are prosocial behaviors that result from this process, there is a larger, underlying phenomenon that is occurring to forcibly make space for these establishments; nationwide, coffee shops are an infamous indicator of gentrification in neighborhoods (Papachristos et al., 2011). In gentrifying areas, this process has had a different impact on crime for White gentrifying neighborhoods than it has had for Black gentrifying neighborhoods. An increasing number of coffee shops in a neighborhood is associated with declining homicide rates for White, Hispanic, and Black neighborhoods;

however, an increasing number of coffee shops is associated with increasing street robberies in Black gentrifying neighborhoods (Papachristos et al.). The extent to which coffee shops on Main street have an overall health-harming or health-promoting presence in these different geographies is disputed.

Third places remain as an understudied form of public space that impacts health. The presence of coffee shops that provide third places on Main street is important for "social interaction, sense of community, and belonging" and overall well-being and quality of life (Finlay et al., 2019). The concentration of coffee shops represents a specific form of economic development and changing consumption patterns, underlying gentrification as a racialized process which has a direct link to public health (Papachristos et al., 2011). At the same time, third places are closing across the U.S., depleting access to key services, goods, and amenities (Finlay et al.). Supporting coffee shops, and other related businesses that can be characterized as third places can be achieved through advocating for Main streets that allow for a sense of safety in the community, prosocial behavior, and healthy lifestyle behaviors.

2. Business Domain: Consumerscape

a. Bars & Liquor Stores

There are other businesses besides those related to food that contribute impacts to community health and the overall consumerscape of Main streets. Neighborhood characteristics are important in understanding alcohol consumption, as outcomes are based on the neighborhood median income and the overall retail environment (Cerda et al., 2010). When connected to the larger scholarship of social systems theory, the extent to which individuals interact with their environment suggests that alcohol-related problems are linked to social and economic systems, such as the neighborhood and retail environment (Holder et al., 1986). For example, research has

seen a 1% increase in the number of adults living in poverty associated with an 86% increase in odds of binge drinking (Cerda et al.). However, in other studies (when controlling for spatial concentration), higher alcohol consumption is greater in poor neighborhoods, where liquor stores are over-concentrated (Bluthenthal et al., 2008, Gorman et al. 1997, Pollack et al., 2005, Romley et al., 2007).

When thinking socio-spatially, the concentration of liquor stores has been most often found in neighborhoods with lower socioeconomic statuses (Cerda et al., 2019). Characteristics that remain as important in understanding alcohol outcomes include neighborhood median income and retail environment (Jackson et al., 2014). Social systems theory suggests that alcohol problems are linked to larger social and economic systems such as the neighborhood and "retailscape" (Holder & Wallack, 1986). Furthermore, several studies have reported that alcohol abuse and dependence, as well as other risk behaviors, cluster in contexts of poverty, residential instability, and social isolation (Cerda et al.). Within the wider scope of establishments that sell alcohol, research is not well-established on the presence of bars and their social function in the U.S. context. Bars and liquor stores serve different functions and understanding the health and community impacts between the two needs more attention. Further research is necessary to guide neighborhood-level programs and policies aimed at reducing alcohol use.

b. Smoke & Tobacco Shops

Smoke and tobacco shops represent another significant business presence on Main street. Research has shown that a higher existence of tobacco stores is associated with a heightened potential of smoking (Berg, 2018). As seen in liquor stores, there are demographic disparities in where tobacco retail is located, with higher concentrations in vulnerable communities (Berg). With the current rise in popularity of electronic cigarettes, similar socio-spatial patterns of "vape

shop" cluster in neighborhoods with lower socioeconomic indicators (Ackerman et al., 2017). This holds for certain areas, as a greater density of tobacco retailers, and their proximity to schools, have been associated with higher rates of smoking among youth and lower rates of successful cessation (Ackerman et al.).

The density of tobacco retailers is often disproportionately higher in low-income census tracts and tracts with a higher proportion of African American or Hispanic residents (Ackerman et al.). Communities can reduce the density and number of tobacco retailers by imposing minimum distance requirements between existing retailers, capping the number of retailers in a given geographic area, establishing a maximum number of retailers proportional to population size, and prohibiting sales at certain types of establishments, such as pharmacies, or within a certain distance of locations serving youth (Ackerman et al). Local governments use direct regulation, licensing, or zoning laws to enact these changes, which should be encouraged when encountering other health-harming businesses on Main streets.

c. Fringe Banking & Payday Lenders

Payday lenders and alternative financial services are another prevalent business type on Main street. While "fringe banking"— defined as short-term financing through payday lenders and check cashing— is a modern alternative financial service, the pervasive inequities driving this industry are systemically rooted. Services within this practice range from lenders that give customers short-term loans "pending their next paychecks", pawnbrokers that purchase customers' property and "allow them to repurchase it later at a higher cost", car-title lenders that hold customers' titles "as collateral for short-term loans", and check cashers which "cash checks for a fee" (Eisenberg-Guyot et al., 2018). With these practices, this industry remains controversial and its overall detrimental impacts on public health are substantiated.

Fringe banking has been associated with a 38 percent higher prevalence of "poor or fair health" (Eisenberg-Guyot et al, 2018). This "poor or fair health" materializes as psychosocial stress, as research has linked financial debt to depression (Sweet et al., 2018). The effect of fringe banking on other businesses, particularly businesses that are known to have health-harming impacts, are causally linked. Through restricting access to payday loans, there can be an overall reduction spending on liquor (Cuffee & Gibbs, 2017). The colocation of lenders and liquor stores can be thwarted through zoning restrictions to keep lenders away from liquor stores. Oakland, CA, for example, prohibits payday lenders from operating within 500 feet of banks, schools, churches and liquor stores (Cuffe & Gibbs). Even more stringent, North Kansas City, MO states that lenders must locate more than 1000 feet from liquor stores (Cuffe & Gibbs). While land use regulations such as zoning serve as a short-term solution to these issues, a more holistic approach to mitigating these health consequences would be to expand social welfare programs and labor protections. These domains would help address the root causes of fringe service usage while advancing health equity.

D. Main Street Retail Districts & ZIP Code Theory

Health links between neighborhood characteristics and the built environment have ties to dimensional relationships between people and places. The significance between health and Main streets' built environments can be seen in the ability of urban design to promote or hinder active living as well as the influence on food availability. Thus, built environment features can multiply the impacts of unhealthier businesses, as they have the potential to increase obesity among adolescents and result in obesity-related racial or ethnic health disparities (Camp, 2015). Food environment research has highlighted the prevalence of food deserts in areas that have certain sociodemographic and urban form characteristics (Camp). Largely preventable diseases such as

heart disease, stroke, diabetes, and cancer are the leading cause of death and disability in the U.S. and are estimated to cost over three-quarters of healthcare spending (*CDC*, 2019).

Literature has established health disparities that exist between different racial and ethnic groups and educational attainment with income classes (Isaacs & Schroeder, 2004). More recently, policy concerns have attempted to address education and income through the roles of "occupation, social capital, and social context" which are all difficult parameters to capture in epidemiologic studies that may not adequately reflect social class (Marmot, 2000). Past theories have manipulated obesity rates and income levels to argue that obesity rates are unrelated to social class—yet the data show that the obesity problem is concentrated in the most disadvantaged areas nationwide (Mokdad et al., 2001). The issue with area-based measures of socioeconomic status is that they are too vague in their attempt to properly address the roots of systemic issues. Additionally, these measures can provide information on the poverty and wealth of an area or population—but are only rarely collected in U.S. health surveys (Krieger et al., 2003).

Present disparities at ZIP Code area-level stand in contrast to past research that failed to incorporate people and place-based frameworks when looking at differences in obesity rates between richer and the poorer areas (Mokdad et al., 2001). When thinking of health on Main street, examining the geography of obesity must be socially, economically, racially, and environmentally studied with statistical and spatial precision—through ZIP Codes. This scale provides an avenue to map disease rates by community and neighborhood and could be "the future of public health assessment" (Mokdad et al.). Bridging the retail environment with community health, ZIP Codes act as a reliable predictor of life expectancy and, by extension,

quality of life (Arias et al., 2018). ZIP Codes are strongly predictive of an individual's health, highlighting the importance of an individual's environment on overall well-being.

E. Present Gap: Importance of Planning for Healthy Retail

Disparities in resources between areas such as South Los Angeles and whiter neighborhoods continue to persist. For example, South Los Angeles has more fast-food restaurants than West Los Angeles and four times as many liquor stores per square mile (Park et al., 2008). Additionally, South Los Angeles has one retail store for every 415 residents compared to a countywide average of one store for every 203 residents (*Assembly Special Commission on the Los Angeles Crisis*, 1992). This signals that systemic forces are at play, affecting vulnerable populations and hampering health outcomes.

This research will examine health outcomes to supplement ZIP Code theory and will examine disparate impacts of residents' health outcomes near retail environments across the city of Los Angeles. A health score that measures the "impact health" of retail environments will serve policymakers and planners with usable metrics to quantify the health of their Main streets (*UCLA Fielding School of Public Health*, 2019). Zoning and planning policies for Los Angeles, when analyzed in the foreground of health outcomes of Main street neighborhoods, is a research feat yet to be undertaken. Businesses that do not have an obvious link to community health, such as law offices, jewelry stores and boutiques still maintain a large presence on Main streets nationally and in Los Angeles (*UCLA Fielding School of Public Health*, 2019). The nexus between these practices presents an opportunity to validate an instrument that can measure the health of all retail types and their impacts on the surrounding environment. The ability of planners to relate these businesses' health impacts on the neighborhood and the larger region can reform the way that we plan communities for accessible and equitable futures.

IV. Data & Measurement

A. Introduction

This project utilizes data representative of Main street environments and health outcomes in neighborhoods adjacent to these retail areas. Data will aid in answering the research question relating to the effect of concentrations of healthy versus unhealthy businesses in retail environments and the health disparities that these create (see *Table 3. Research Design Overview*). The data is from ESRI Business Analyst (used for the Main street mapping and business analysis), NAICS (used for calculating the business type frequency), the CDC "500 Cities Project" (used for the sociodemographic analysis through the Social Vulnerability Index (SVI) and US Small Areas Life Expectancy Project (USALEEP)), and the American Community Survey's census data (used for median household income and race/ethnicity composition). Utilizing these health and sociodemographic data, the statistics are tied to the census tract-level which provides a granular representation of the health outcomes of communities adjacent to Main street environments. Health impacts from retail environments within this research are observed in census tracts that are in (and border) retail areas to test the hypotheses (MacQuillan, 2017). Table 1 shows the types of health and sociodemographic data and their sources utilized for this study.

Table 1. Variables by Data Source

Data source	Variables	Notes
ESRI Business Analyst	- Business points & Business codes (6-digit code between 440000-920000) that specify business type and activity	- Used in the analysis of the frequency of businesses - Businesses generally found to be on Main street
UCLA Fielding School of	- RBCHI: the composite score assigned to a business and overall Main street based on the retail type's ability to promote healthy lifestyle	- Weighted score soured from diverse data sources

Public Health	choices, promote social interaction, allow greater access to health and care services or advice, promote mental wellbeing	- Operationalized for Main streets in 50 cities and 25 states nationwide - Draws on literature and research from urban design, built environment, health impacts, business trade associations
CDC 500	- SVI: Social Vulnerability Index (socioeconomic status, household composition/ disability, minority status/ language, housing transportation) - LEEP: Life Expectancy	- Composite health outcomes score adjusted to the census level tract
U.S. Census Bureau (ACS)	- Race/ethnicity - Median Household Income - Age	- Health outcomes mapping near Main streets - Supplements RBCHI analysis

B. Retail Environments

Business and community data from *ESRI Business Analyst* provide the definitions and parameters of major business districts in the city of Los Angeles. False business districts were systematically eliminated to stay consistent with the metrics used in the national study of "Health on Main Street" (see *Appendix B, GIS False Positive Criteria*). For mapping Main streets, my sample has 145 polygons (retail corridors) within the city of Los Angeles. Errors in this data could come from the elimination of polygons that were not within the selection criteria (*Appendix B, GIS False Positive Criteria)* as this approach was taken due to time and quality control reasons. Ground-truthing and further research into Google Street View will help relay further information.

The North American Industry Classification System ("NAICS") classifies businesses and their specific activities through a six-digit code. NAICS has a more granular classification system as opposed to the Standard Classification System (SICS) which relays data in a four-digit

code. The databases are formed by industry and trade associations and are not standardized by the government or some independent body. During the research process, attempts were made to find a national SIC dataset that had a six-digit code specificity, but it does not exist. For my sample, some of the most frequent NAICS codes within the Main streets include full-service restaurants, law offices, clothing stores, and real estate services (*UCLA Fielding School of Public Health*, 2019). Issues with this data include inadequacies with the type of business activity specified and reported by the business under the NAICS code, causing the RBCHI to be inaccurate. For example, marijuana dispensaries are cited as 453998 under "All Other Miscellaneous Retailers" which is a broad category and includes several business types. However, ground-truthing and further inquiring about certain codes can help to solve these issues with remote data sensing and mapping.

C. Retail Business and Community Health Index (RBCHI)

The Retail Business and Community Health Index (RBCHI) as developed by UCLA's *Center on Occupational & Environmental Health*, will be applied to rate the health-promoting or health-harming qualities in each of the business districts in the sample (*UCLA Fielding School of Public Health*, 2019). The process of creating the tool was overseen by an international advisory group from different sectors and fields of research related to this topic. The group scored the most frequent type of retail outlets found on Main streets and further validated their chosen score value through public polling (from a randomly selected representative population of 2000 adults to retain validity). Through the polling, the public scored each of the retail outlets across each of the domains of health-related outcomes. RBCHI provides an understanding of the health impact of each type of business found on Main street that is supported by literature, direct observation,

GIS mapping, and expert and public opinion. Utilizing this tool for Los Angeles will shed light on the health impacts of businesses in different parts of the city.

Built from principles at four scales that draw from the fields of urban design and community health, the RBCHI metric includes in its scoring information about a business's promotion of healthy lifestyle choices, social interaction, access to health and care services, and mental wellbeing (see *Appendix C, Figure 1*). The tool provides an innovative and evidence-driven manner to address gaps in quantifying impacts of retail on overall well-being and health. Through scoring businesses and compiling a composite Main street RBCHI, the "healthiest" (and "unhealthiest") business types and streets within the City's jurisdiction will be highlighted. Furthermore, the scores will be assessed to see if there is an association between business districts' RBCHI and the population health status of surrounding communities (after controlling for population demographics such as race, mean household income and percent below poverty) (see *Appendix A* for comprehensive and case study mapping).

D. Health Outcomes

Public health literature relays certain statistics and measures as being representative of larger structural forces in community health (Stiefel, 2010). The CDC's "500 Cities" project's purpose is to provide nationwide county and census tract-level small area estimates for chronic disease risk factors, health outcomes, for clinical preventive service use. This data will point to the burden and geographic distribution of health-related variables in certain neighborhoods that are serviced by certain business types. Within this database, the three larger themes of "health outcomes", "prevention", and "unhealthy behaviors" provide specific epidemiological data related to these measures (*CDC,* 2016). The measures selected for this research are both "health outcomes" which are understood to be shaped by environmental factors (in this case—the retail

and built environment) (*CDC*). Selected measures to encapsulate this category include physical health, mental health, obesity, stroke, cancer, and coronary heart disease (*CDC*). This data was collected by the CDC through surveying.

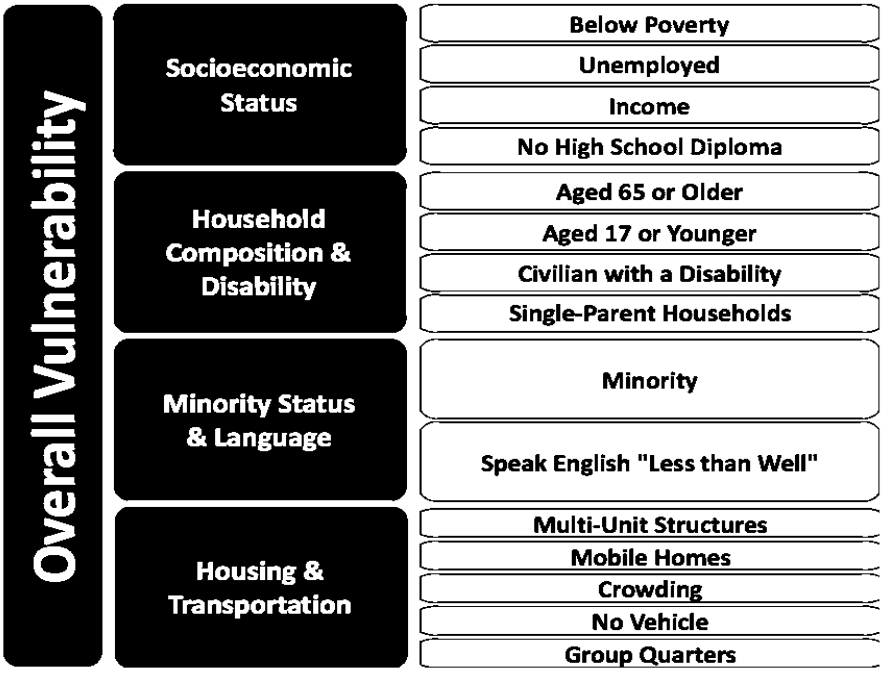
Utilizing the CDC's "U.S. Small-Area Life Expectancy Estimates Project" (USALEEP) will show the estimates of life expectancy at birth (the average number of years a person can expect to live) for Main street neighboring census tracts in Los Angeles. This measure will illuminate ZIP Code theory as a vehicle through which aspects of social and environmental factors contribute to this health outcome. Selected for measuring the health of these communities, LEEP and SVI data are both sourced from the CDC and are tied to the ACS census tract data, eliminating data incongruences. Very few census tracts do not have information on SVI data (due to the size of the census tract and the granularity of the data collected). It is not projected that a site will be chosen that has SVI data missing. The health outcomes mapping was designed with this in mind, as LEEP will provide a measure of health outcomes for these few tracts.

It is important to note that some of the health outcomes are constructed from other variables. For example, the vast majority of the life expectancy data are estimated in about three-quarters of the tracts. The estimations include SES and possibly other factors, which then are correlated to neighborhood built environment indicators. This could infer a tautological relationship. However, the hypothesis test focuses on the RBCHI as the independent factor that impacts the health outcomes and further the built environment analysis. The scale of main street businesses is being tested as the driving force of variances in health data.

E. Social Demographic Data

For this research, the Social Vulnerability Index (as seen below in *Table 2. Social Vulnerability Index Composition*) is a way to compare social conditions, such as high poverty, a low percentage of vehicle access, or crowded households and their overall effect on that community's ability to prevent human suffering and financial loss in the event of a disaster (*CDC*). Socioeconomic status, household composition and disability, minority state and language and housing and transportation indicators are socio-spatial measures which I created are standardized in an index that can identify larger community health needs. This data is being used as an index to measure broader health inequities that exist at the neighborhood level in comparison to the RBCHI.

Table 2. Social Vulnerability Index Composition



Source: Center for Disease Control and Prevention (CDC). (2019). "National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP): Chronic Disease Index". *NCCDPHP*.

F. Expected Findings

I expect to find that Main streets in areas with higher levels of social deprivation, will have businesses that promote adverse health outcomes. Furthermore, if Main streets with higher median household income levels have higher scoring (RBCHI) businesses—then those who live in neighboring census tracts will have better-off health outcomes. If the literature stands true for the on-the-ground impacts, then concentrations of unhealthy businesses will serve areas with lower sociodemographic indicators with worse-off health outcomes. Changes in these health disparities are expected to reflect the changes in RBCHI scores. The data analysis will provide evidence that can supplement the scoring system for better addressing health disparities. Retail corridors with their RBCHI score will be analyzed with other indicators, such as levels of social deprivation and premature mortality.

Table 3. Hypothesis Testing

Expected findings/outcomes of Main Streets in Los Angeles:

1. (Site 1) Highest median income + **highest** RBCHI composite score = **positive** health outcomes
2. (Site 2) High median income + **second highest** RBCHI composite score = **fewer** positive outcomes

Potential findings/outcomes of Main Streets in Los Angeles:

3. (Site 3) Low median income + **fourth highest** RBCHI composite score = **positive** health outcomes
4. (Site 4) Lowest median income + **third highest** RBCHI composite score = **fewer** positive health outcomes

* "highest than average" meaning higher than the city of LA's RBCHI
** "highest/second/third/fourth highest" within the case study sites

V. Methodology

A. Introduction & Research Design Overview

This research involves two strands of work: 1) mapping out Main streets and applying RBCHI and 2) further analysis of sociodemographic data and health outcomes, as well as ground-truthing. This project deploys spatial analysis to test the hypothesis that highlights the relationship between the density of retail types and the localized population health (see *Table 2. Hypothesis Testing*). Literature, expert opinion, statistical frequencies, and public polling provide the RBCHI's weighted score (see *Appendix C, Figure 1*). Observation and ground-truthing ("MAPS") will provide an analysis of the built and social environmental characteristics of the selected Main streets. The breadth and diversity of data collected will provide evidence for targeted policy recommendations.

Table 4. Research Design Overview

Research Question(s)	**Methodology**	**Data**	**Deliverables**
How does the concentration of different businesses along a Main street affect the health of adjacent households?	- Spatial analysis (GIS Mapping Main streets) - Instrument (RBCHI scoring) - Spatial analysis (Mapping health outcomes)	- NAICS codes - RBCHI scores - CDC 500 Cities: SVI LEEP -ACS	- Database of Main streets in LA - Evaluation of RBCHI against MAPS - Database of neighborhood health adjacent to Main streets in LA
Sub-questions:			
How does the built environment interact with the retail settings of Main street?	- Ground-truthing (MAPS tool)	- MAPS scores - RBCHI scores	- Scoring of the "health" of businesses and Main streets in LA
To what extent can the RBCHI serve as a bridge for	- Spatial analysis (GIS Mapping Main streets)	- NAICS codes	- RBCHI can serve other public sector agents to work with businesses to

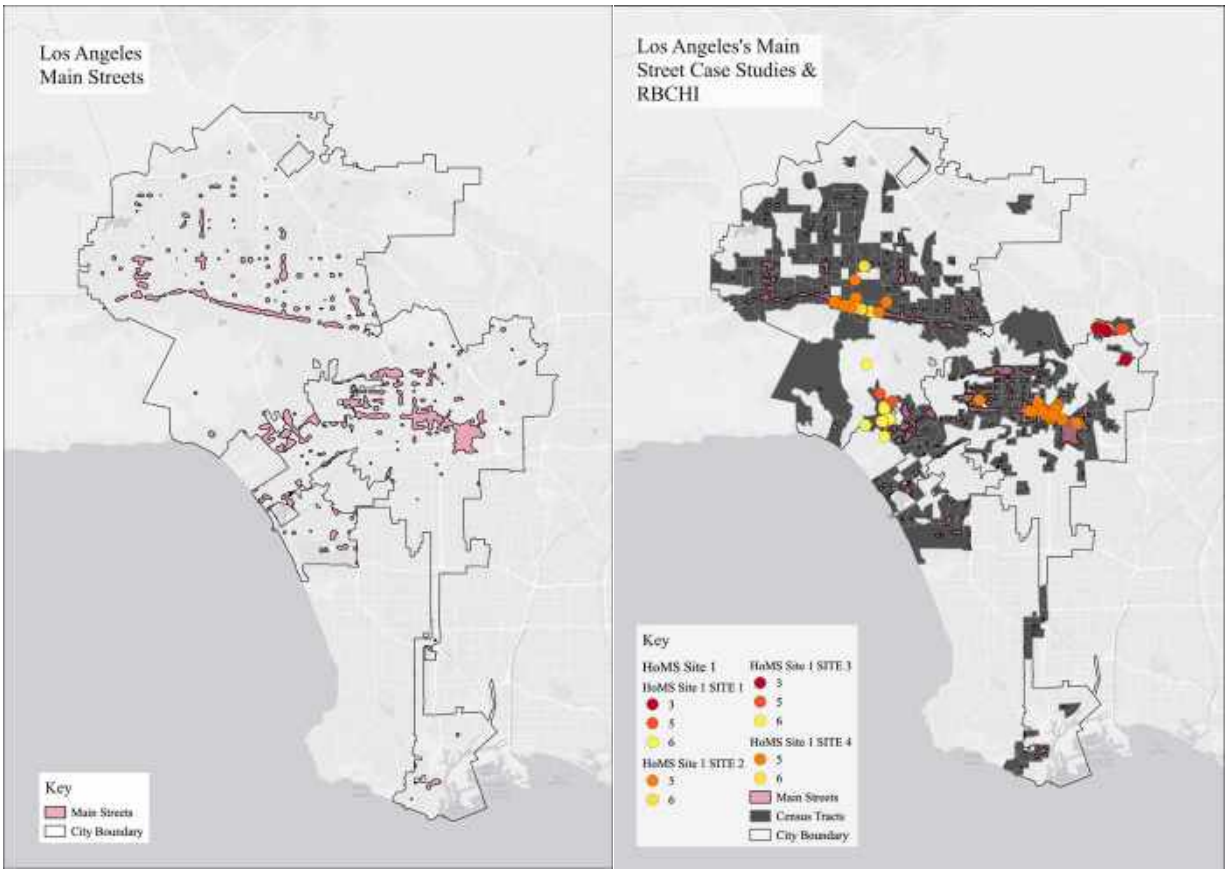
planning practices and public health advocacy?	- Instrument (RBCHI scoring) - Spatial analysis (Mapping health outcomes)	- RBCHI scores - CDC 500 Cities: SVI LEEP -ACS	create healthy retail environments

B. Mapping Main Streets

Currently, there is no database of Main streets or retail corridors for Los Angeles (or the US). With the Center on Occupational & Environmental Health, the first step was to prescribe the definition of the type of retail businesses that would be included in the sample (businesses between the 6-digit NAICS code (440000-920000)). Next, Los Angeles's jurisdictional boundary and buffer were created. The jurisdiction was set to the city boundaries and a buffer was produced due to the health impacts that linger around business districts (see *Appendix A, Figure 2*). Data for this part of the methodology were procured from databases such as *Dun & Bradstreet, InfoUSA, ESRI Business Analyst, Open Street Maps* and a trade association and state databases to supplement any data inadequacies in the aforementioned process. Retail corridors were then created using the specific NAICS bandwidth.

After an analysis of the types of clusters produced, "false positive" corridors were deleted due to a refined set of criteria as advised by the advisory group (see *Appendix B, GIS False Positive Criteria*). False business districts were eliminated in two rounds of criteria testing. The first round included eliminating polygons that: had less than 5 business points, had several businesses registered to the address without the physical appearance of a retail hub (i.e. P.O. box as verified through Google Street View) appeared to be an office park or a skyscraper that was devoid of businesses on the ground floor and polygons that were clustered partially on the edge of a jurisdiction (due to the impact it would have on census tracts outside of the study site). A

second elimination round was created to further distill and eliminate districts in proportion to the size of the neighborhood that it serves. Polygons with less than 10 business points were eliminated as these were not considered sizable enough to produce the health outcomes measured.



After producing the elimination round of false positives, the business points found within these polygons were selected and exported into a spreadsheet. The frequency of NAICS codes was calculated to reveal the top businesses found on these streets. After this, NAICS codes and their subsequent business types were matched to the literature review to see the present gaps in research.

C. Mapping Health Outcomes & Social Demographic Data

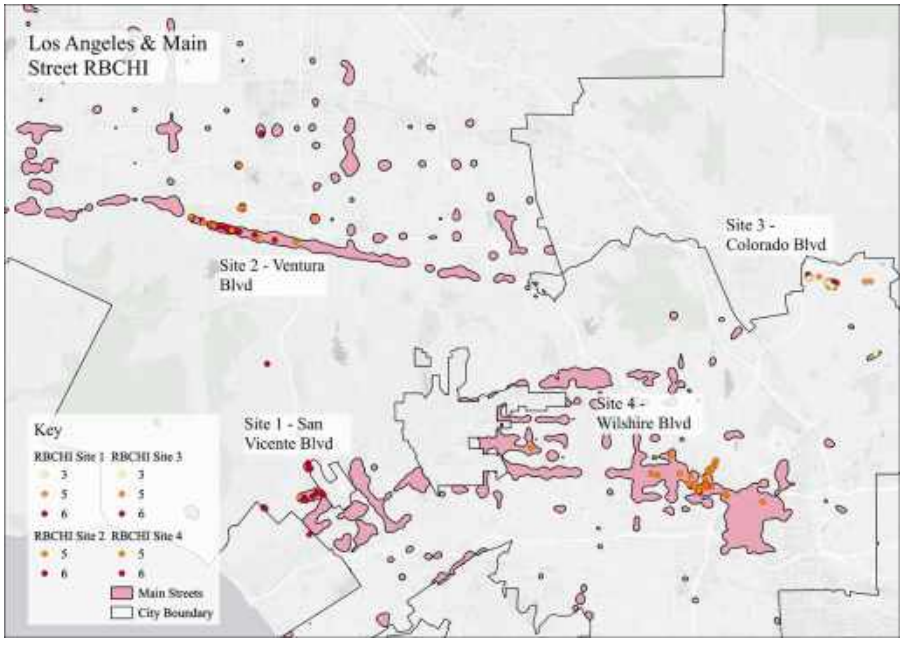
Sociodemographic data will be examined with the RBCHI and ground-truthing survey results. This process included utilizing data from the CDC *500 Cities* project which includes small area estimates to provide accurate census tract-level information. Measurements from this project are the USALEEP (life expectancy) and SVI (social vulnerability index). These measures provide a wide-scale picture of socioeconomic status, sociodemographic data and health indicators for these adjacent neighborhoods to Main street. SVI will be an indicator used to highlight health disparities (as seen below) as it encompasses rankings based on vulnerability (*CDC*).

Table 5. GIS Model

In the GIS model, the LEEP and SVI data are tied together to the census tract-level. The retail districts were then joined to these data to (at the census tract level) to measure the health outcomes of Main street neighborhoods. From here, selected sites are chosen from the expected findings and outcomes section (see *Table 1* above) based on the median household income and RBCHI for these streets. For a detailed procedural list of the GIS methodology, see *Appendix B.* The RBCHI will serve as a scale that will be used to validate both the hypothesis that the concentration of health-promoting or health-harming businesses and their association with better or worse health outcomes for the adjacent population.

D. Case Study: Ground-truthing Selection

Ground-truthing will provide detailed insight into this research. For the study sites, they will be selected based on differences in median household income and the composite RBCHI scores of the Main street businesses (see *Table 3. Hypothesis Testing*). Once the scoring is complete, Main streets will be chosen from the Westside, the San Fernando Valley, Metro LA, and Northeast LA (see *Appendix A. Figure 5*). Following the hypotheses, I expect to find that Site 1 (Brentwood) has health-promoting outcomes concentrated in this area of higher-median household income (with a higher than average RBCHI). I expect to find that Site 2 (Encino) will have more health-harming outcomes than Site 1 when comparing these two areas of high-median household income within the sample. I expect to find that Site 3 (Eagle Rock) has a smaller concentration of health promoting outcomes in this area of middle-median household income (with a lower than average RBCHI). Finally, I expect to find that Site 4 (Westlake) has health-harming outcomes concentrated in this area of lower-median household income (with a slightly lower RBCHI).



The selected study areas will reveal the conceptual model's projected impacts and the validity of hypothesis testing (see *Appendix B, Figure 1*). While all of the retail areas and their projected health outcomes will be relayed, I will select four streets for a deep dive and representation of various sociodemographic data and retail types. These areas are projected to have divergent health outcomes based on their retail, built, and social environment.

E. Case Study: Ground-truthing Instrument

I will ground-truth the selected streets and make direct observations of these areas using the Microscale Audit of Pedestrian Streetscapes ("MAPS") (see *Appendix C Figure 2.*). As previously cited, macroscale factors are associated with physical activity (Cain et al., 2017). The smaller microscale "modifiable" elements of these spaces, such as sidewalks and green infrastructure, also influence physical activity. Measures to evaluate these microscale elements are effectively carried out through the MAPS Survey. This tool was developed to collect data on the pedestrian environment and walkability in neighborhoods (Sallis et al., 2015). MAPS will add the elements of urban design components to the data analysis of health on Main streets through scoring streetscape design (sidewalks, crossings, street trees, and bike facilities) and relating this data to physical activity levels.

MAPS comes in a "Full", "Abbreviated", and "Mini" tool. For the purpose of this research, the Mini tool is the best survey length for the size and composition of the unit being analyzed (Main street). The survey is separated into sections related to their physical and social domain including: the route, land use/destinations, streetscape, aesthetics and social, and walkways and sidewalks (Sallis et al., 2015). By auditing these streets, this tool will relay the capacity for physical activity and public accessibility to the overall RBCHI and health outcomes of a study site. Utilizing this instrument with the RBCHI provides a method for planners and

policymakers to assess and implement healthy Main streets. In regard to the ground-truthing and surveying, it is projected that the business perceptions are not fully attuned to the impacts that they cause a community. Any deviations from the expected or unexpected results will also be interesting, as any health outcomes related to retail environments for the city of Los Angeles have yet to be fully investigated.

VI. Findings

A. Main Street & RBCHI

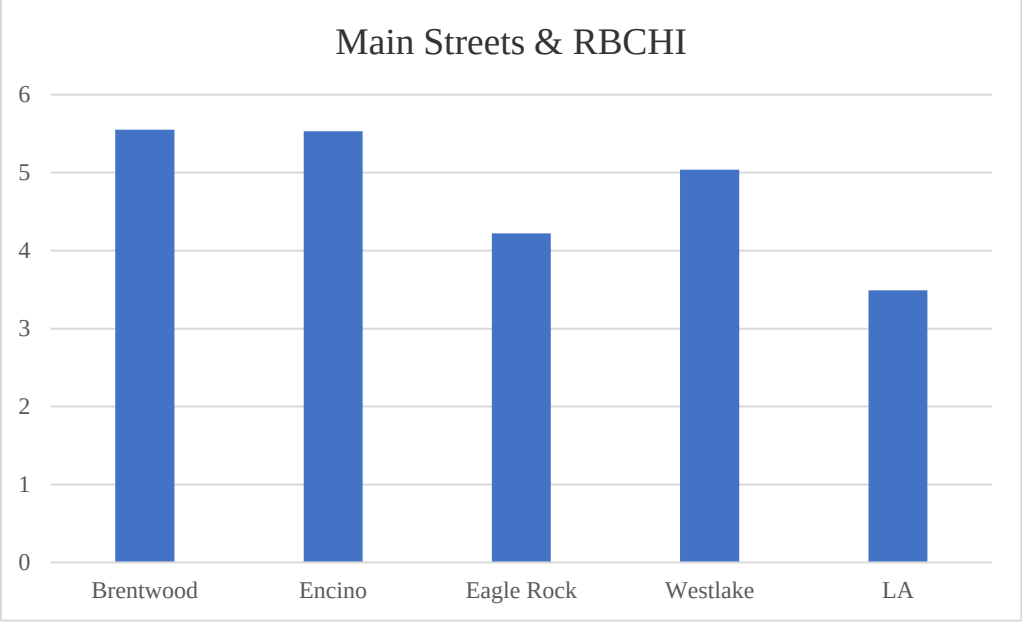
For the Main streets in the case studies, each site consists of 50 clustered businesses that were concentrated within its retail district. The sites were selected based on their median household income and RBCHI (see Section V.A.) and were further surveyed using a built environment analysis tool (see *Appendix C. Figure 3. Case Study Businesses & Locations*). RBCHI's scale ranges from -10 to +10. For the city of Los Angeles, the RBCHI average is 3.49. The site selection below shows that Site 1 (Brentwood) has the highest rank among the four case studies at 5.55, followed by Site 2 (Encino), Site 3 (Eagle Rock), and finally, Site 4 (Westlake). The businesses on these Main Streets have a diverse mix of retail. The most frequent code for sites 1, 2 and 4 is 6211107, which is classified by NAICS as "a wide range of social welfare activities", such as educational, scientific, cultural, and health businesses (*NAICS*). This was unexpected, as the city of LA's top business type is full-service restaurants (code 72251117). This is indeed the most frequent business type in the Main Street in Site 3.

According to my hypothesis (as stated in the *Data & Measurements* section (pg. 13)), Site 1, the Main street with the highest RBCHI and higher median household income, will have the most positive health outcomes. Site 2, the Main street with the higher than average RBCHI

and higher median household income, will have somewhat positive health outcomes, but will not be the highest in the dataset. Site 3, the Main street with the lower than average RBCHI and lower median household income, will have somewhat more negative health outcomes. Finally, Site 4, the Main street with the lower than average RBCHI and the lowest median household income, will have negative health outcomes.

Table 6. Main Street RBCHI & NAICS Frequency

Main Streets	RBCHI	Rank	HH Income	NAICS Classification
Site 1 Brentwood	5.55	1st	$121,671	62111107: "social welfare activities"
Site 2 Encino	5.53	2nd	$67,093	62111107: "social welfare activities"
Site 3 Eagle Rock	4.22	4th	$45,478	72251117: "full-service restaurants"
Site 4 Westlake	5.04	3rd	$26,757	62111107: "social welfare activities"
City of LA	3.49	5th	$58,385	72251117: "full-service restaurants"



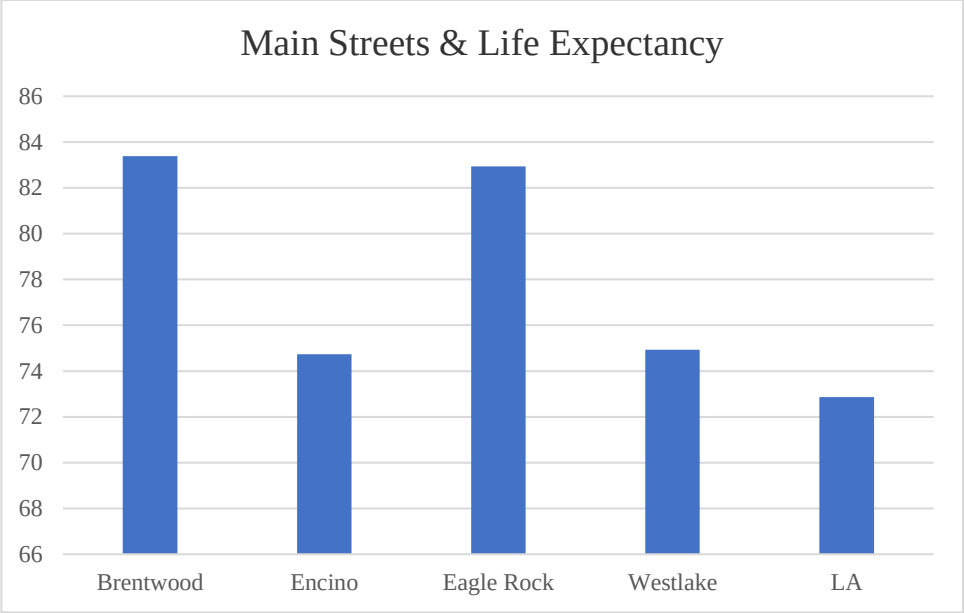
B. Health Outcomes

a. Life Expectancy

The average life expectancy for all four case study sites is higher than the Los Angeles city average. The average city of Los Angeles's life expectancy is 72.86 years (*CDC*, 2016), while the average life expectancy for Encino is 74.73 years, Eagle Rock is 74.73 years, Eagle Rock at 74.94 years, Westlake at 82.94 years, and Brentwood at 83.38 years (*CDC)*. Life expectancy has been labeled as an indicator of economic and health development of a community (Acemoglu, 2006). It is exceptional that the city's overall age is the lowest value in this dataset, whereas the Main street with the highest median household income (Brentwood) has the highest life expectancy. When juxtaposed to the median household income of the sites, the highest life expectancy is paired with Brentwood. Westlake, however, where the most adverse effects were expected, has the second highest life expectancy among the case studies, and quite above the city average.

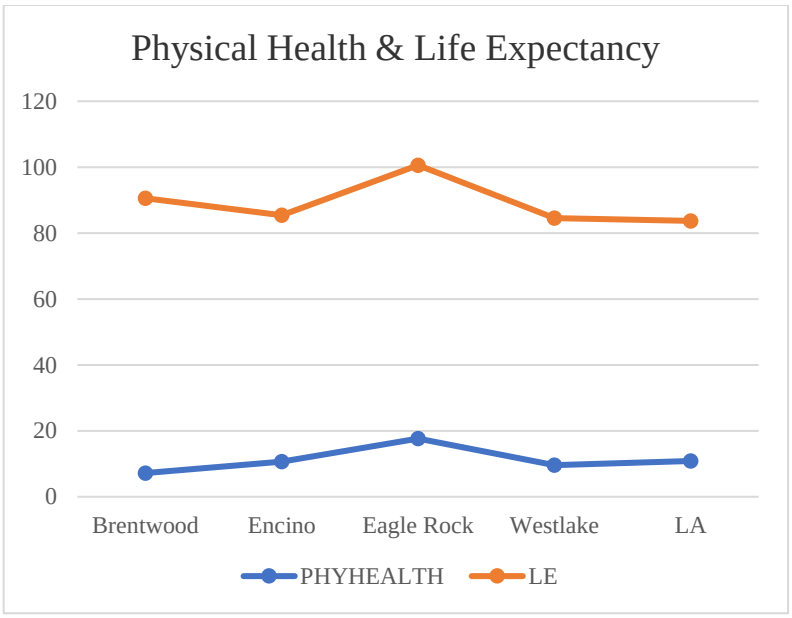
Table 7. Main Street Life Expectancy

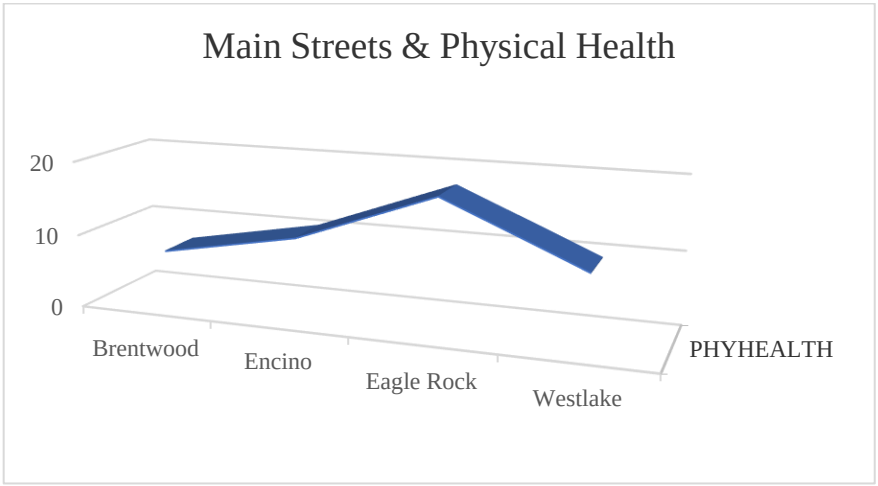
Main Street	**Life Expectancy**
Site 1 Brentwood	83.38
Site 2 Encino	74.73
Site 3 Eagle Rock	74.94
Site 4 Westlake	82.94
City of LA	72.86



b. Physical Health

The physical health outcome measures the wellness of health (under the framing of "not having good physical health for 14 or more days in one year") among adults aged 18 years and older. For the city of Los Angeles, the physical health of its population in the sample was 10.6, meaning that approximately 11% of the population did not have good physical health for two weeks or more during 2016. When analyzed further by Main street, the Brentwood site had the lowest value of adults that did not have good physical health (7.2%), followed by Eagle Rock (9.6%), Encino (10.7%), and Westlake (17.7%). Overall, the Main streets had a higher value of adults that did not have good physical health (11.3%) when compared to the average for the city of LA (10.9%).

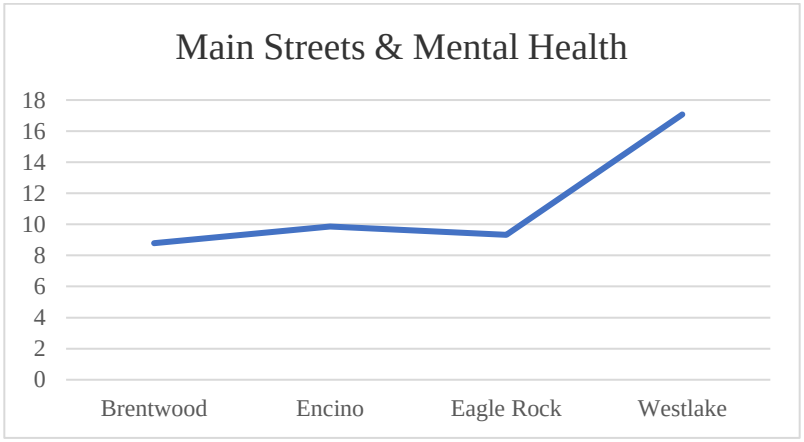




c. Mental Health

The mental health outcome measures the wellness of health (under the framing of "not having good mental health" for 14 or more days) among adults (aged 18 years and older). For the city of Los Angeles, the mental health of this population in the sample was 11.4, meaning that a bit over 11% of the population did not have good mental health for two weeks or more during 2016. When analyzed further by Main street, the Brentwood site had the lowest value of adults that did not have good mental health (8.8%), followed by Eagle Rock (9.32%), Encino (9.9%),

and Westlake (17.1%). Overall, the Main streets had a higher value of adults that did not have good mental health (12.1%) when compared to the average for the city of LA (11.4%).

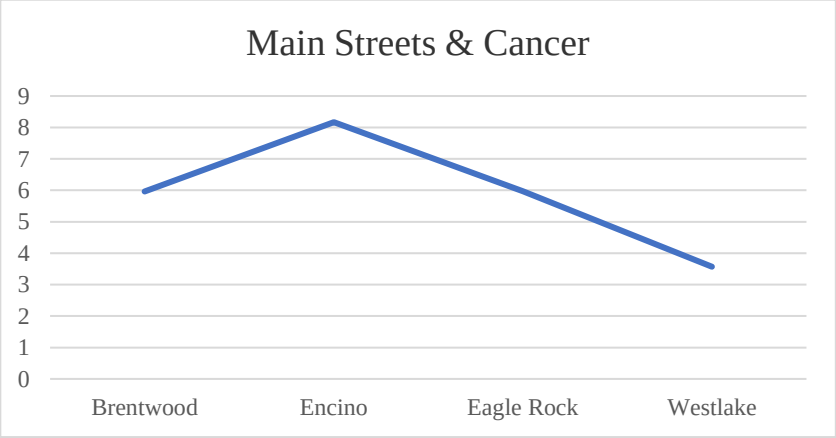


d. Obesity

For the city of Los Angeles, the obesity of this population in the sample was 22.4, meaning that 22.4% of the population measured was considered medically obese in 2016. When analyzed further by Main street, the Encino site had the lowest value of obesity (18.54%), followed by Westlake (19.83%), Brentwood (21.7%), and Eagle Rock (30.9%). Overall, obesity was slightly lower in the Main streets communities (22.4%) when compared to the average for the city of LA (22.7%).

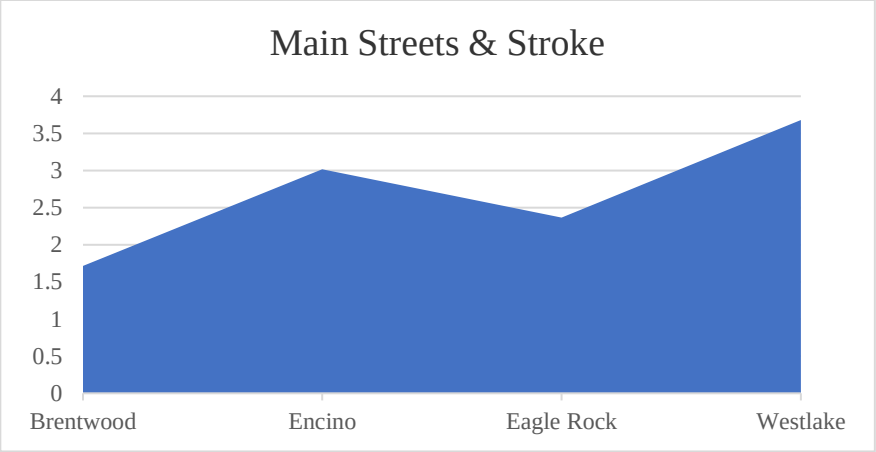
e. Cancer

For the city of Los Angeles, the percentage of the population in the sample was 5.2, meaning that 5% of the population had (and could still have) cancer in 2016. When analyzed further by Main street, the Westlake site had the lowest value of adults with cancer (3.6%), followed by Brentwood (6.0%) and Eagle Rock (6.0%), and finally Encino (8.2%). Overall, the Main streets had a higher value of adults with cancer (5.9%) when compared to the average for the city of LA (5%). It is interesting that the site with the lowest RBCHI had the lowest cancer incidence.



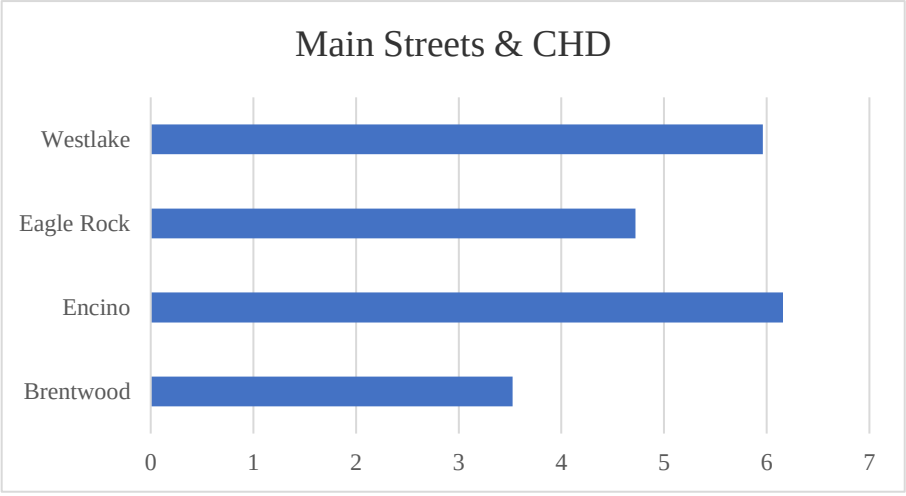
f. Stroke

The stroke outcome measures the percentage of adults (aged 18 years and older) that have had an episode(s) of stroke. For the city of Los Angeles in the sample, the value is 2.6, meaning that approximately 3% of the population had a stroke (or more than one stroke) during 2016 (CDC). When analyzed further by Main street, the Brentwood site had the lowest value of adults that had a stroke (1.7%), followed by Eagle Rock (2.4%), Encino (3%), and Westlake (3.7%). Overall, the Main streets had a higher value of adults that had a stroke (2.7%) when compared to the average for the city of LA (2.6%).



g. Coronary Heart Disease

The coronary heart disease (CHD) outcome measures the percent of adults (aged 18 years and older) that have this disease. For the city of Los Angeles, the percent of the population in the sample with CHD was 4.7, meaning that approximately 5% of the population had a diagnosis of CHD during 2016. When analyzed further by Main street, the Brentwood site had the lowest value of adults with CHD (3.5%), followed by Eagle Rock (4.7%), Westlake (6.0%), and Encino (6.2%). Overall, the Main streets had a higher value of adults that had CHD (5.1%) when compared to the average for the city of LA (4.7%).



h. Conclusion

Below are the outcomes for the ranking of the Main streets. As explained in detail above, Site 1 has the highest overall RBCHI and the highest health-promoting outcomes that are compared in this research. They are ordered by the summation of the health outcome rankings. Overall, Site 3 has the lowest overall RBCHI and the lowest health-promoting health outcomes. The RBCHI does appear to have a direct relationship with health outcomes for residents of Main street communities.

Table 8. Outcomes of Main Streets in Los Angeles

Site 1: Highest median income + healthy RBCHI composite score = ***#1*** *health-promoting* outcomes
Site 2: High median income + unhealthy RBCHI composite score = ***#2*** *health-promoting* outcomes
Site 3: Low median income + unhealthy RBCHI composite score = ***#4*** *health- promoting* outcomes
Site 4: Lowest median income + healthy RBCHI composite score = ***#3*** *health-promoting* outcomes

B. Main Streets & SVI

The RBCHI's relation to the Social Vulnerability Index appears to have a somewhat proportional relationship. As SVI is calculated into four domains, the weighted average of these four relays an overall picture of vulnerability. For the city of Los Angeles, overall SVI was 45.7, meaning that approximately 46% of the population in 2016 experienced vulnerability in the areas of socioeconomic status (SVI 1), household composition/disability (SVI 2), minority status/ language (SVI 3), and housing/transportation (SVI 4). When SVI is analyzed further in combination with the RBCHI, the Eagle Rock site had the highest SVI ranking, followed by Westlake, Encino, and Brentwood. Overall, the Main streets had a slightly higher SVI (46.3%),

when compared to the average for the city of LA (45.7%). The RBCHI score for these Main streets is ranked from highest to lowest as Brentwood, Encino, Eagle Rock, and Westlake.

Table 9. Main Street SVI

	SVI 1	SVI 2	SVI 3	SVI 4	Averaged
Site 1	4th	4th	4th	4th	4th
Site 2	3rd	2nd	3rd	3rd	3rd
Site 3	2nd	3rd	2nd	2nd	2nd
Site 4	1st	1st	1st	1st	1st

C. Main Street RBCHI & Built Environment

MAPS Mini Tool is an effective scale to observe Main street built environment impacts. Through scoring elements of the "Crossing" and "Segment", this microscale pedestrian experience allows analysis of the environment through which visitors and residents experience the urban form of Main street. The four sites (Brentwood, Encino, Eagle Rock, and Westlake) were observed on the same day of the week and for the same duration (1:00 PM – 1:30 PM), when people would be travelling to and interacting on Main streets. Below are the audit results as well as the ranking of the built environments for the sites.

Table 10. Main Street MAPS Mini Results

		Site 1 – Brentwood	**Site 2 – Encino**	**Site 3 – Eagle Rock**	**Site 4 – Westlake**
Crossing	1. Is a pedestrian walk signal present?	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**

	2. Is there a ramp at the curb(s)?	Yes, at both pre-crossing and post-crossing **curbs (+2)**	Yes, at both pre-crossing and post-crossing curbs **(+2)**	Yes, at both pre-crossing and post-crossing curbs **(+2)**	Yes, at one curb only **(+1)**
	3. Is there a marked crosswalk?	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**
Segment	1. Type: Residential/ Commercial	Commercial **(+1)**	Commercial **(+1)**	Commercial **(+1)**	Commercial **(+1)**
	2. How many public parks are present?	0 **(+0)**	0 **(+0)**	1 **(+1)**	0 **(+0)**
	3. How many public transit stops are present?	2 or more **(+2)**	1 **(+1)**	2 or more **(+2)**	2 or more **(+2)**
	4. Are there any benches or places to sit?	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**	No **(+0)**
	5. Are streetlights installed?	Ample **(+2)**	Ample **(+2)**	Ample **(+2)**	Some **(+1)**
	6. Are the buildings well maintained?	100% **(+1)**	100% **(+1)**	100% **(+1)**	0-99% **(+0)**
	7. Is graffiti//tagging present?	No **(+1)**	No **(+1)**	No **(+1)**	Yes **(+0)**
	8. Is there a designated bike path?	Painted line **(+1)**	No **(+0)**	Painted line **(+1)**	No **(+0)**
	9. Is a sidewalk present?	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**
	10. Are there poorly maintained sections of the sidewalk that constitute major trip hazards?	None **(+1)**	Any **(+0)**	None **(+1)**	Any **(+0)**
	11. Is a buffer present?	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**	Yes **(+1)**

	12. What percentage of the length of the sidewalk/walkway is covered by trees, awnings or other overhead coverage?	26-75% **(+1)**	**0-25% (+0)**	76-100% **(+2)**	0-25% **(+0)**
TOTAL Rank		**16/21: 76% #2**	**12/21:57% #3**	**19/21: 90% #1**	**9/21: 43% #4**

VII. Analysis

A. Introduction

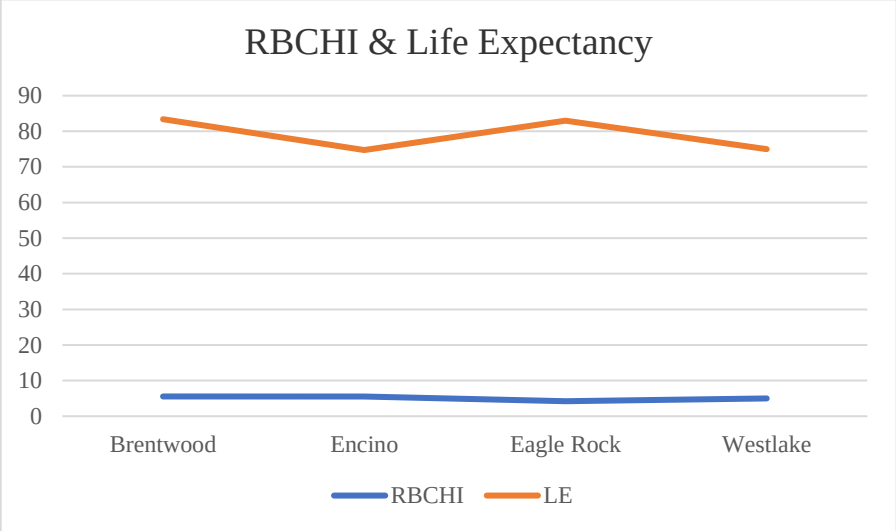
The data reveal that overall, for Main streets with higher RBCHI, the health outcomes are higher. The data show that health outcomes for the case study communities are slightly worse than communities near Main streets, when compared to the city of LA. In regard to social vulnerability, this pattern was inverse to RBCHI, meaning that a more socially vulnerable street had a lower RBCHI. The streets with the higher RBCHI also have higher built environment scores. However, the data suggest that the built environment scores can be used as identifiers for understanding the Main streets' prioritization of public space.

B. Main Street RBCHI & Health Outcomes

a. RBCHI & Life Expectancy

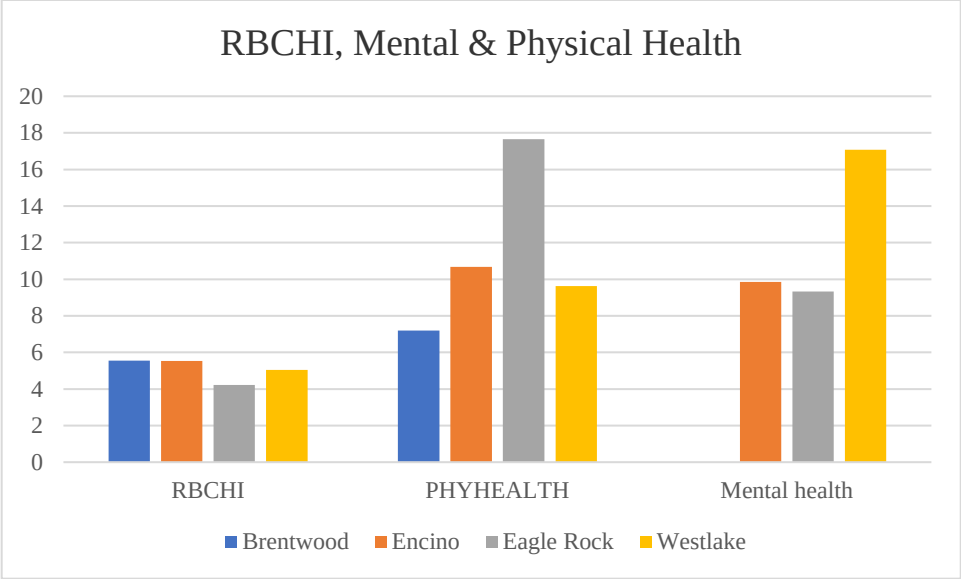
RBCHI's and life expectancy have a directly proportional relationship. The higher the RBCHI, the higher the life expectancy. For the city of Los Angeles, the life expectancy of the population in the sample was 72.9, meaning that the population's life expectancy in 2016 was approximately 73 years of age. When analyzed further by Main street, the Brentwood site had the highest life expectancy (83.4), followed by Eagle Rock (82.9), Westlake (74.9), and finally Encino (74.7). Overall, the Main streets had a higher life expectancy value (78.9) by six years,

when compared to the average for the city of LA (72.9). The RBCHI for these Main streets is ranked as Brentwood, Encino, Eagle Rock, and Westlake. Therefore, it can be stated that for Main street communities, there is a general relationship between lower RBCHI, lower household median income, and lower life expectancy.



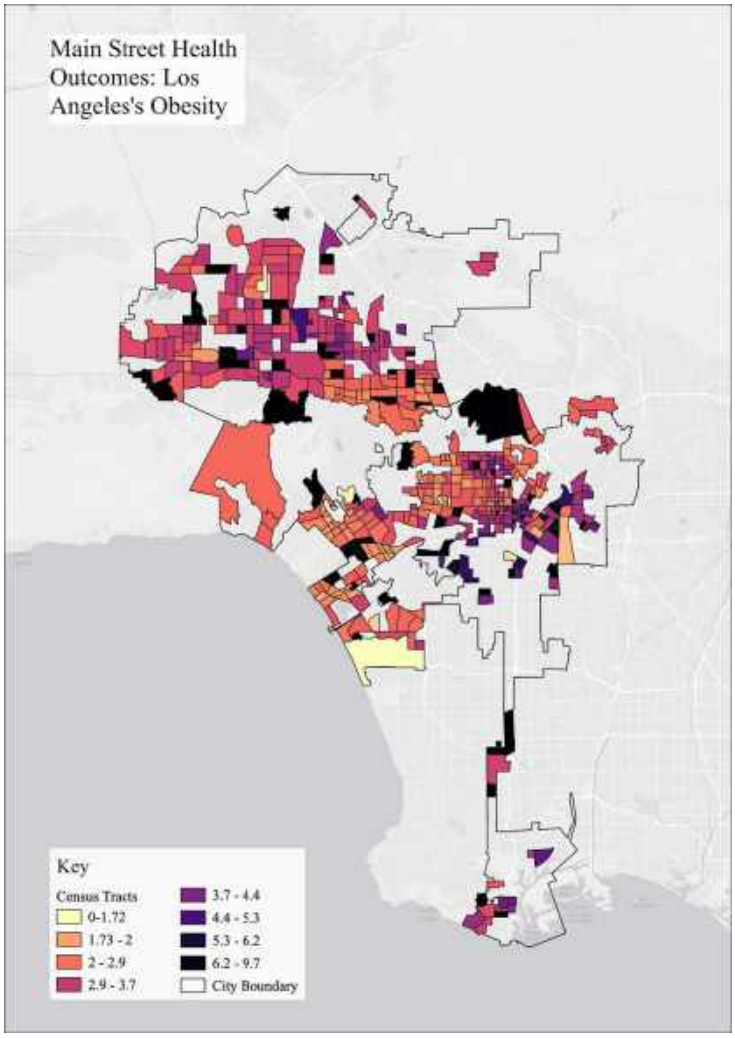
b. RBCHI & Mental/Physical Health

The RBCHI's impact on mental and physical health appears to have a directly proportional relationship. The higher the RBCHI, the lower the percentage of the population that did not have good health. When mental and physical health are analyzed further in combination with one another and their RBCHI, the Eagle Rock site had the highest percentage of reported "not good health" (13.5%), followed by Westlake (13.4%), Encino (10.3%), and Brentwood (7.2%). Overall, the Main streets had quite similar percentages of reported "not good health" (11.10%), when compared to the average for the city of LA (11.12%). The RBCHI for these Main streets is ranked as Brentwood, Encino, Eagle Rock, and Westlake. Therefore, it can be stated that for Main street communities, there is a general relationship between lower RBCHI, lower household median income, and higher levels of "not good" mental/physical health.



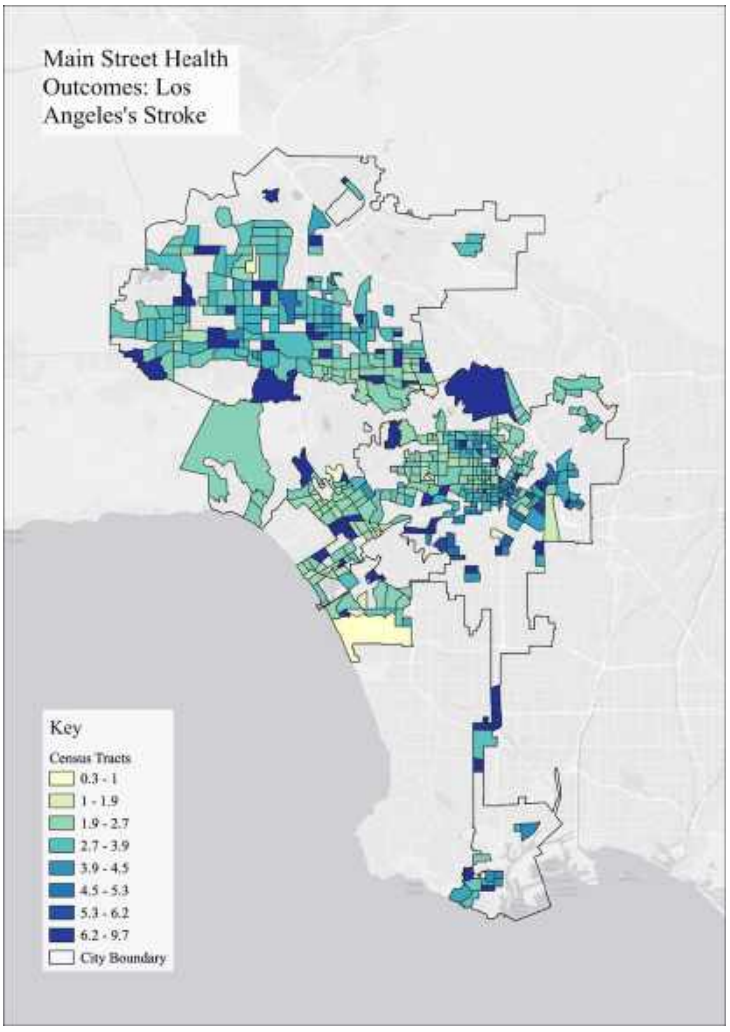
c. RBCHI & Obesity

For the obesity health outcome, Eagle Rock has the highest obesity rate (30.95) at 31%. Brentwood has the second-highest value (21.7) at 22%, followed by Westlake (19.83) at 20%, and finally Encino (18.54) at 19%. It is interesting to note that Brentwood, which has the best RBCHI, the highest median household income, and overall the highest health outcomes, had the second highest rate for obesity. This is the only health measure where this community deviated from its general pattern. Obesity is a health outcome that is influenced by nutrition and can result from an excess of food intake (complemented with lower levels of physical activity), which can be found both in food swamps/deserts of lower median household income communities and areas with higher median household income with higher purchasing power for food. Therefore, it cannot be stated that for Main street communities, there is a relationship between a lower RBCHI and higher levels of obesity when compared to the strength of the other health measures. Obesity appears to be influenced more heavily by household income and built environment than RBCHI.



d. RBCHI & Stroke

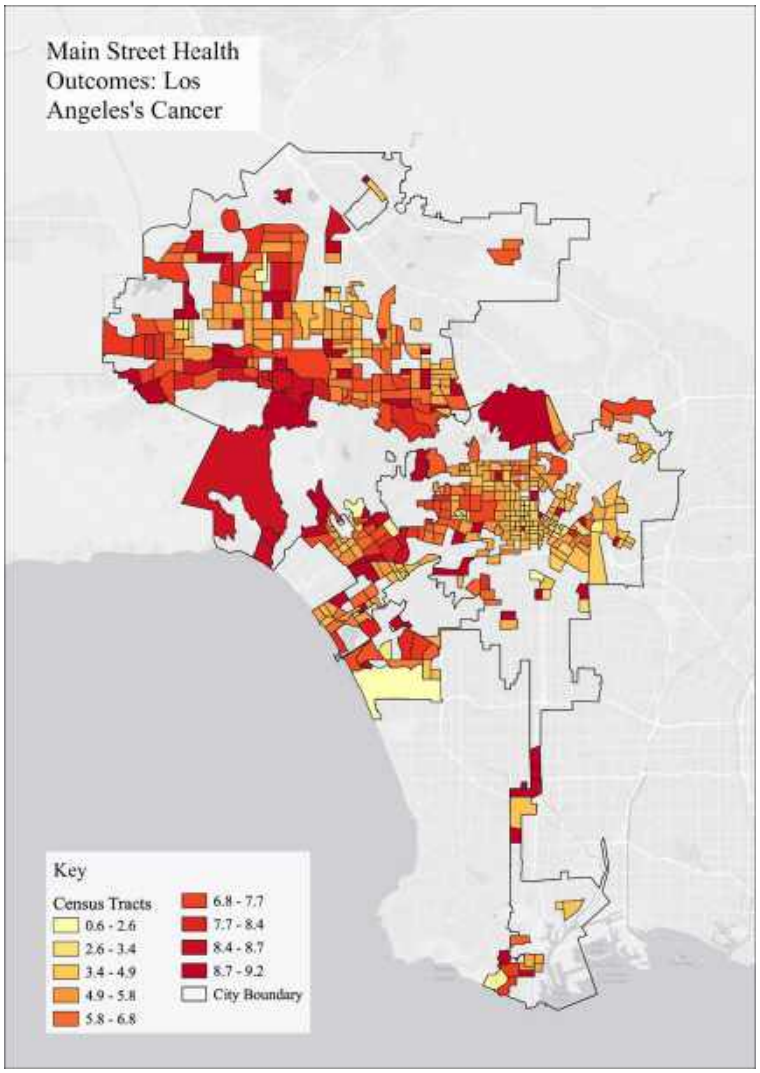
In the sample, Westlake had the highest value for stroke (3.68%) with Encino following (3.01%), Eagle Rock (2.37%) and Brentwood (1.72%). For this health outcome, the RBCHI hypothesis (the higher the RBCH, the higher health-promoting outcomes) is not applicable. Stroke (just like cancer as seen below) can be influenced by other non-environmental and social factors (i.e. risk factors, such as genetics). However, the highest likelihood of having a stroke for an individual in the sample is found in Westlake. Therefore, it can be stated that for Main street communities, there is a relationship between lower RBCHI and a higher chance of stroke.



e. RBCHI & Cancer

The RBCHI's relationship to cancer appears to not be significant. In other words, when RBCHI is higher or lower than average, cancer appears to be unrelated. For the city of Los Angeles, the cancer rate of the population in the sample was 5.2, meaning that the population cancer rate in 2016 was approximately 5.2%. When analyzed further by Main street, the Encino site had the highest rate of cancer (8.2%), followed by Brentwood (6.0%) and Eagle Rock (6.0%), and finally Westlake (3.6%). Overall, the Main streets had a higher cancer rate (5.9%), when compared to the average for the city of LA (5.2%). The RBCHI for these Main streets is ranked as Brentwood, Encino, Eagle Rock, and Westlake. Therefore, it cannot be stated that for

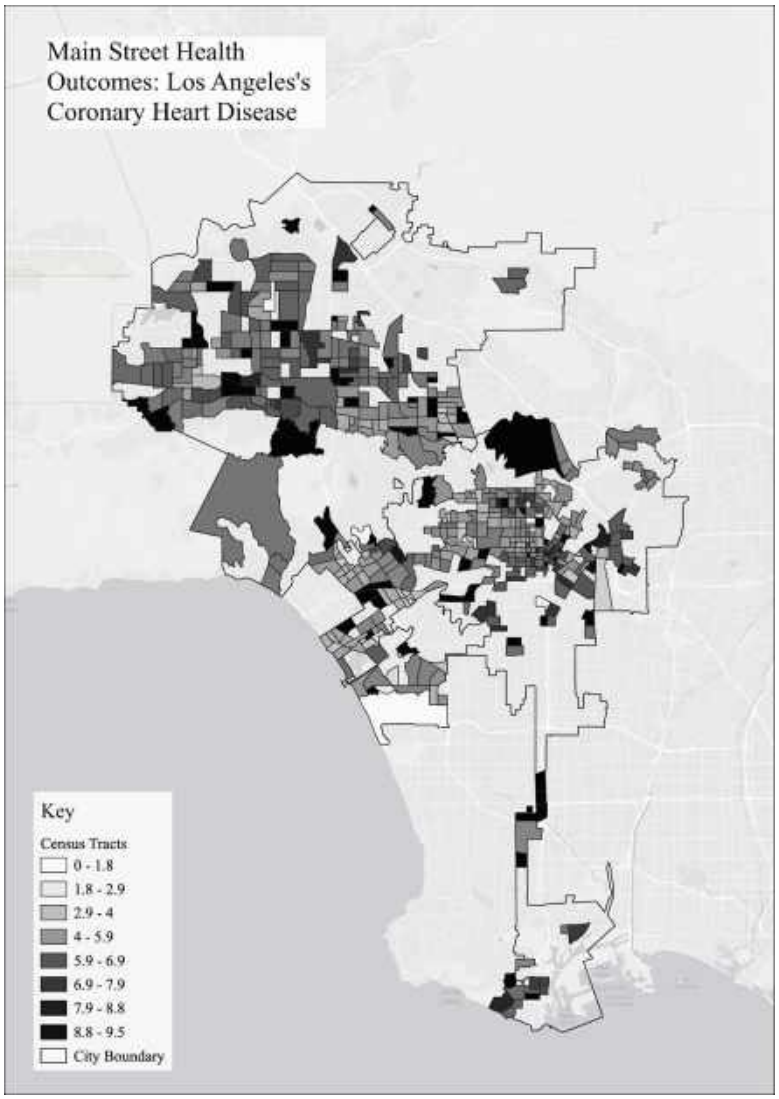
Main street communities, there is a general relationship between lower RBCHI, lower household median income and higher levels of cancer. There are elevated levels of cancer for the streets with higher RBCHI and higher median household incomes.



f. RBCHI & CHD

The RBCHI's association to CHD appears to have a directly proportional relationship. For the city of Los Angeles, the weighted score of the population's health outcome in these three areas was 9.9, meaning that approximately 10% of the population in 2016 experienced any three of these health outcomes. When these health outcomes are analyzed further in combination with

one another and their RBCHI, the Eagle Rock site had the highest percentage of experiencing these outcomes (12.7%), followed by Westlake (9.8%), Encino (9.2%), and Brentwood (9.0%). Overall, the Main streets had a slightly higher percentage of combined stroke, obesity, and CHD (10.2%), when compared to the average for the city of LA (9.9%). The RBCHI for these Main streets is ranked as Brentwood, Encino, Eagle Rock, and Westlake. Therefore, it can be stated that for Main street communities, there is a general relation between lower RBCHI and higher levels of CHD.



C. Main Street RBCHI & SVI

a. Introduction

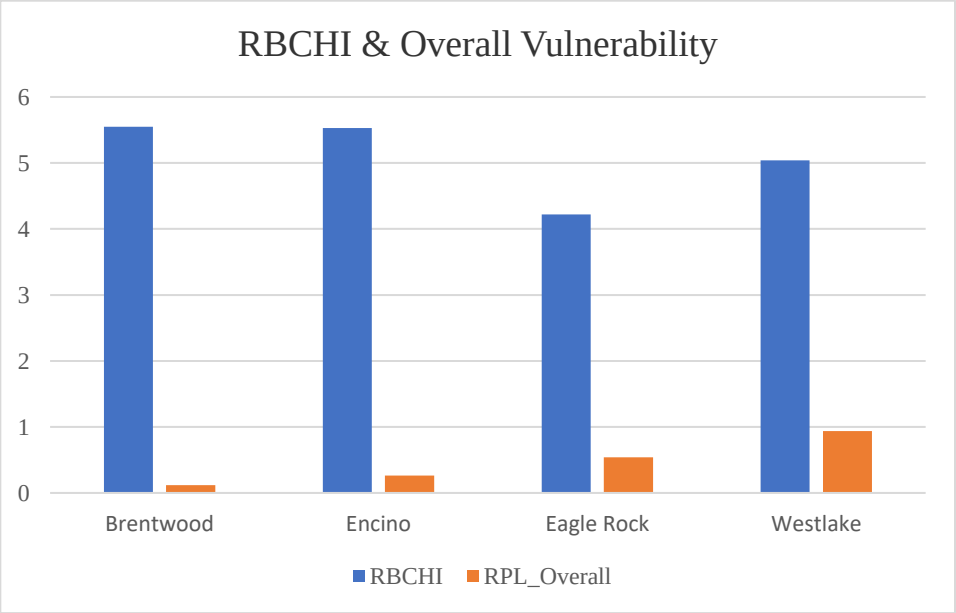
This research proved that the overall social vulnerability of a Main street is related to the RBCHI. The categories for SVI include “socioeconomic status”, “housing composition/ disability”, “minority status/language”, and “housing/transportation”. These categories also combine to create a composite score, an “overall vulnerability”. The city of LA has an overall SVI of 45.74%, meaning that just under half of the communities in the city are vulnerable when viewed under these sociodemographic indicators. Westlake has the highest vulnerability (93.63%) and the second lowest RBCHI in the sample, while Brentwood has the lowest vulnerability (11.67%) and the highest RBCHI. Encino has the second-lowest vulnerability (26.11%) and the second highest RBCHI. Eagle Rock has the second-highest vulnerability score (53.74%) and the lowest RBCHI in the sample. The difference between the most vulnerable Main street (Westlake) and the second most vulnerable street (Eagle Rock) is a substantial difference of about 40 units. The least socially vulnerable streets have smaller deviations when comparing their SVI and RBCHI values.

This research found that a higher RBCHI leads to higher health-promoting outcomes for Main street communities. However, in the case of social vulnerability, Westlake with the lowest median household income, has the highest SVI. While RBCHI generally was a good predictor of health outcomes, SVI is more directly related to median household income, relaying how socioeconomic status can be a predictor of how communities fare in times of crisis or disaster.

Table 11. Main Street Overall SVI & RBCHI

Overall SVI	Rank	RBCHI	Rank
Site 1	4th	5.55	1st

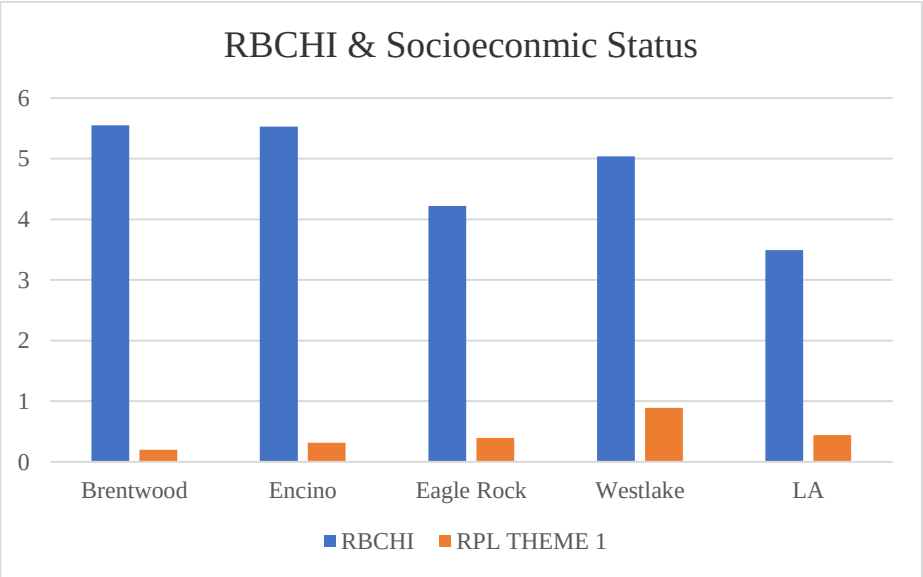
Brentwood			
Site 2 Encino	3rd	5.53	2nd
Site 3 Eagle Rock	2nd	4.22	4th
Site 4 Westlake	1st	5.02	3rd



b. SVI Theme 1: Socioeconomic Status

Socioeconomic status (SES) includes the percentage of poverty (population living below federal poverty level), people unemployed (age 16 and over and seeking work), per capita income (in 2016 inflation-adjusted $), education (age 25+ without a high school diploma), and health insurance (age less than 65 without insurance) of a community. For socioeconomic status, Westlake has a score of 88.96 meaning that it is about 89% vulnerable when viewed through SES. Westlake is followed by Eagle Rock, (39.24%), Encino (31.54%), and Brentwood (19.87%). The city of LA's SVI socioeconomic status is 44.20%. The difference between the averages of the Main street sites (44.90%) and the city's (44.20%) is 0.70%. The difference

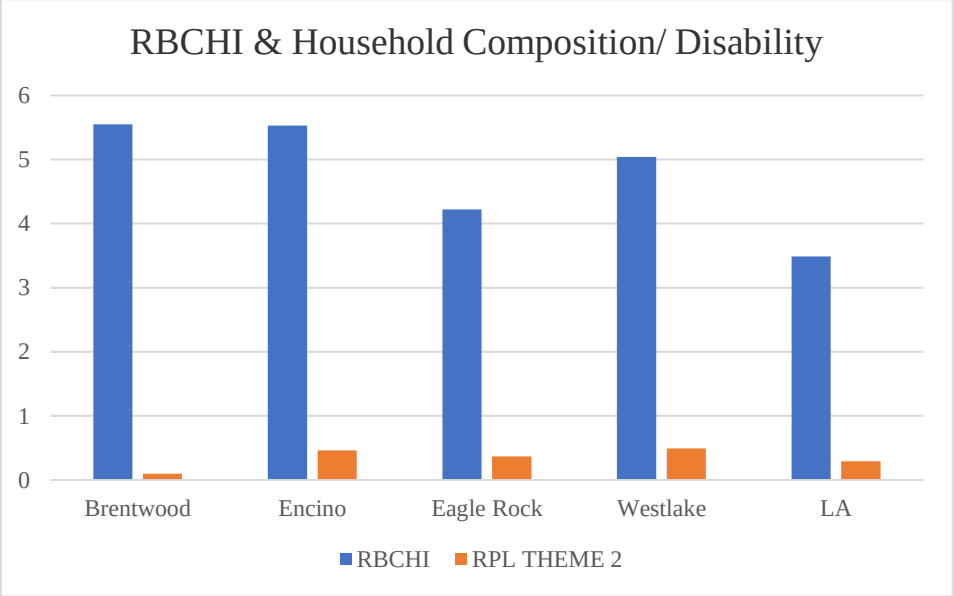
between the highest-ranking SVI value (Westlake (88.96%)) and the city's score is almost 50% (44.76%). In this category, it is clear that median household income is a significant factor when analyzing SES as a whole in terms of social vulnerability.



c. SVI Theme 2: Household Composition/Disability

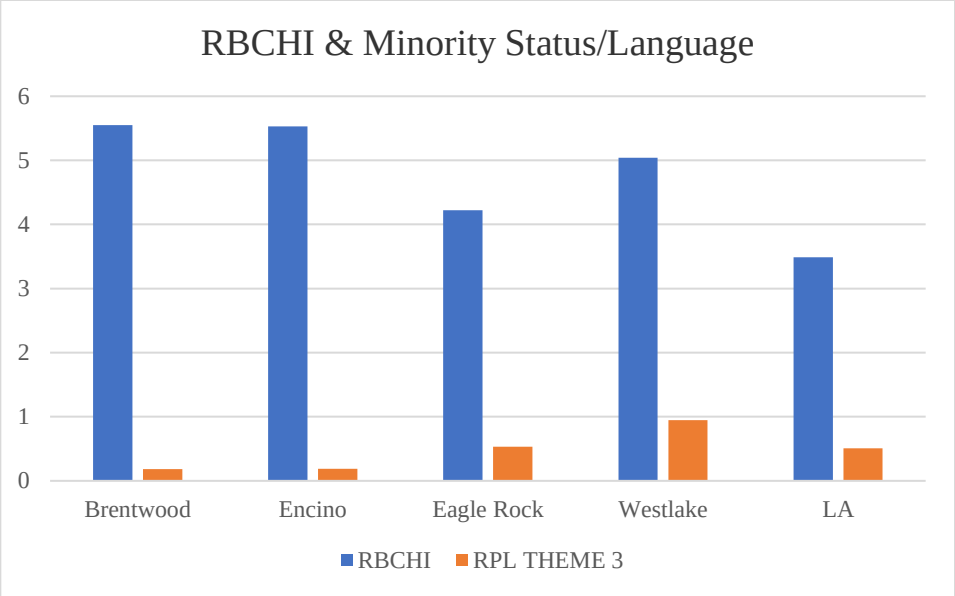
Household composition/ disability includes the percentage of children (population age less than 18 (%)), elderly (population aged 65 and older), disabled (age 5 or more with a disability (%)), and single parents (percent of households with children (%)) of a community. For this category, Westlake has a score of 49.31, meaning that it is about 50% vulnerable when viewed through household composition/disability. Westlake is followed by Encino (46.07%), Eagle Rock (36.78%), and Brentwood (9.64%). The city of LA's SVI household composition/disability score is 29.31%. The difference between the averages of the Main street sites (35.45%) and the city's score (29.31%) is 6.14%. The difference between the highest-ranking SVI value (Westlake (49.31%)) and the city's score (29.31%) is 20%. This difference between the case study sites and the city's score was the second-lowest value in the analysis for

SVI data highlighting that Angelenos across Main street communities have similar disability and household composition levels.



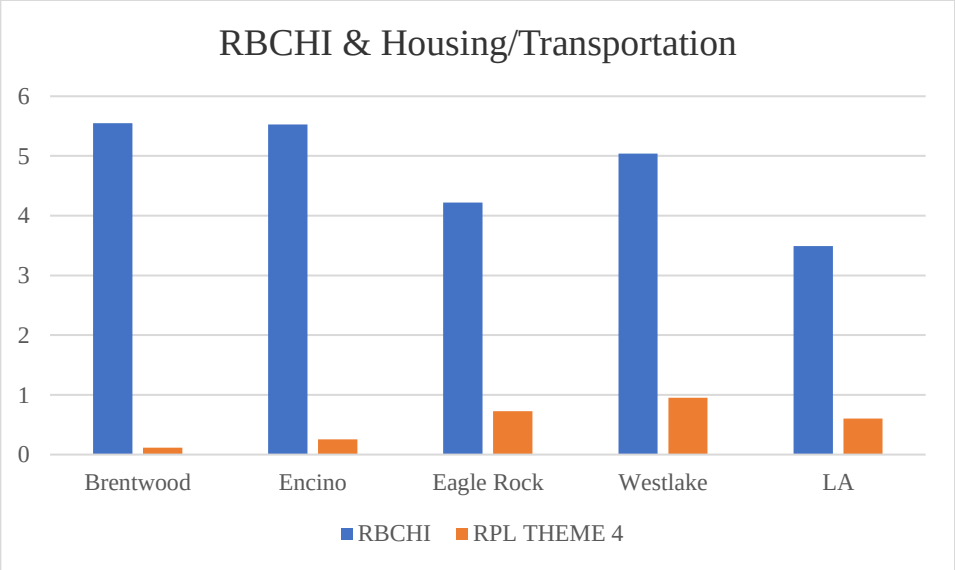
d. SVI Theme 3: Minority Status/Language

Minority status/language includes the percentage of minority (Hispanic or non-white race), and limited English speakers (age 5 and over who speak English less than "well") of a community. For this category, Westlake has a score of 94.64, meaning that this Main street is approximately 95% vulnerable when viewed through minority status/language. Westlake is followed by Eagle Rock (53.11%), Encino (19.05%) and Brentwood (18.31%). The city of LA's SVI minority status/language score is 50.72%. The difference between the averages of the Main street sites (46.28%) and the city's score (50.72%) is 4.44%. The difference between the highest-ranking SVI value (Westlake (94.64%)) and the city's score (50.72%) is almost 50% (46.28%). This is the category where there is the largest deviation between the most vulnerable Main street site when compared to the city of LA as a whole. However, the average of the case study streets and the city's score is the smallest, at 4.44%. This points to a barrier in language and access to information that may be present for Westlake community members.



e. SVI Theme 4: Housing/Transportation

Housing/transportation includes the measures of large apartment buildings (housing units 10 or more per building (%)), mobile homes (percent of housing units (%)), crowding (housing units with more than one person per room (%)), no vehicle (households with no vehicle available (%)), and group quarters (population living in group quarters (%)) of a community. For this category, Westlake has a score of 94.92, meaning that it is about 95% vulnerable when viewed through housing/transportation. Westlake is followed by Eagle Rock (72.81%), Encino (25.69%), and Brentwood (11.67%). The city of LA's SVI housing/transportation score is 60.09%. The difference between the averages of the Main street sites (51.27%) and the city's (60.09%) is almost 10% (8.82%). The difference between the highest-ranking SVI value (Westlake (94.92%)) and the city's score (60.09%) is just over 30% (34.83%).

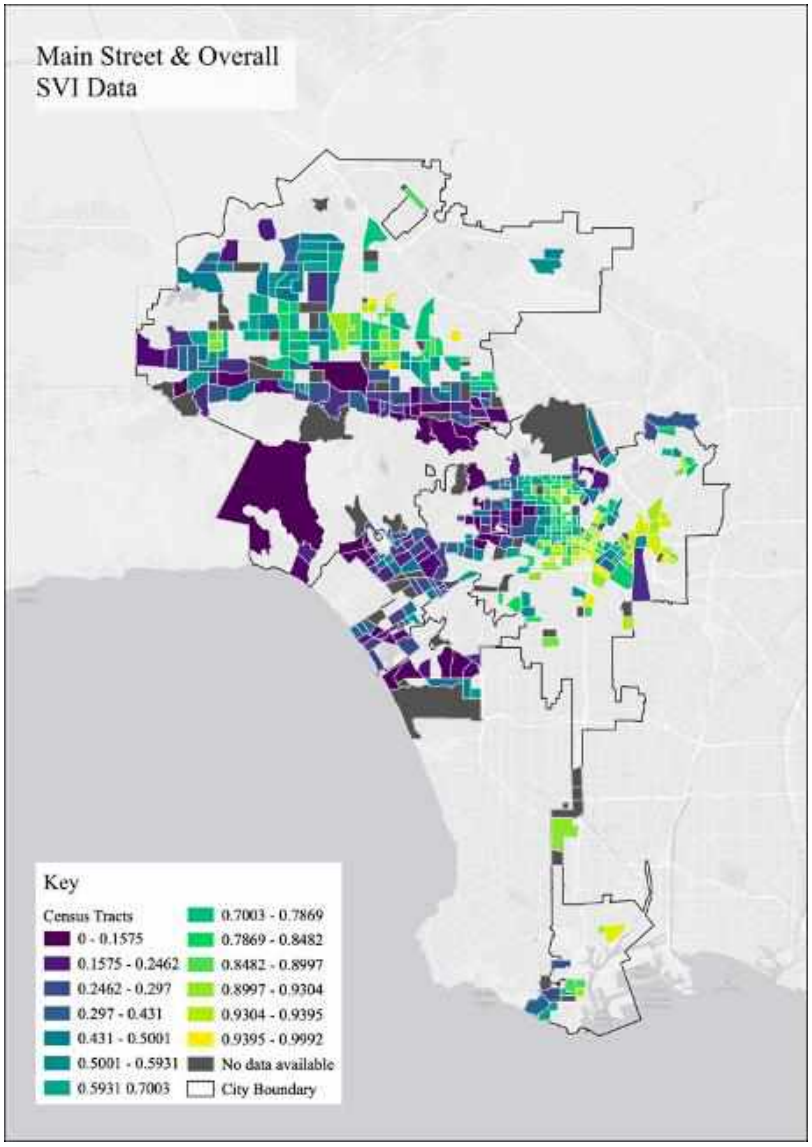


f. Conclusion

The largest difference between the highest Main street SVI scores and the city of LA's SVI score is in the minority status/language category at nearly 45%. This points to the Westlake's Main street demographics and the potential insecurity that is present because of the community's minority status/language isolation. With a lower level of English speakers, health services and access to other information requires more effort to retrieve. In the housing/transportation category Westlake has a score of 94.92% (the highest measure of vulnerability throughout the four categories). Vulnerability in housing and transportation impacts individual and community health outcomes; and in Westlake is associated with the poorest mental health outcome (Westlake 17.1). The higher SVI in this category has also the ability to impact other wellbeing indicators, such as physical health outcomes and life expectancy.

Even though the SVI is a useful tool for emergency preparedness and public-health planning, it is not a substitute for qualitative experts, especially for those familiar with local areas and populations. The SVI data is a bridge between health outcomes and the RBCHI which can be a starting point for discussions on how to plan for healthy Main streets and public spaces. As the

SVI is not a health measure, it is a measure for understanding the social vulnerability aspects of Main streets. In this perspective, Westlake has the most socially precarious Main street and the second lowest RBCHI. Eagle Rock has the second-highest SVI value, the lowest RBCHI, and the lowest health outcomes. RBCHI appears to have a stronger link to health outcomes when compared to SVI. With this in mind, how planners and policymakers approach Main streets must include viewing businesses as important drivers of public health.



D. Main Street RBCHI & Built Environment

a. Introduction

Overall, Site 3 (Eagle Rock's Colorado Blvd) gained the highest built environment score, followed by Site 1 (Brentwood's San Vicente Blvd), Site 2 (Encino's Ventura Blvd), and Site 4 (Westlake's Wilshire Blvd). This ranking also deviates from the RBCHI findings, which found that RBCHI for Site 3 was the lowest. This finding was unexpected but the historical significance of Site 3 (Colorado Blvd) may have played into the physical upkeep of its space. The median household income of these streets also points to the positive-scoring aesthetic qualities of these important public spaces.

Table 12. Main Street MAPS Mini Ranking

	Site 1 – Brentwood	Site 2 – Encino	Site 3 – Eagle Rock	Site 4 – Westlake
Crossing	**4**	**4**	**4**	**3**
Segment	**12**	**8**	**15**	**6**
TOTAL Rank	**16/21: 76% #2**	**12/21: 57% #3**	**19/21: 90% #1**	**9/21: 43% #4**

b. Brentwood: San Vicente Blvd

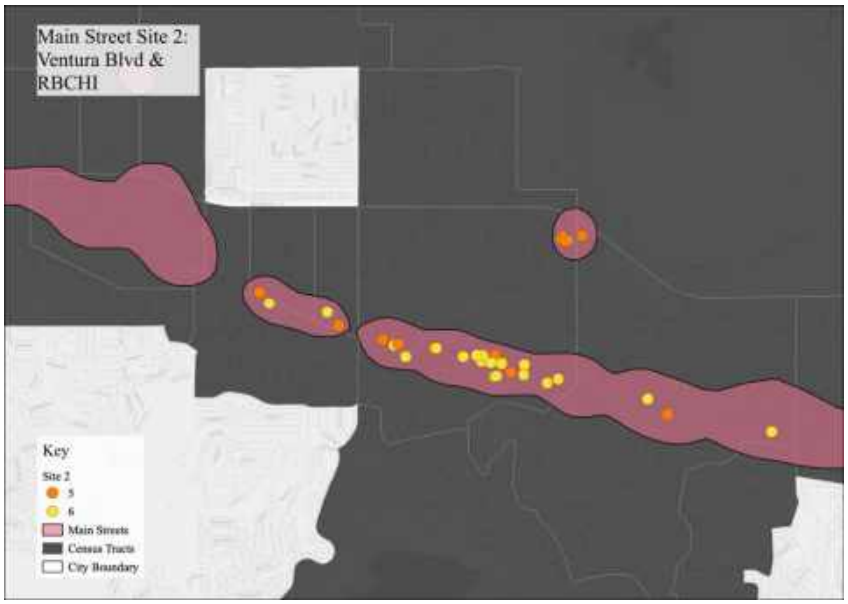
San Vicente is a well-known shopping area on the Westside of LA. With a RBCHI of 5.55, the Main street was walkable and calm during the lunch rush hour. Trees were symmetrically spaced along the "buffer" (sidewalk tree well). The sidewalks were over 5 feet in width and curbs, and crossing ramps were present at the intersection. This street had the largest number of cyclists in the bicycle lane (Class III) and had a high number of pedestrians. The presence of cafes and coffee shops increased the number of shadings and awnings due to the

presence of dining and socializing outside. The businesses appeared to be welcoming as the owners propped open doors and several long, unobstructed glass windows invited pedestrians and visitors to view what each store has to offer. The businesses in the site included cafes, full-service restaurants, boutiques and clothing stores/beauty shops and financial offices. The transit stops (Big Blue Bus) provided both seating and timetables. Overall, with the highest RBCHI in this sample, San Vicente has the second highest built environment score. With a higher built environment score and advantageous SVI data, this community is positioned well to manage, mitigate and adapt in the case of a disaster.

c. Encino: Ventura Blvd

Ventura Boulevard is dubbed as a section of "Miracle Mile" which points to the qualities that make the infrastructure for an auto-oriented Main street. With a RBCHI of 5.53, this Main street is without bike lanes and was not hospitable to pedestrians when compared to the other streets in the sample. The sidewalks were maintained and were over the threshold for allowing pedestrian foot traffic. However, there was not a high presence of pedestrians on the street. The site was populated with several shopping plazas with brick buildings and dark glass windows

with spacious parking lots. The plazas are not diverse in their architecture and physical layout. The businesses in this site include many supermarkets, chain restaurants, medical offices and pharmacies. There is some street furniture which allowed for sitting/resting on the Main street. The awnings were few, if any at all, and did not provide adequate shade. There were two transit stops (Metro) with benches available but without timetable information. Overall, Miracle Mile as a Main street, has the second highest RBCHI score, but the second lowest scoring-built environment score. With a lower built environment score and average SVI data, this community is not precariously positioned in the case of a disaster.



d. Eagle Park: Colorado Blvd

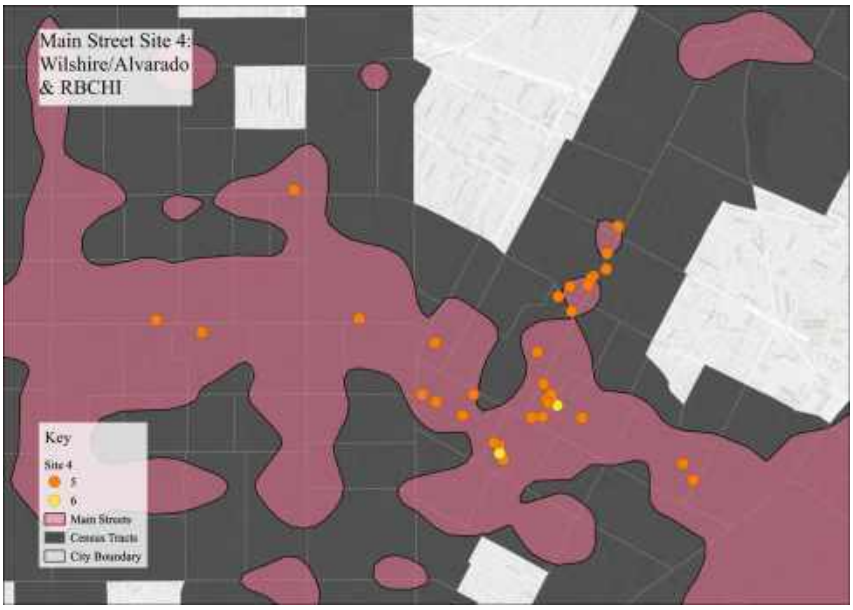
Colorado Boulevard is a historic street in Northeast LA. Home to Occidental College students, young artists, families, and a public park, this Main street's built environment provided a pleasurable and accessible user experience. With a RBCHI of 4.22, this Main street has a well-established bi-directional bicycle lane. During the audit, many cyclists were present and were riding solely on the street. There was no wrong-way riding, or sidewalk riding as the sidewalk was solely for the pedestrians and those sitting outside under the shade or in the outdoor seating

sections. Due to Colorado's multimodal mobility, this area is equipped for physical activity and a higher volume of Main street visitors. The businesses in this site included cafes, salons/hair parlors, art studios, full-service restaurants and bars. With the restaurants, there were outdoor dining options that had seating with awnings. There were many benches in the area, and the transit stops were well marked and provided seating, but there were no timetables. Overall, with the lowest RBCHI in the sample, Colorado Blvd had the highest built environment score. With a higher built environment score, Eagle Rock has potential to manage disaster with their SVI data, which would not drastically lower health outcomes in the long term.

e. Westlake: Wilshire Blvd

Westlake lies adjacent to the heart of Downtown LA. Without dedicated bike lanes, this Main street was not as cyclist-friendly, when compared to the other Main streets that were audited. However, this Main street had the highest concentrations of pedestrians and residents either walking on the sidewalks or spending time near the street-vendors during the lunch hour. The higher volume of people on the Main street had the effect of a traffic-calming measure, as cars appeared to move slower through the intersections. The sidewalk was not as well

maintained, and there was trash on the sidewalk despite the number of trash cans available. The amount of green infrastructure (trees, native vegetation) was not well organized nor maintained. The businesses in this site included smaller grocery stores/convenience stores, fast-food restaurants, churches and health service establishments. Overall, with an average RBCHI score Wilshire Blvd in Westlake had the lowest scoring-built environment score. The higher SVI data associates with the lower built environment score. When the two datasets are combined, the community has both social and built infrastructure that cannot readily adapt to a disaster. All in all, this has the potential to lower health outcomes in the long term.



E. Importance of Incorporating Health Outcomes into Planning

As revealed by the data, businesses do have a measurable health impact on the neighboring community. Main streets represent service locations for both visitors and residents of an area. Life expectancy, physical and mental health, obesity, CHD, stroke and cancer varied among the Main streets and between the Main streets and the city of LA averages. However, the most optimal outcomes in the case study sites followed a general pattern based on RBCHI. RBCHI did appear to play a role in certain health outcomes that are more heavily tied to nutrition

(i.e. obesity, physical health, mental health). Life expectancy was highest in the Main street where the RBCHI was highest (Brentwood), and lowest in the Main street were RBCHI was the lowest (Eagle Rock). Cancer was not a direct causal relationship as cancer is based on many different factors, with genetics being the main driver (cite).

While health outcomes can be driven by genetics, social and environmental factors do have a significant effect. The hypothesis tested (see *Section V.E. Expected Findings*), that a street with a higher RBCHI would have higher health-promoting outcomes (as well as the inverse, a lower RBCHI and lower health-promoting outcomes), is proven by the data. Brentwood had the highest RBCHI, and the highest health outcomes. Eagle Rock had the lowest RBCHI and the lowest health outcomes. It is also interesting to juxtapose the SVI data alongside the health outcomes as the social vulnerability was the lowest in Brentwood where the health outcomes were also the highest.

Planners would be advised to incorporate long-range techniques that look at life expectancy and other standards of health that clearly reveal the impacts that both the built, commercial and social environment of Main Street. RBCHI has an impact on the health of a community. This is inextricably tied to median household income but has a separate function. As seen in Eagle Rock(an area with a lower RBCHI, but higher household income as compared to Westlake) the health outcomes are inevitably tied to business types. If we are to plan for healthy, sustainable futures, we must take health outcomes seriously. With this in mind, the following section puts forth recommendations for how to capture these findings and utilize them for equitable, healthy planning of Main streets.

1. Project Significance

This research examined health outcomes supplement the ZIP Code theory, which indicates the disparate impacts of health outcomes are related to a neighborhood's ZIP Code. The findings reveal an opportunity to validate an instrument that can measure the health of retail types and their impacts on the surrounding environment. This research underscores the necessity to evaluate our retail districts through the longer-term impact that they have for the surrounding communities. This research also examined social vulnerability variations across Main street communities, which have a direct impact on health outcomes and an indirect impact on the social and built environment. With this in mind, the following section puts forth recommendations for how to capture these findings and utilize them for equitable, healthy planning of Main streets.

VIII. Recommendations

A. Introduction

Recommendations for creating and maintaining health-promoting business streets include policy, planning and outreach measures. These courses of action will be accomplished through strong partnerships with local, city, and national organizations. As seen below, collaboration with business councils and public officials, working with public health professionals, partnering with national associations and with local stakeholders, and through reimagining planning, and developing multifaceted plans can help develop sustainable impacts and serve Main streets.

Table 13. Multifaceted Course of Action

Avenue of Approach	Stakeholders & Partnerships
Interaction with Business Council & Policymakers	• LA Business Councils • Business Improvement District • City Council
Incorporation of Public Health Engagement in Planning departments	• LA Department of Public Health • Community Groups
Coordination at the National & Local Main Street Level	• National Main Street Association • American Planning Association • Community Groups • Green Business Networks
Reorientation of Planning Practices	• Community Plan Areas • Department of Planning • Licensing Authority

B. Collaboration with Business Council & Policymakers

The Los Angeles Business Council (LABC) is an organization that was founded in 1936 and drives development on a wide range of issues, including education, housing, green building, energy efficiency, transportation and solar development (*LABC Institute*). Working with a variety of stakeholders and institutions, LABC can have an impactful presence in the realm of redesigning and maintaining health-promoting Main streets. The scale of working with businesses is crucial as they represent the variable that has an associational relationship with the built environment analysis and the RBCHI.

Business Improvement Districts (BIDs) is also another avenue for driving change. BIDs provide activities and programs that are paid for through a special assessment that is charged to all members within the district in order to equitably distribute the benefits received and the costs

incurred to provide the agreed-upon services (cite). With 40 BIDs in the City of LA, these bodies can provide various types of financial assistance and information related to Main street health for potential and current businesses in the designated district (*City of Los Angeles City Clerk*). This financial source can help streamline funding specifically related to Main street built environment elements that allow for sociable behaviors and sustained livability.

Councilmembers are a third set of important actors for Main Streets' future. Councilmembers are held accountable by their constituents and may guide the dialogue on healthy planning and the impact of businesses on their districts. Thus, bringing together the LABC and BIDs, City Council members and their staff can provide important resources for Main street improvements and projects.

C. Incorporation of Public Health Engagement in Planning Departments

This research has shown the interconnectivity of the planning and public health fields. Many planning departments nationwide now have a public health deputy that oversees environmental and community health. LADCP does not have a task force devoted to public health-oriented planning but does have a program titled "Plan for a Healthy Los Angeles". This document outlines the environmental and human health outcomes of the city with recommendations for certain sectors as to how to improve these measures (*City of Los Angeles,* 2015). The mention of the Main streets area as spaces for promoting health behaviors is absent from this document. While the county of LADPH's divisions seems to be more applicable to how resources and programs could be tailored around a Main street, physical changes to the streetscape would be under the jurisdiction of LADCP. Combining this shared knowledge, the two governmental bodies could work together to promote healthier main streets. Public health outreach has been an important mechanism through which community health has improved and

has been driven by the community members. Outreach in this area could include hosting Main street parklets or pop-up informational programs. This could be an efficient way to bring together residents and governmental representatives to positively discuss Main street plans, while also promoting the businesses.

D. Coordination at the National & Local Main Street Level

Nationally, the National Main Street Association is a body that oversees historic Main streets in the US and promotes the nature of diverse, small businesses in these spaces. Working with the National Main Street Association to spearhead a campaign that is focused more on healthy planning and how this can be adapted for different Main streets would be an efficient approach. The American Planning Association (APA) designates "Great Streets" (see *Section II.A.1.* above) which include areas where shopping and commerce heavily occurs—which in essence are Main streets. APA highlights these streets and annually publishes their unique qualities. They highlight the planning approaches taken by the planners for these streets, which allow for a sharing of knowledge and best practices.

The city of LA's Great Streets Initiative aims to target places "where we live, work, learn, and play every day" (*GSLA*). These public spaces "reflect the character of our people and of our city" (*GSLA*). The Initiative aims "to serve, support, and strengthen the vibrant corridors that are the backbone of Los Angeles". Currently with 18 corridors, the Great Streets team accomplished this work through partnerships with communities and by leveraging additional resources to transform the streets. The confluence of these resources and programmatic guidance could serve to help other Main streets in LA. The addition of a "health" target is a sure way to sustain project relevance and importance on Main streets and their implications (*GLSA*).

Finally, the city of Los Angeles has a Green Business Network which aims to encourage sustainable growth of businesses that enact environmentally friendly practices. As a nonprofit organization, GBN provides the owners and decision-makers of "socially and environmentally conscious businesses a time and place for connecting, sharing, deal-making and networking" (*GBN*). Working with local businesses to learn from one another in a specialized context is crucial for local sustainability. Larger movements towards carbon neutral and renewable energy in business practices can only be accomplished with unity at the localized level, where the practice may be unique to certain geographies or business types. A wider membership of GBN would highlight the advantages of designing Main street infrastructure and business practices through sustainable means.

E. Reorientation of Planning Praxis

When thinking institutionally, the way in which planning's land-use policies drive activity on Main street provides a wider scope as to interactions between policy initiatives and built environment aspects. Land use elements and policies governing these streets have impacts on health outcomes (Wooten et al., 2013). Incorporating public health assessments, such as a "Health Impact Assessment" (equivalent to an "EIA") which looks specifically at environmental justice and community health would increase transparency about the planning processes and a wider understanding of how public spaces are governed. For local planning, specific strategies that should be considered (in comparison to the RBCHI and SVI and their impact on health outcomes) include zoning for multi-uses, design of active transportation spaces (i.e. protected bike lanes), implementation of green spaces that sustainably provide larger net benefits, and creation of "Third places" that advance sociability. Working with a task force that is specifically oriented towards equitable, environmentally friendly planning goals under the aim of improving

human health is the only way forward to a healthy, happy Main street.

IX. Conclusion & Future Studies

Main streets are an integral landscape to most American cities that impacts multiple sectors and spheres of society. The relationship of the retail area and built environment of a Main street frames how social infrastructure and public health are shaped. Conscious planning practices can have beneficial impacts on health. This research aimed to uncover the health outcomes for neighborhoods adjacent to Main streets. It examined health outcomes supplementing the ZIP Code theory, which indicates the disparate impacts of health outcomes are related to a neighborhood's ZIP Code. Indeed, this research also examined social vulnerability variations across Main street communities, which have a direct impact on health outcomes and an indirect impact on the social and built environment.

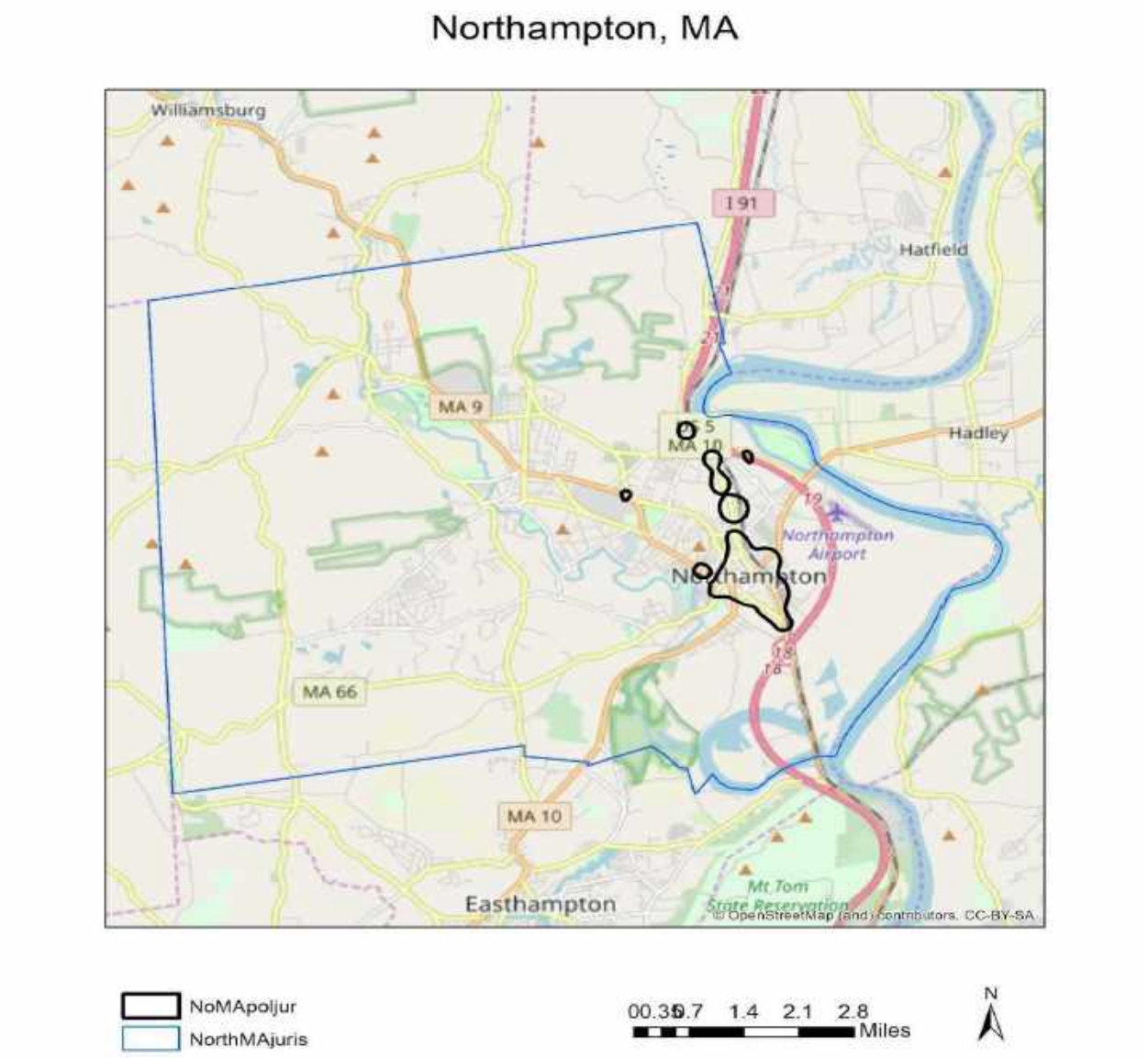
Overall, the case studies showed that health outcomes were slightly worse off for those that reside in and around Main streets. The built environments of Main streets were also analyzed to see if there was an association with the overall streetscape and the health outcomes of these areas. Our built environment audit found that the built environment had a direct relationship with the RBCHI and health outcomes (i.e. the higher the business score, the higher the health outcomes). These findings reveal an opportunity to validate an instrument that can measure the health of retail types and their impacts on the surrounding environment. This research underscores the necessity to evaluate our retail districts through the longer-term impact that they have for their surrounding communities.

Future courses of study would benefit from addressing and scoring businesses that were not included in the framing of this research's typical Main street (or which were not declared as

having a health impact and therefore not scored within the RBCHI). Other businesses to add include vacant lots/stores, as they often maintain a presence on a Main street. Other studies could examine transportation and mobility in and around Main streets. Another aspect that should be studied is the zoning and licensing of certain Main street businesses. Incorporating an analysis of different business codes has the potential to draw associations between health outcomes and RBCHI. A comparison across Main streets when examining these additional factors could better reveal how these spaces function. Findings from these future areas of research can bring together Main street stakeholders (planners, policymakers, and businesses) and underscore their ability to improve Main streets' community health outcomes.

Appendix A. Main Street Maps

Figure 1. Main Street, USA: Northampton, Massachusetts



*Source: UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. "Health on Main Street". *Awaiting formal citation upon publication (January 2020).*

Figure 2: Observed City of Los Angeles Jurisdiction

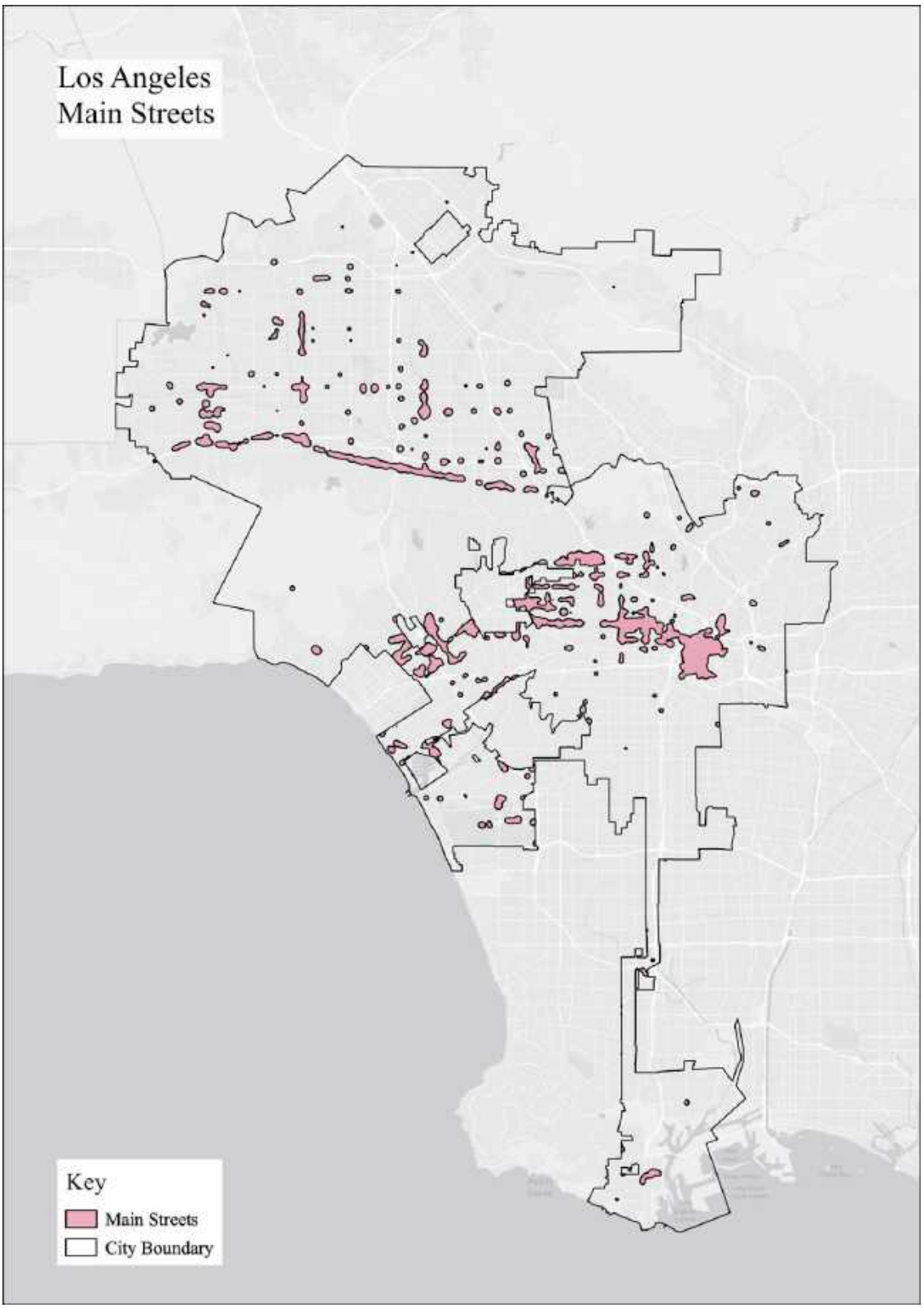
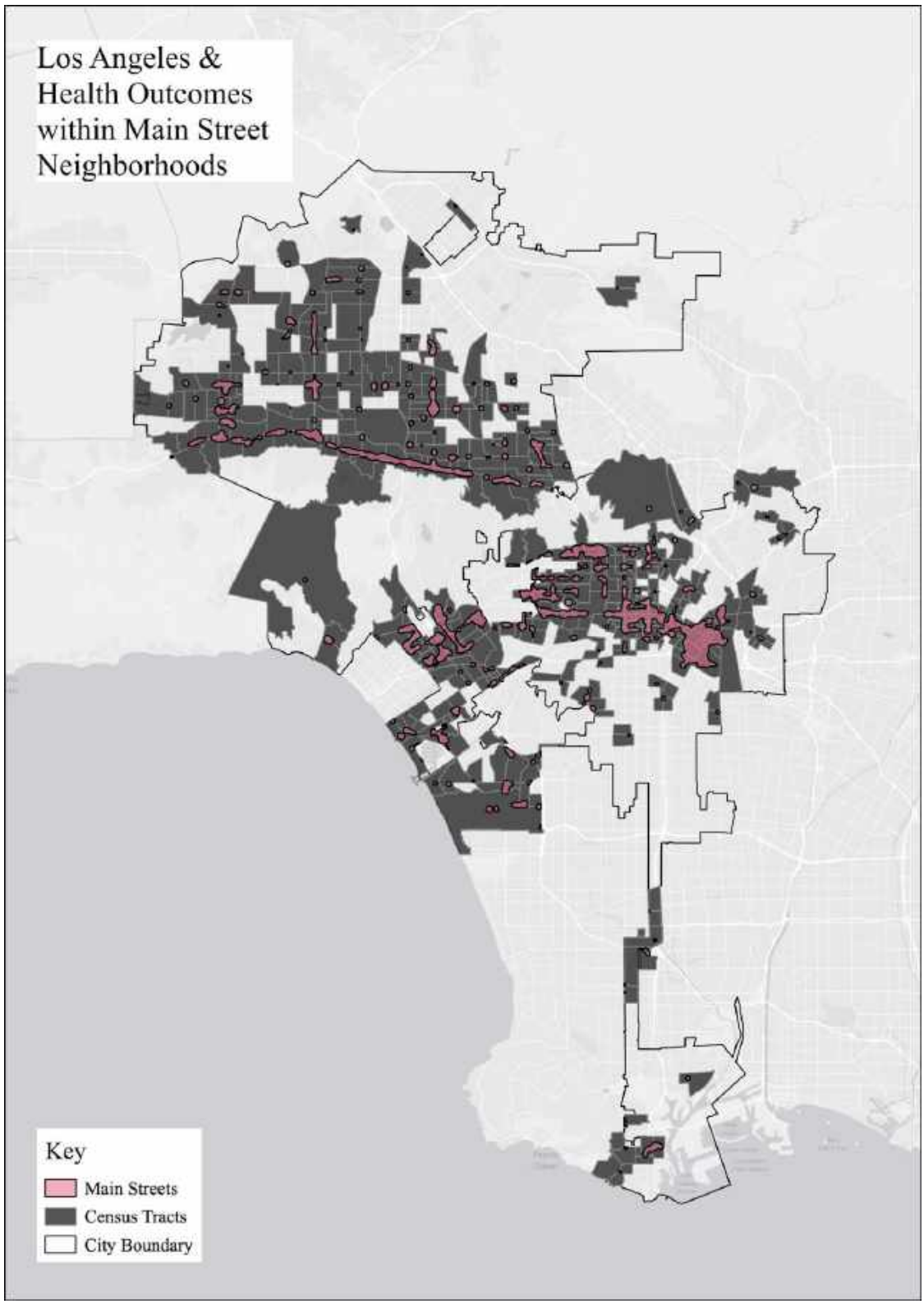
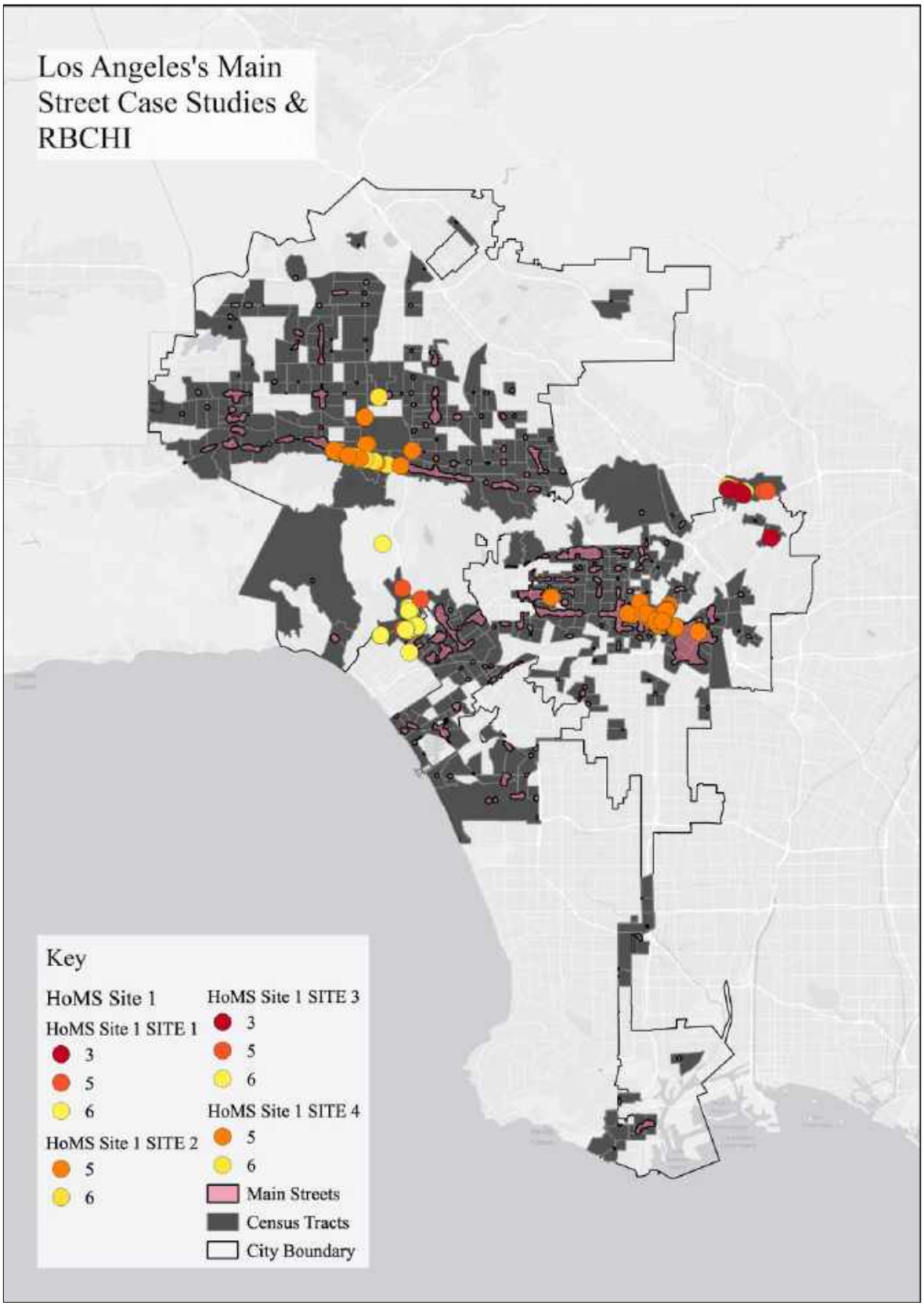


Figure 3. Observed Health Outcomes of Census Tracts in Main Streets Neighborhoods




Los Angeles's Main Street Case Studies & RBCHI
Key
HoMS Site 1
HoMS Site 1 SITE 1
3
5
6
HoMS Site 1 SITE 2
5
6
HoMS Site 1 SITE 3
3
5
6
HoMS Site 1 SITE 4
5
6
Main Streets
Census Tracts
City Boundary

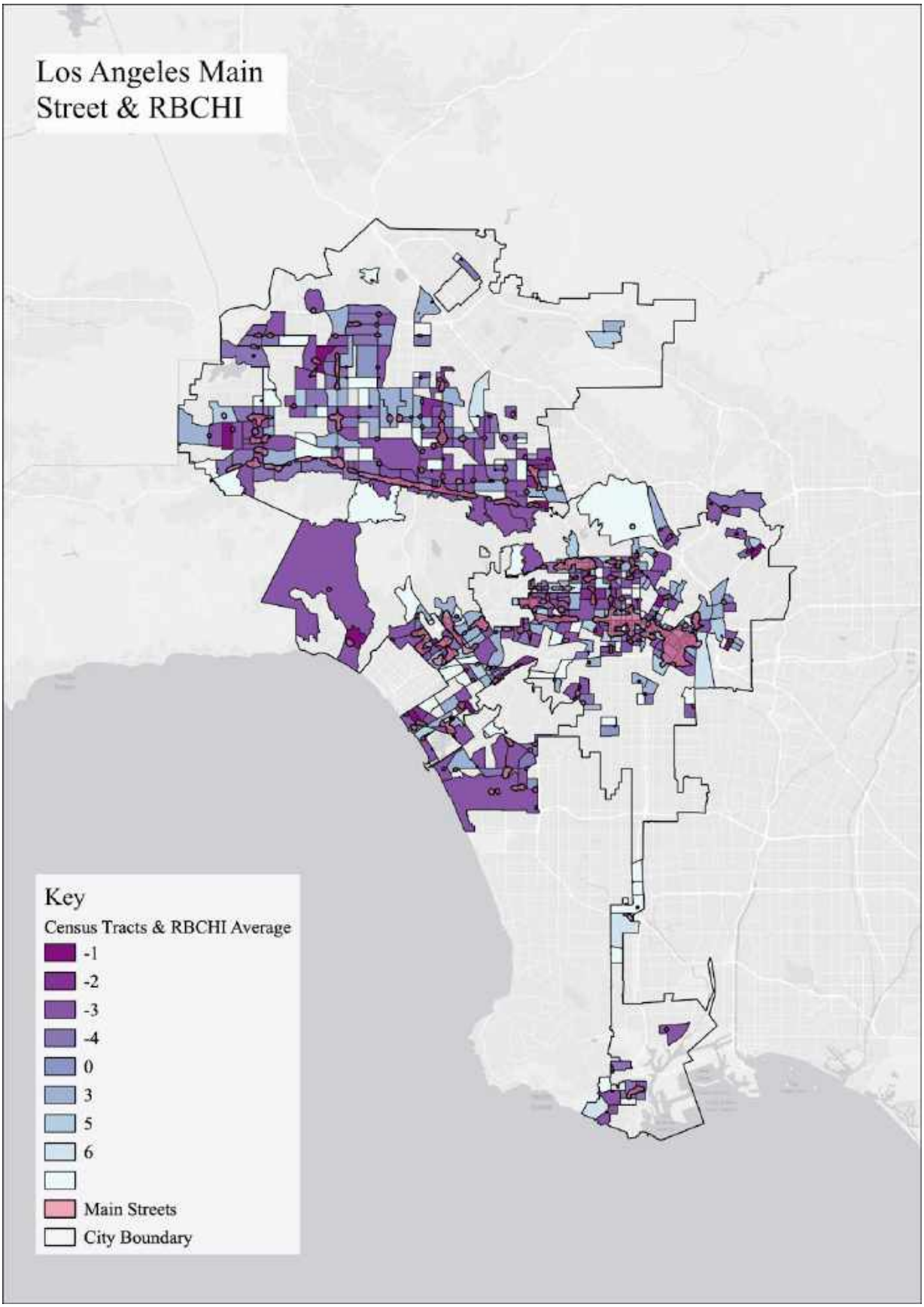
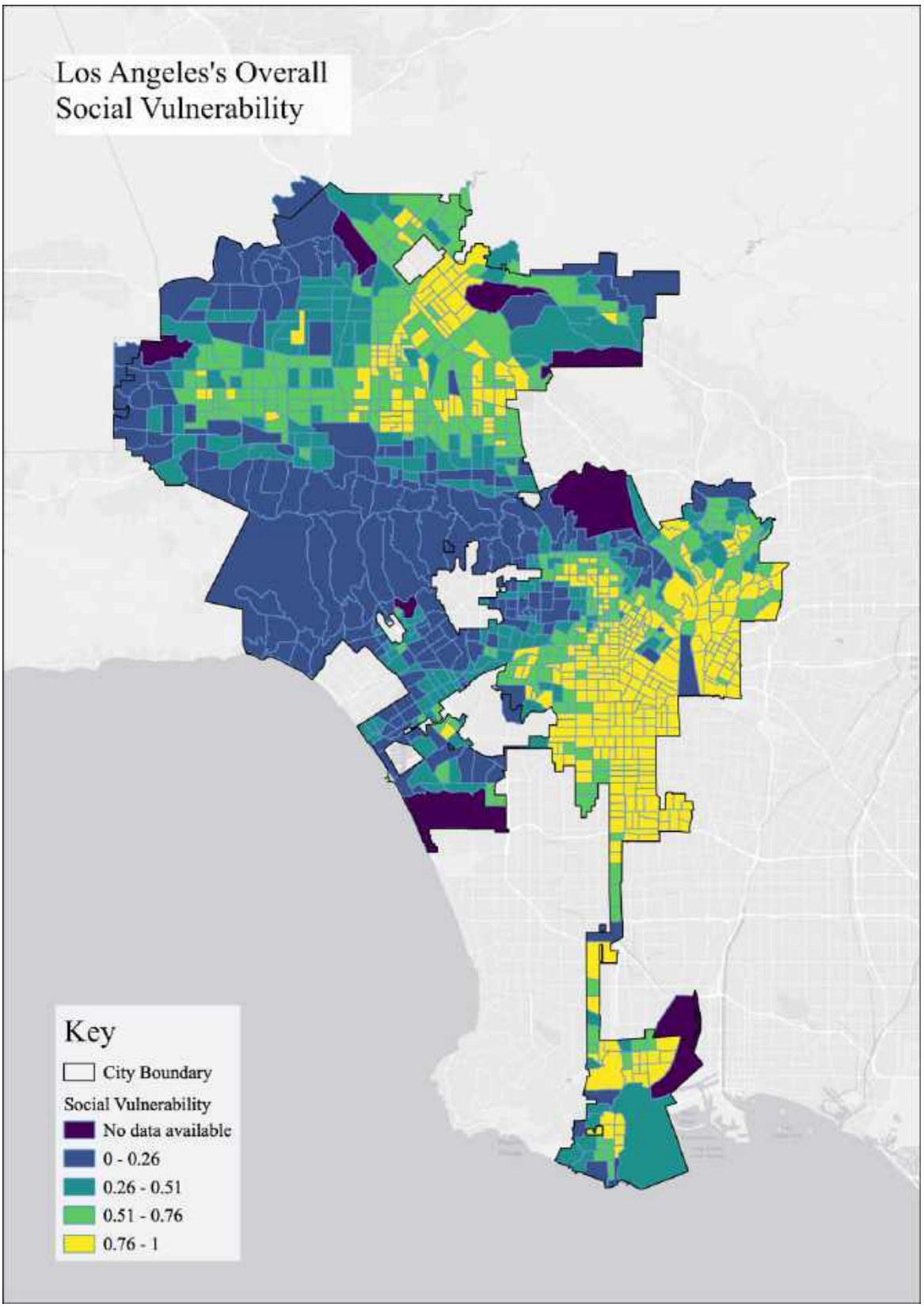

Los Angeles Main Street & RBCHI
Key
Census Tracts & RBCHI Average
-1
-2
-3
-4
0
3
5
6
Main Streets
City Boundary

Figure 4. City of Los Angeles Overall SVI



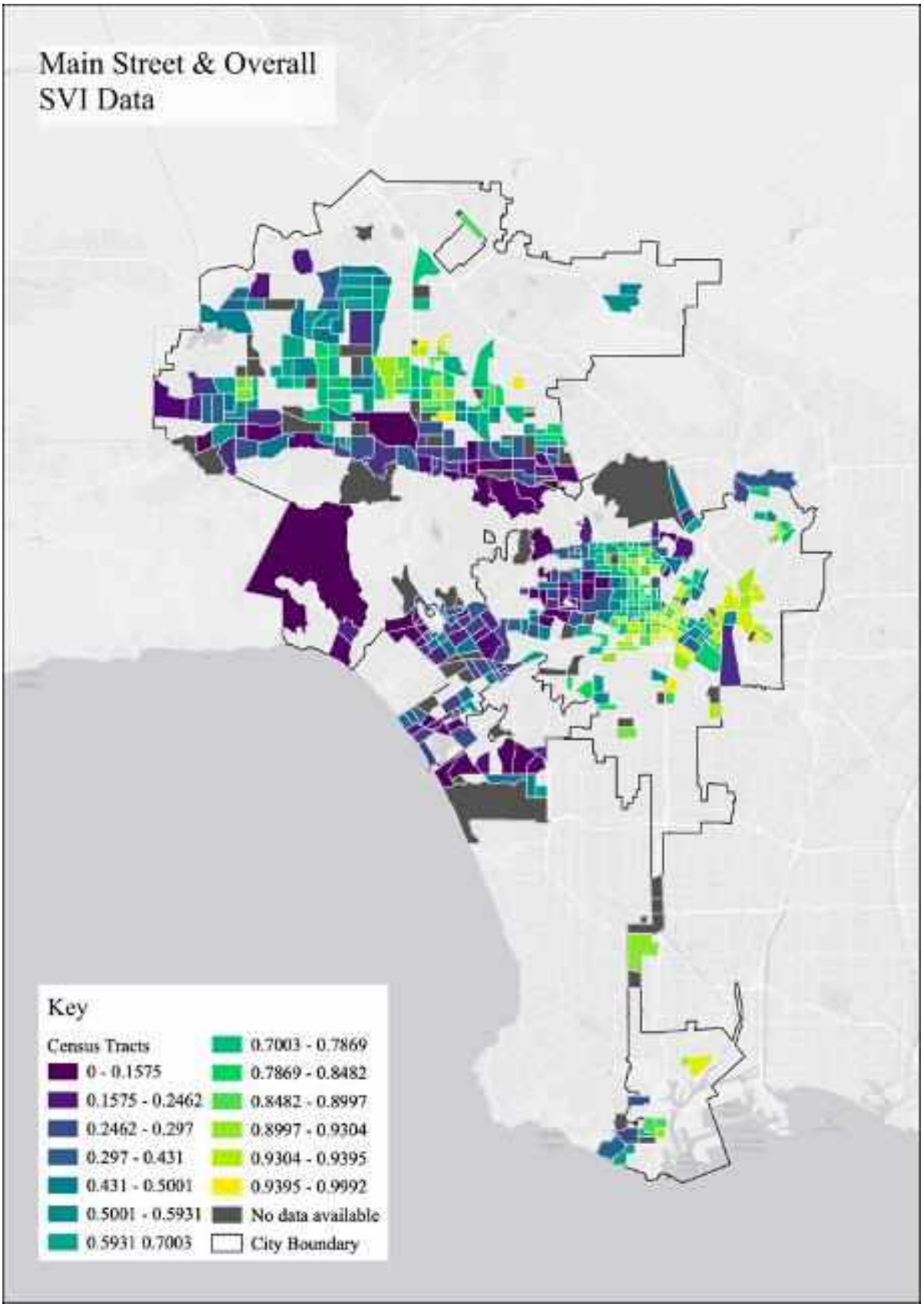

Main Street & Overall
SVI Data
Key
Census Tracts
0 - 0.1575
0.1575 - 0.2462
0.2462 - 0.297
0.297 - 0.431
0.431 - 0.5001
0.5001 - 0.5931
0.5931 0.7003
0.7003 - 0.7869
0.7869 - 0.8482
0.8482 - 0.8997
0.8997 - 0.9304
0.9304 - 0.9395
0.9395 - 0.9992
No data available
City Boundary

Figure 5. Case Study Geography (Retail Districts)

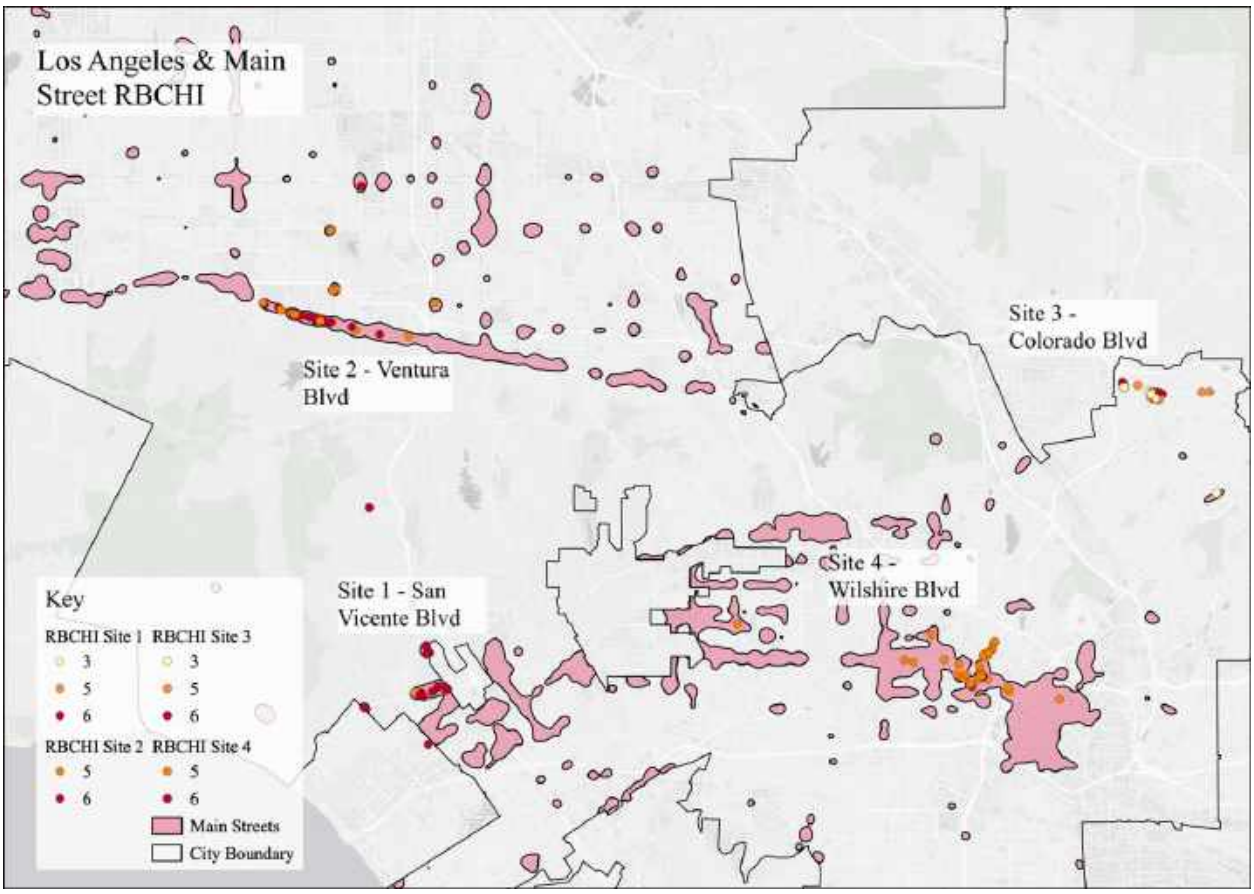


Figure 6. Brentwood RBCHI & Main Street

Figure 8. Encino RBCHI & Main Street

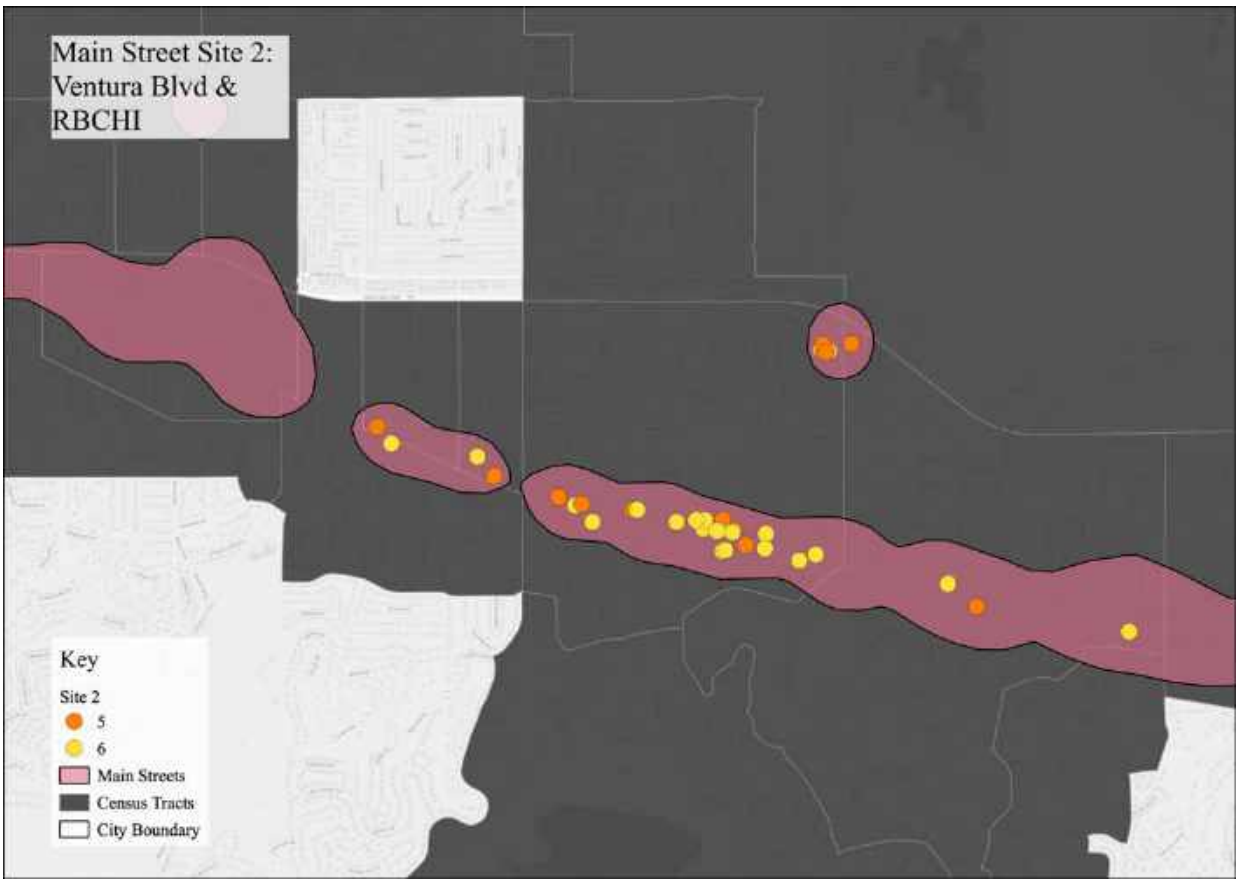
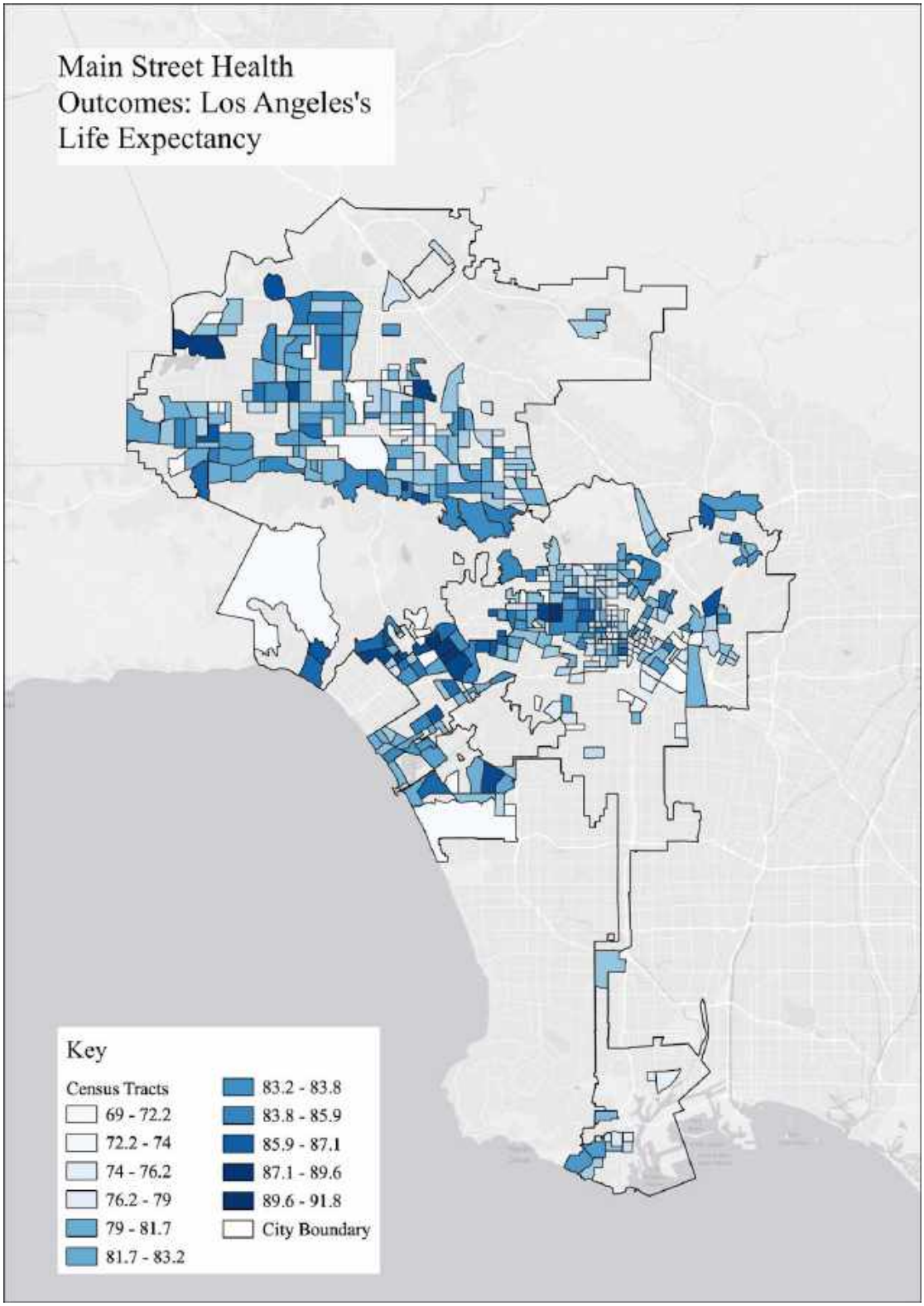
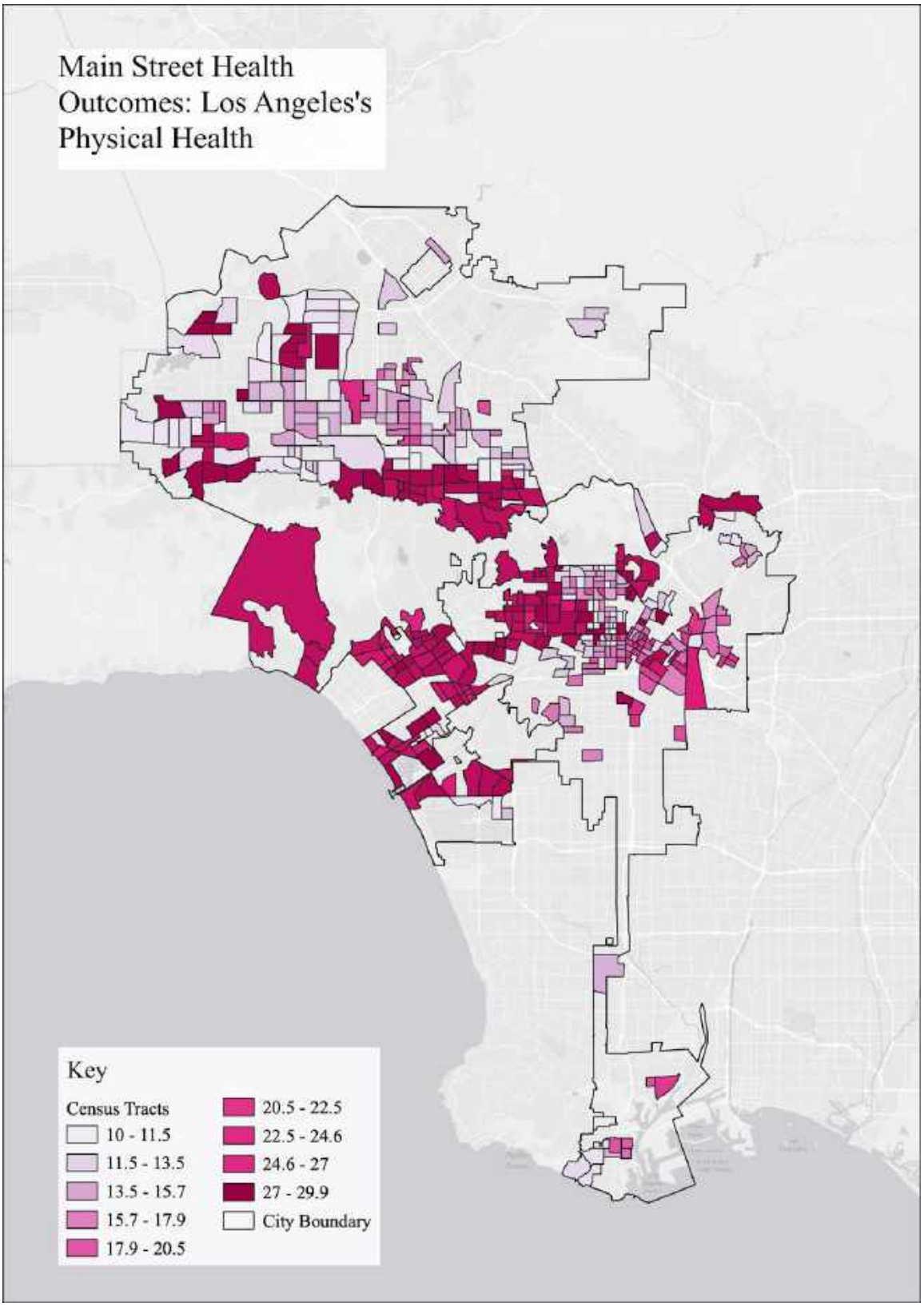


Figure 9. Eagle Rock RBCHI & Main Street

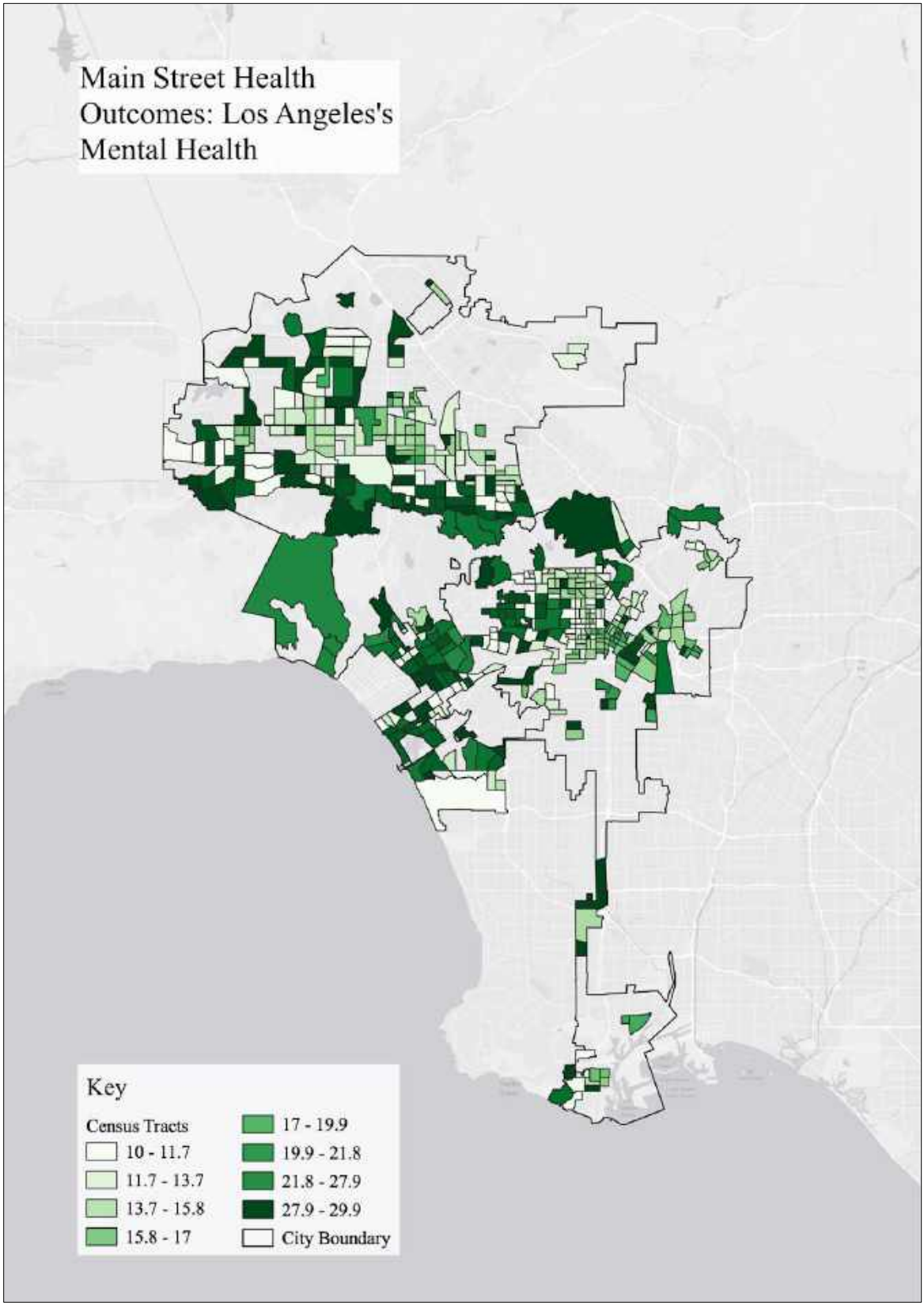
Figure 7. Westlake RBCHI & Main Street



UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).



UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).



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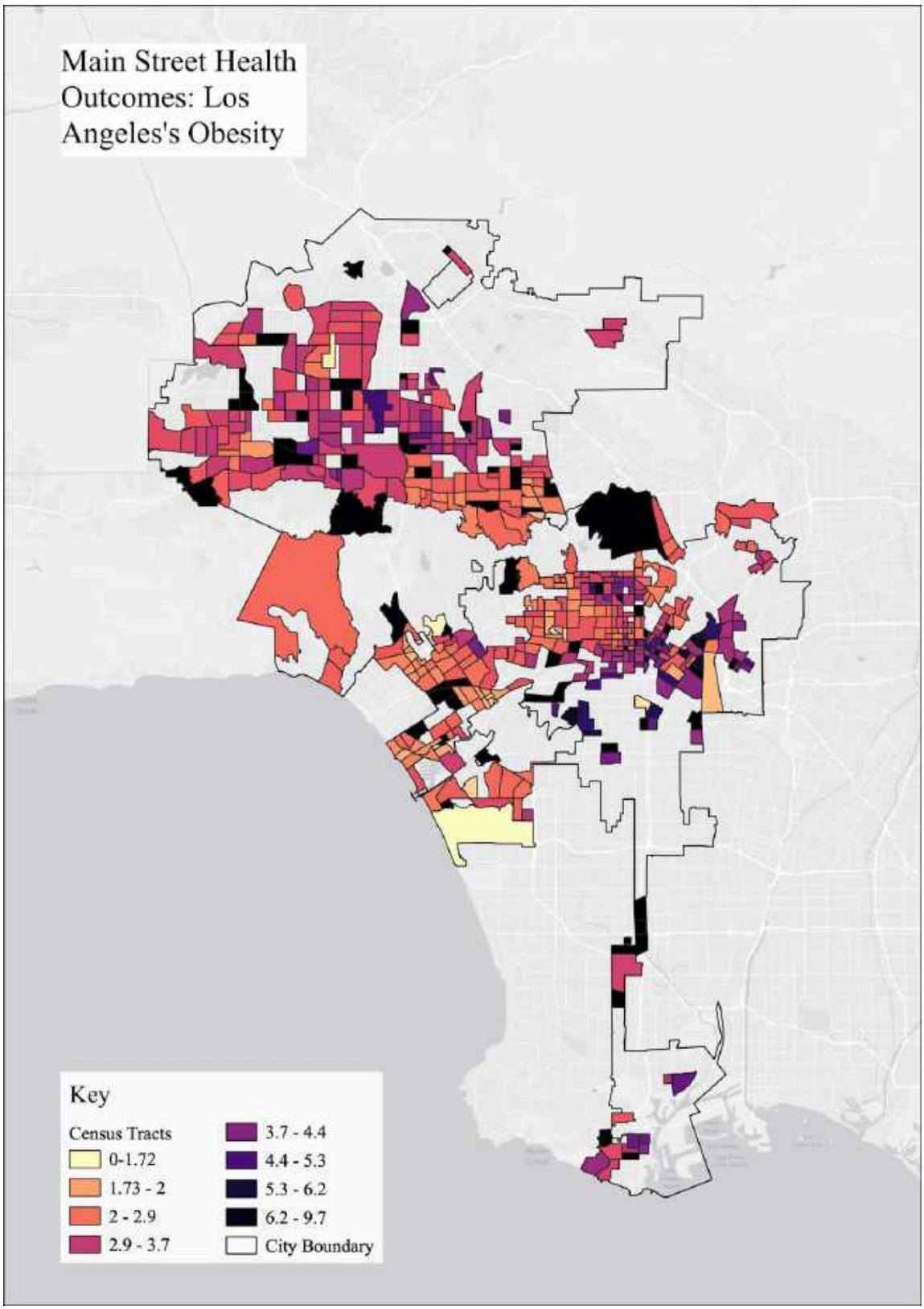
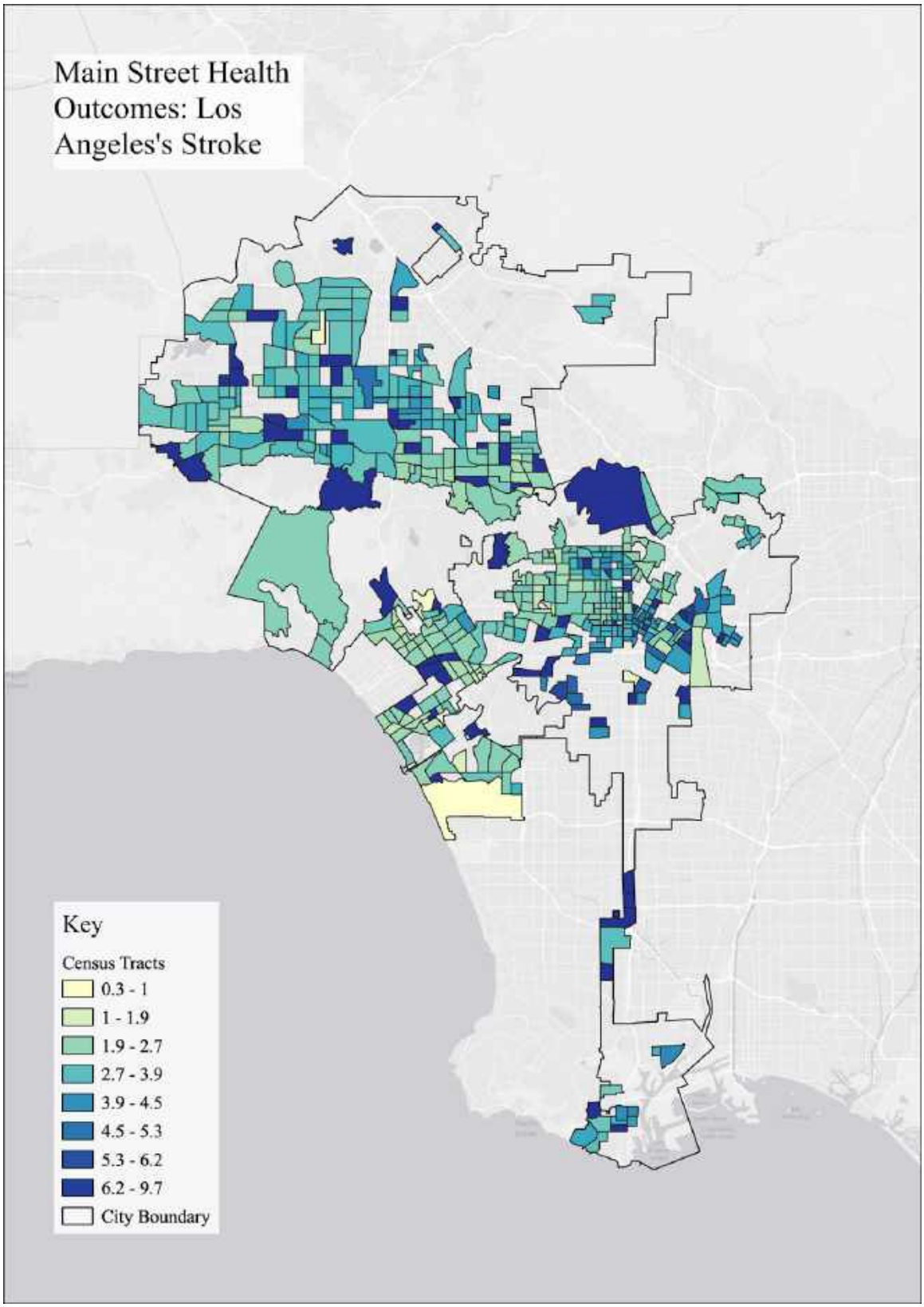
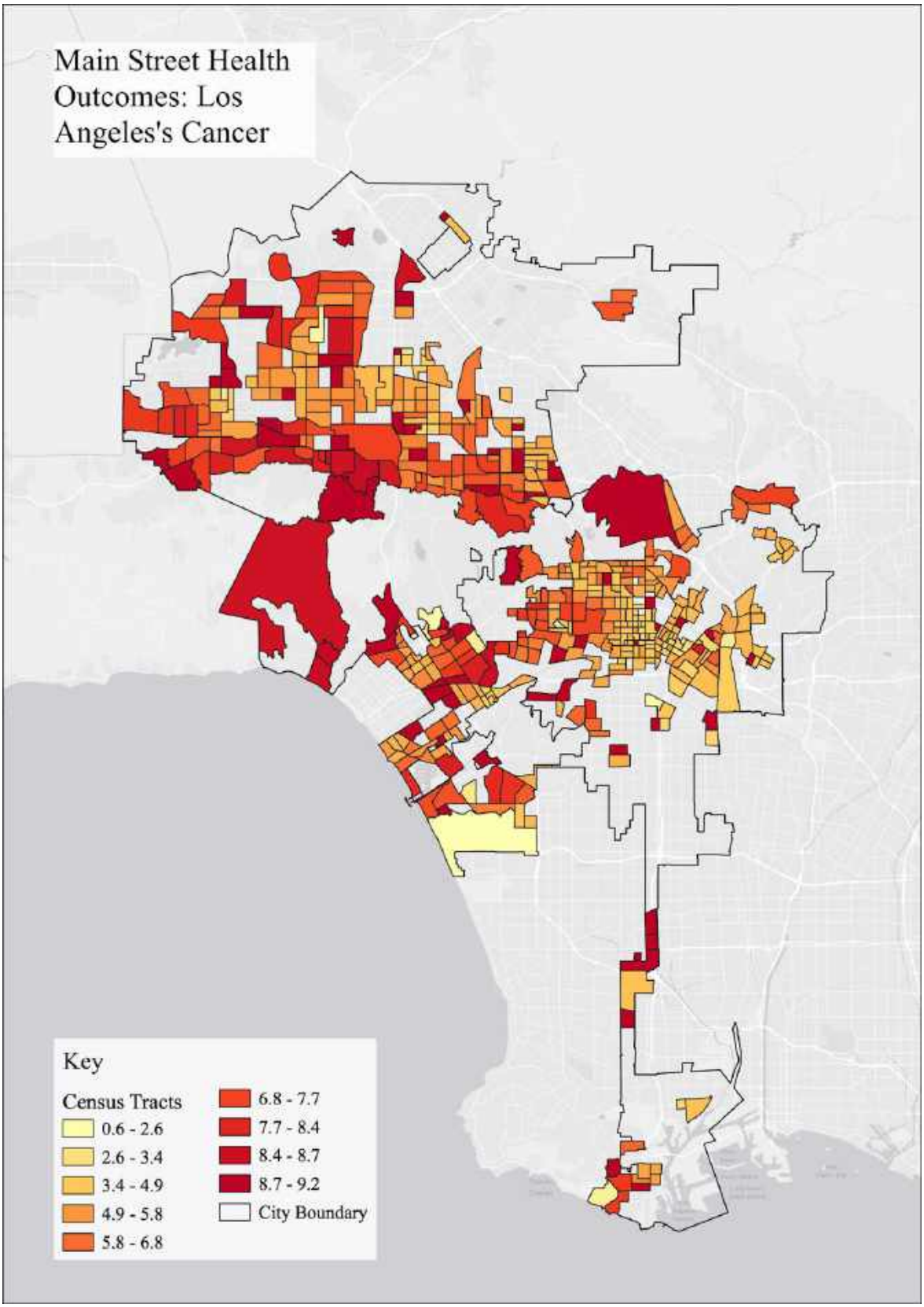


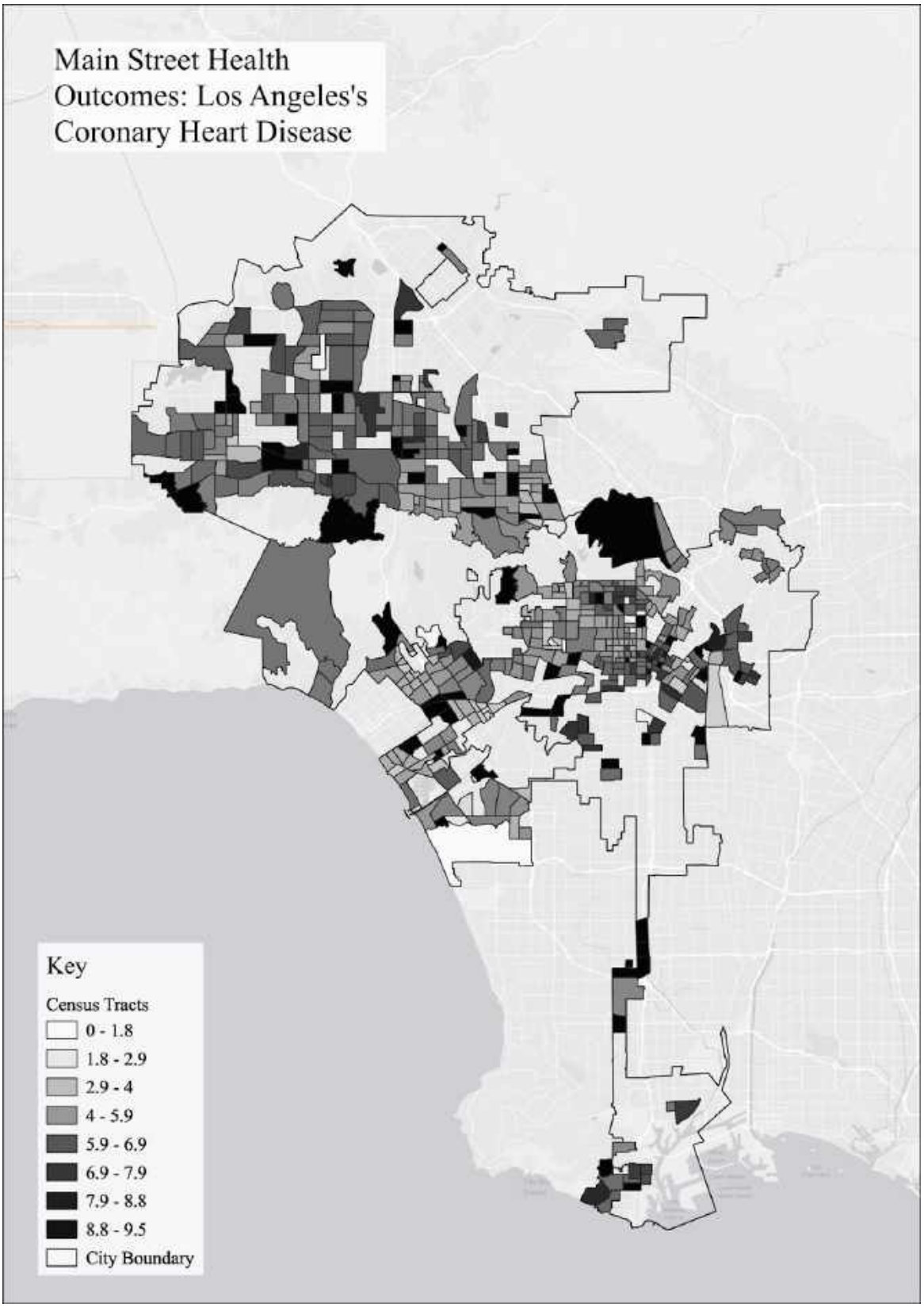
UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).



UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).



UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).



UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).

Appendix B: Model & Methodology

Figure 1. Conceptual Model

In an attempt to fully understand the intersectional concepts and frameworks that govern these fields, the conceptual model illustrates the relationship as put forth by this research that is found between planning and public health. The model is loosely adapted from built environment research and is expanded upon to include both public health outcomes for the design and legal elements of planning (Berke & Vernez-Moudon, 2014). The model tests the hypothesis that when unhealthy businesses serve a historically disinvested and underserved community, then the health outcomes and the potential quality of life are diminished for communities near Main street. However, the arrows highlight that these processes are interconnected to avoid endogeneity.

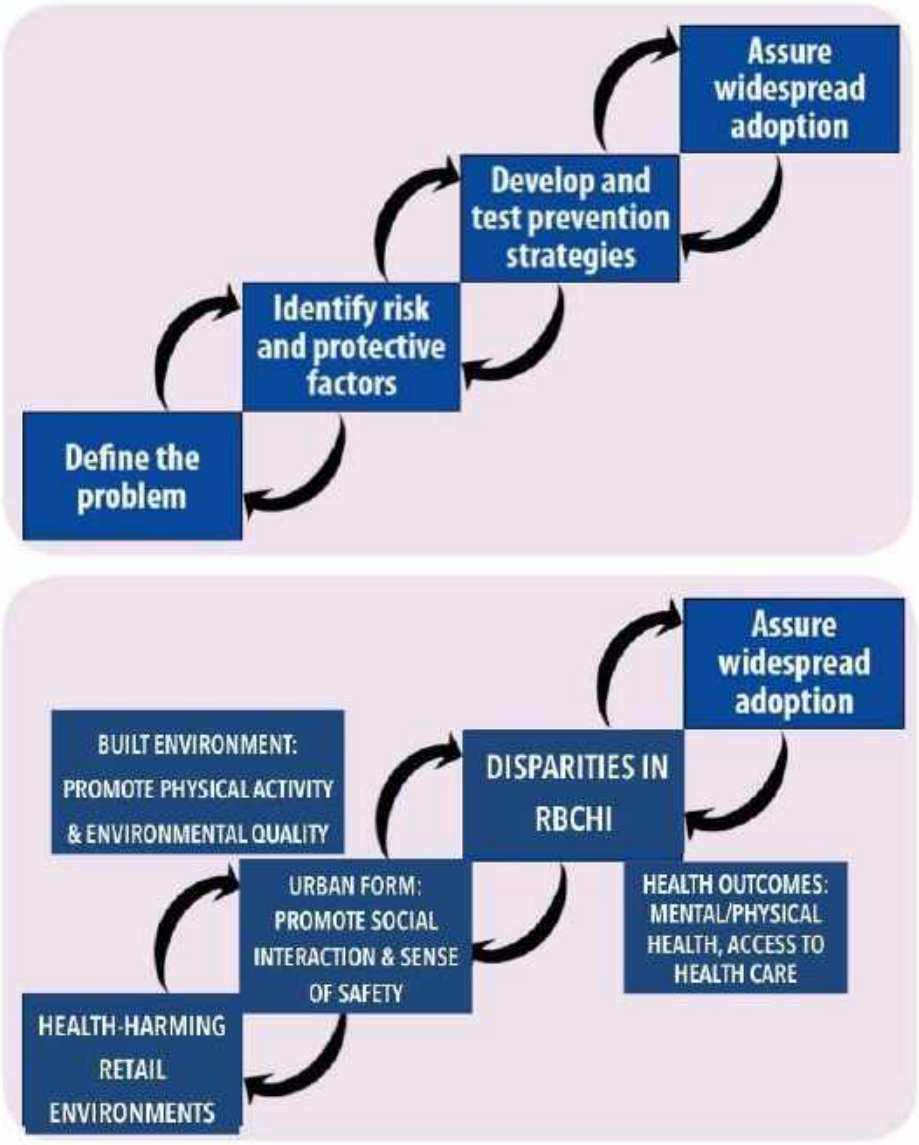


Figure 2. GIS Methodology

Generating Business Zones for "Health on Main Street USA"

Background: No comprehensive dataset could be found that maps or lists every business district in the United States, let alone classifies them based on differing characteristics. City land use maps are useful, but they are restricted to the local level and varying file formats, which are not conducive to this national project. Some proprietary sources come close, such as Google Maps "Areas of Interest"[i] though it is not downloadable or easily analyzable. ESRI Business Analyst Tapestry Segmentation is instead demographically based.

To identify commercial areas in cities across the United States, we used the ESRI Business Analyst Package, which includes point-level data for over 12 million businesses across the United States. We created our method for identifying commercial clusters, using the following assumptions and methods.

1. Define the jurisdictional boundary of study city (source: ESRI Demographic Data, Census Places)

2. Clip all businesses within a 500m buffer of study city, to avoid edge effects (source: ESRI Business Data, Infogroup)

a. What to do with Edge clusters? Drop? Still score?

3. Screen out only business types of interest, eliminating SIC codes < 40 and 50-52 (ie: Agriculture, Forestry, Fishing, Mining, Construction, Manufacturing, and Wholesale Trade).[i]

4. Run kernel density spatial analysis on remaining business points within study city. Parameters for the density analysis included: 400m search radius around each point (assuming a ¼ mi walking distance to the business) and bound the extent of the analysis to the city's boundary.

5. Reclassify the kernel density using Standard Deviation, selecting only the zones that were the furthest deviation from the mean density of businesses in the city (as seen in dark blue in Map 4 above). We call these our business zones or clusters.

6. Clip relevant businesses within densest clusters and city jurisdiction, for cursory analysis of business types (refer to Business Frequencies excel documents).

7. Remove business zones that have too few businesses or are too small of an area to be considered a Main street or business zone, using zonal statistics.

8. Score select businesses within each zone

Source: UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health.
**Awaiting formal citation upon publication (January 2020).*

[i] https://www.naics.com/sic-codes-industry-drilldown/
[i]https://www.citymetric.com/horizons/why-has-google-maps-started-shading-bits-cities-orangebrown-instead-grey-2342

Appendix C. Fieldwork Tools

Figure 1. RBCHI Scoring Criteria

Composite Average Scores (+10 to -10)* across 6 Domains of Health Effects by Type of Business
(Mean and 95% Confidence Interval)

* scores for each domain calculated based on survey respondents' ranking of health effects
'very positive' = +10, 'somewhat positive' = +5, 'somewhat negative' = -5, 'very negative' = -10, 'no effect' = 0.

Business Types

1. **Grocery Stores**
2. **Convenience Stores** (such as 7-11 or Circle-K)
3. **Liquor Stores** (including Beer, wine, liquor stores)
4. **Tobacco/Cigarette Shops** (including "vape" shops)
5. **Fast food restaurants**
6. **Restaurants** (i.e. Full-service restaurants)
7. **Coffeeshops**
8. **Bars**
9. **Physical Activity Spaces**: Fitness and recreation spaces, such as gyms, YMCAs & parks
10. **Pharmacies**
11. **Public Facilities** (libraries, museums, etc.)
12. **Healthcare Facilities** (i.e. hospitals and clinics)
13. **Payday Loans** and Advance Check Cashing (companies that provide short-term paycheck loans, not banks or credit unions)

Domains of Health Effects

1. **Health Behaviors**: Healthy lifestyle behaviors, including any products and services sold, as well as any other social or physical effects on a community.
2. **Mental Well-being**: how people feel and their ability to cope with day-to-day life.
3. **Social Interaction**: encouraging people meeting, talking, working, and enjoying leisure time together
4. **Health Services**: learning about and accessing physical and mental health care, medications and counselling services
5. **Safety**: community members' sense of safety
6. **Environmental Quality**: overall environmental quality in the community including clean air, water and land free of hazards.

Figure 2. MAPS Mini Audit

Date Auditor ID#
Route #
Start Time: _____End Time: _____

Crossing Intersection of _____& _____
Crossing from N S E W to N S E W
1. Is a pedestrian walk signal present?
□ **_No (0)**
□ **_Yes(1)**
2. Is there a ramp at the curb(s)?
□ **_No (0)**
□ **_Yes, at one curb only(1)**
□ **_Yes, at both pre-crossing and post-crossing curbs(2)**
3. Is there a marked crosswalk?
□ **_No (0)**
□ **_Yes(1)**

Segment: **Count one (your) side of the street**
Street _____ Side N S E W
Starting Cross-street: _____
Ending Cross-street: _____
1. Type: Residential (0) / Commercial (1)
2. How many public parks are present?
□ 0 □1 □2 or more
3. How many public transit stops are present?
□ 0 □1 □ 2 or more
4. Are there any benches or places to sit (include bus stop benches)?
□ No (0) □ Yes(1)
5. Are streetlights installed?
□ None (0) □ Some (1) □Ample (2)
6. Are the buildings well maintained?
□ 0-99% (0) □100% (1)
7. Is graffiti/tagging present (do not include murals)?
□ No (1) □ Yes (0)
8. Is there a designated bike path?
□No (0) □Painted line (1) □Physical barrier(2)
9. Is a sidewalk present? *If no, skip to 12*
□ No (0) □Yes (1)
10. Are there poorly maintained sections of the sidewalk that constitute major trip hazards? *(e.g. heaves, misalignment, cracks, overgrowth, incomplete sidewalk)*
□None (1) □Any/no sidewalk present (0)
11. Is a buffer present?
□No/no sidewalk present (0) □Yes(1)
12. What percentage of the length of the sidewalk/walkway is covered by trees, awnings or other overhead coverage?
□ 0-25% / no sidewalk (0) □26-75% (1) □76-100% (2)
Score = Total Points____/21 = ____%

Source: Sallis, J. F., Cain, K.L., Millstein, R. A., Conway, T.L., Gavand, K. A., Frank, L. D., Saelens, B. E., Geremia, C. M., Chapman, J., Adams, M. A., Glanz, K., King, A. C. (2015). Microscale Audit of Pedestrian Streetscapes (MAPS). Active Living Research Organization. Retrieved from, https://activelivingresearch.org/microscale-audit-pedestrian-streetscapes

Figure 3. Case Study Businesses & Locations

Site 1: Brentwood, San Vicente

LOCNUM	CONAME	STREET	CITY	STATE	ZIP	ZIP4	NAICS	SIC	RBCHI
396473563	MASSAGE PLACE	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6610	81219908	729917	6
434395027	H2 WELLNESS INC	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5130	81219103	729934	5
723709464	SAUNABAR	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5128	81219103	729934	5
404881610	BAR METHOD	SAN VICENTE BLVD	LOS ANGELES	CA	90049	4851	81219101	729906	6
715126656	PACIFIC DINING CAFETERIA	N LOS ANGELES ST	LOS ANGELES	CA	90053	3336	72251117	581208	3
404771870	VELOCITY SPORTS PERFORMANCE	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6507	71394030	799111	6
592324858	CLASSIC PILATES BODY	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5098	71394023	799107	6
715948998	BESTTENNISEVER.COM	KIOWA AVE	LOS ANGELES	CA	90049	6247	71394021	799703	6
266675248	SKINPECCABLE DERMATOLOGY	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5106	71394017	799105	6
372190108	FIRM BODY EVOLUTION	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5128	71394017	799105	6
426823030	ILLUME SPA LLC	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5133	71394017	799105	6
426422664	KALOLOGIE SPA	SAN VICENTE BLVD	LOS ANGELES	CA	90049		71394017	799105	6
435951651	L A SPA ESTHETIQUE	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5013	71394017	799105	6
722631903	TLC SPA	S BARRINGTON PL	LOS ANGELES	CA	90049	3305	71394017	799105	6
426809113	ILLUME SPA LLC	GORHAM AVE	LOS ANGELES	CA	90049	4378	71394017	799105	6
706760781	FS2 TRAINING	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5106	71394013	799106	6
405815930	CIRCUIT WORKS BRENTWOOD LLC	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5123	71394011	799101	6
435000800	ORANGETHEORY FITNESS	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5103	71394011	799101	6
427794459	SOUL CYCLE	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6521	71394011	799101	6
592256639	KINETIC CYCLING LLC	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6610	71394011	799101	6
700550626	POP PHYSIQUE	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6610	71394011	799101	6
718327110	TA STUDIO CITY LLC	SAN VICENTE BLVD	LOS ANGELES	CA	90049		71394011	799101	6
421929979	MOORE DANCING CARDIO DANCE STD	MONTANA AVE	LOS ANGELES	CA	90049	6654	71394011	799101	6
721185061	LITEBODY FITNESS	MONTANA AVE	LOS ANGELES	CA	90049	6654	71394011	799101	6
718722625	CYCLEBAR BRENTWOOD	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5123	71394009	799102	6
809544117	PRO GYM	MONTANA AVE	LOS ANGELES	CA	90049	6655	71394009	799102	6
574635413	ALLEN LETGOLTS DOCTOR-PHYSICAL	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6610	62149301	801104	5
439004424	GENASCIS	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5042	62111107	801101	5
440575374	NANCY MOTZKIN GLASER PSYCHTRY	SAN VICENTE BLVD	LOS ANGELES	CA	90049	4964	62111107	801101	5
401829513	AGELESS MEN'S HEALTH	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6513	62111107	801101	5
405816188	BRENTWOOD PEDIATRICS	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6511	62111107	801101	5
501735468	SAN VICENTE PEDIATRICS	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6513	62111107	801101	5
710340329	CENTER FOR FUNCTIONAL PDTRCS	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6511	62111107	801101	5
710692521	KIRIAKOS LINDSAY R MD	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6514	62111107	801101	5
809521867	MARMER & MEZQUITA	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6505	62111107	801101	5
400555052	UCLA MEDICAL GROUP	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5012	62111107	801101	5
415323495	DR NORA ORAL & MAXILLOFACIAL	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6603	62111107	801101	5
574619086	BRENTWOOD DERMATOLOGY MED GRP	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6602	62111107	801101	5
708275454	GOODSKIN	SAN VICENTE BLVD	LOS ANGELES	CA	90049	6604	62111107	801101	5
416964388	MD DEBRA BA VILINSKY		LOS ANGELES	CA	90049		62111107	801101	5
707692103	HALL SWIM ACADEMY	S BARRINGTON AVE	LOS ANGELES	CA	90049	3355	61162019	799967	6
715513219	TAE RYONG TAE KWONDO	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5102	61162014	799945	6
906585526	UNITED STUDIOS OF SELF DEFENSE	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5004	61162014	799945	6
718750275	KEITH COOKE CHAMPION MARTIAL	S BARRINGTON PL	LOS ANGELES	CA	90049	3305	61162014	799945	6
886487578	CHAMPIONS MARTIAL ARTS	S BARRINGTON PL	LOS ANGELES	CA	90049	3305	61162014	799945	6
809522428	DANCE FOR KIDS LLC	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5133	61161011	791101	6
366094365	MNR DANCE FACTORY	SAN VICENTE BLVD	LOS ANGELES	CA	90049	5102	61161011	791101	6
716954444	JAVIER CAMPINES DANCE	MONTANA AVE	LOS ANGELES	CA	90049	6654	61161011	791101	6
719479954	DANCE & DIALOGUE	GORHAM AVE	LOS ANGELES	CA	90049	4756	61161011	791101	6
719665497	GETTY CENTER		LOS ANGELES	CA	90049		44719005	554101	5

Site 2: Encino, Ventura Blvd

LOCNUM	CONAME	STREET	CITY	STATE	ZIP	ZIP4	NAICS	SIC	RBCHI
425108873	INVISION FITNESS	VENTURA BLVD	ENCINO	CA	91316	4068	81219101	729906	6
404806444	ASIANGEL MASSAGE & SPA	VENTURA BLVD	ENCINO	CA	91316	4142	81219908	729917	6
660965641	HEAVEN THERAPEUTIC MASSAGE	VENTURA BLVD	ENCINO	CA	91316	3988	81219908	729917	6
700641362	OSTARA MASSAGE SPA	VENTURA BLVD	ENCINO	CA	91316	4007	81219908	729917	6
388131849	S K MOVEMENT	VENTURA BLVD	ENCINO	CA	91316	4007	61161011	791101	6
401855626	DEGAS DANCE STUDIO	VENTURA BLVD	ENCINO	CA	91316	4007	71112002	792215	6
586724601	LA FITNESS	VENTURA BLVD	ENCINO	CA	91316	3860	71394011	799101	6
217556869	ARENA FITNESS	VENTURA BLVD	ENCINO	CA	91316	4068	71394011	799101	6
433596960	H N L MEDI SPA	VENTURA BLVD	ENCINO	CA	91316	4109	71394017	799105	6
707205832	BASE TRAINING & PHYSICAL THRPY	VENTURA BLVD	ENCINO	CA	91316	4035	71394013	799106	6
558944666	MY GYM CHILDREN'S FITNESS CTR	VENTURA BLVD	ENCINO	CA	91316	4007	71394024	799108	6
401952794	CRANE MARTIAL ARTS	VENTURA BLVD	ENCINO	CA	91316	4007	61162014	799945	6
710657397	LA TRADITIONAL WING CHUN KUNG	VENTURA BLVD	ENCINO	CA	91316	4129	61162014	799945	6
251290953	UNITED STUDIOS OF SELF DEFENSE	VENTURA BLVD	ENCINO	CA	91316	3854	61162014	799945	6
425318129	FORWARD FOLD	VENTURA BLVD	ENCINO	CA	91316	4130	61169914	799949	6
434749076	CORE POWER YOGA	VENTURA BLVD	ENCINO	CA	91316	4050	61169914	799949	6
949111629	BIKRAM'S YOGA CLG-INDIA-ENCINO	VENTURA BLVD	ENCINO	CA	91316	5014	61169914	799949	6
421954532	ENCINO PARK	VENTURA BLVD	ENCINO	CA	91316	4125	71219004	799951	6
660566076	VALLEY BOOTCAMP	VENTURA BLVD	ENCINO	CA	91316	3516	71399045	799979	6
672286119	NUVO SPINE	VENTURA BLVD	ENCINO	CA	91316	5109	62111108	801102	6
203752050	ALIGNED HEALTH CTR	VENTURA BLVD	ENCINO	CA	91316	3893	62131002	804101	6
427396283	STAR CHIROPRACTIC & REHAB	VENTURA BLVD	ENCINO	CA	91316	3517	62131002	804101	6
251228672	YELENA OREL CHIROPRACTIC	VENTURA BLVD	ENCINO	CA	91316	3650	62131002	804101	6
438900828	MENTA-MEYER HEALTHCARE	VENTURA BLVD	ENCINO	CA	91316	3860	62131002	804101	6
949112122	ARDALAN CHIROPRACTIC CORP	VENTURA BLVD	ENCINO	CA	91316	4092	62131002	804101	6
402336828	ZONE HEALING HEALTH & WELLNESS	VENTURA BLVD	ENCINO	CA	91316	3890	62131002	804101	6
171913403	WELLS CHIROPRACTIC GROUP	BALBOA BLVD	ENCINO	CA	91316	2805	62131002	804101	6
613157841	HURST CHIROPRACTIC INC	BALBOA BLVD	ENCINO	CA	91316	1576	62131002	804101	6
628849465	VALLEY SPINAL DECOMPRESSION	BALBOA BLVD	ENCINO	CA	91316	2837	62131002	804101	6
629220104	PHARMACOLOGY RESEARCH INST	BALBOA BLVD	ENCINO	CA	91316	1511	44611008	591207	5
725211709	GOODWILL	VENTURA BLVD	ENCINO	CA	91316	3742	45331041	593222	5
717788824	HOAG HOSPITAL	BALBOA BLVD	ENCINO	CA	91316	1519	45322013	594712	5
171913619	WIZARD OF EYES OPTICAL	VENTURA BLVD	ENCINO	CA	91316	4007	44613004	599504	5
875421620	RUBIO OPTICAL INC	BALBOA BLVD	ENCINO	CA	91316	1512	44613004	599504	5
414640762	DR MOOSSA HEIKALI M D	VENTURA BLVD	ENCINO	CA	91316	3517	62111107	801101	5
717075154	NORTH VALLEY ORTHOPEDIC INST	VENTURA BLVD	ENCINO	CA	91316	3717	62111107	801101	5
352276539	MID VALLEY MEDICAL ASSOC	VENTURA BLVD	ENCINO	CA	91316	3860	62111107	801101	5
203955778	ENCINO TOWN MEDICAL GROUP	VENTURA BLVD	ENCINO	CA	91316	4003	62111107	801101	5
438901272	ALLERGY-ASTHMA CARE PETER J	VENTURA BLVD	ENCINO	CA	91316	4054	62111107	801101	5
403009188	MICHAEL R SHAPIRO MD INC	VENTURA BLVD	ENCINO	CA	91316	5129	62111107	801101	5
623805132	THR CARDIOVASCULAR INST	VENTURA BLVD	ENCINO	CA	91316	3866	62111107	801101	5
628840019	CARDIOVASCULAR INSTITUTE	VENTURA BLVD	ENCINO	CA	91316	3866	62111107	801101	5
672991478	ENHANCE AESTHETICS & GYNCLGY	VENTURA BLVD	ENCINO	CA	91316	5101	62111107	801101	5
707315235	CRANIOSPINAL CENTER-LOS ANGLS	VENTURA BLVD	ENCINO	CA	91316	5109	62111107	801101	5
414818480	ASSOCIATED PSYCHOLOGICAL SVC	BALBOA BLVD	ENCINO	CA	91316	1500	62111107	801101	5
425485572	SAMSON HAIR RESTORATION	BALBOA BLVD	ENCINO	CA	91316	1511	62111107	801101	5
205058456	ASSISTED REPRODUCTIVE TECH MED	BALBOA BLVD	ENCINO	CA	91316	2867	62111107	801101	5
242886398	F O R C E	BALBOA BLVD	ENCINO	CA	91316	2889	62111107	801101	5
250909132	VALLEY PEDIATRIC MEDICAL GROUP	BALBOA BLVD	ENCINO	CA	91316	2858	62111107	801101	5
420830374	PEDIATRIC CARE PHYSICIANS	BALBOA BLVD	ENCINO	CA	91316	2890	62111107	801101	5

Site 3. Eagle Rock, Colorado Blvd

LOCNUM	CONAME	STREET	CITY	STATE	ZIP	ZIP4	NAICS	SIC	RBCHI
651667354	THAI HANDS EMPORIUM SALON	COLORADO BLVD	LOS ANGELES	CA	90041	1063	81219908	729917	6
415178406	AIKIDO CULTURAL INSTITUTE	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1924	61162014	799945	6
607322898	XTREME TRAINING CTR	COLORADO BLVD	LOS ANGELES	CA	90041	1221	61162014	799945	6
707733354	ONE DOWN DOG	COLORADO BLVD	LOS ANGELES	CA	90041	1242	61169914	799949	6
651673964	PEEKABOO PLAYLAND	COLORADO BLVD	LOS ANGELES	CA	90041	1248	71219006	799956	6
554912808	CALIFORNIA WEIGHT CONTROL CTR	COLORADO BLVD	LOS ANGELES	CA	90041	1251	81219103	729934	5
231745183	AMERICAN NOTARY GROUP	COLORADO BLVD	LOS ANGELES	CA	90041	1142	54112001	738979	5
425943408	EYE Q OPTOMETRY	COLORADO BLVD	LOS ANGELES	CA	90041	1048	62111107	801101	5
651654634	CHILDREN'S DENTAL GROUP	COLORADO BLVD	LOS ANGELES	CA	90041	1048	62121003	802101	5
477784615	JOVEN FAMILY DENTISTRY	COLORADO BLVD	LOS ANGELES	CA	90041	1156	62121003	802101	5
439299230	CHONA FRIAS YU INC	COLORADO BLVD	LOS ANGELES	CA	90041	1164	62121003	802101	5
726622696	JENNIFER LAVORO ACUPUNCTURE	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1908	62139901	804913	5
692091119	EAGLE ROCK COMM ACUPUNCTURE	COLORADO BLVD	LOS ANGELES	CA	90041	1248	62139901	804913	5
722158032	MICHELLE HARWELL THERAPY	COLORADO BLVD	LOS ANGELES	CA	90041	1255	62134007	804918	5
215681644	SCIENCE OF EXCELLENCE	COLORADO BLVD	LOS ANGELES	CA	90041	1255	62139902	804946	5
710684953	SOPHIA BICOS	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1923	62133009	804998	5
170386866	SOLHEIM SENIOR COMMUNITY	MERTON AVE	LOS ANGELES	CA	90041	1915	62331101	805904	5
426596926	URBAN HOSPICE CARE INC	COLORADO BLVD	LOS ANGELES	CA	90041	1251	62311011	805908	5
707315189	RAMI KOUZ D D S COSMETIC & GEN	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1924	62199921	809907	5
403500236	O SKIN CARE	COLORADO BLVD	LOS ANGELES	CA	90041	1087	62199921	809907	5
613523828	J & L HOME HEALTH SVC	COLORADO BLVD	LOS ANGELES	CA	90041	1251	62199921	809907	5
477785828	ST DOMINIC SCHOOL	MERTON AVE	LOS ANGELES	CA	90041	1911	61111004	821101	5
808012025	EAGLE ROCK PUBLIC LIBRARY	CASPAR AVE	LOS ANGELES	CA	90041	1901	51912006	823106	5
415176128	PURPLE TWIG	COLORADO BLVD	LOS ANGELES	CA	90041	1248	61161001	829919	5
255843211	ST DOMINIC YOUTH MINISTRIES	CASPAR AVE	LOS ANGELES	CA	90041	1902	62411006	832222	5
681978771	PRESCHOOLS CALIFORNIA	EAGLE ROCK BLV	LOS ANGELES	CA	90041	2087	62441006	835102	5
706443738	INTERFAITH MOVEMENT 4 HUMAN	N MAYWOOD AVE	LOS ANGELES	CA	90041	2054	61331908	839998	5
440556465	EAGLE ROCK VALLEY HISTORICAL	COLORADO BLVD	EAGLE ROCK	CA	90041	1142	71211001	841201	5
612920256	SEAFOOD CITY SUPERMARKET	COLORADO BLVD	LOS ANGELES	CA	90041	1085	45221003	531104	3
417299052	GNC GENERAL NUTRITION CORP	COLORADO BLVD	LOS ANGELES	CA	90041	1048	44619103	549901	3
424729658	GNC	COLORADO BLVD	LOS ANGELES	CA	90041	1048	44619106	549904	3
554826875	VITAMIN WORLD INC	COLORADO BLVD	LOS ANGELES	CA	90041	1048	44619106	549904	3
701250347	GREEN BEAN	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1924	44813003	564103	3
707405105	CHIPOTLE MEXICAN GRILL	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1923	72251117	581208	3
668287110	ARMON'S RESTAURANT	EAGLE ROCK BLV	LOS ANGELES	CA	90041	1924	72251117	581208	3
371865320	LILLIAN'S BAKERY	COLORADO BLVD	LOS ANGELES	CA	90041	1088	72251117	581208	3
381948066	JOLLIBEE	COLORADO BLVD	LOS ANGELES	CA	90041	1085	72251117	581208	3
260070578	COLORADO WINE CO	COLORADO BLVD	LOS ANGELES	CA	90041	1144	72251117	581208	3
496257452	POLLOS A LA BRASA EAGLE ROCK	COLORADO BLVD	LOS ANGELES	CA	90041	1251	72251117	581208	3
177885712	OK CHINESE FOOD RESTAURANT	COLORADO BLVD	LOS ANGELES	CA	90041	1164	72251117	581208	3
403102961	FOUR CAFE	COLORADO BLVD	LOS ANGELES	CA	90041	1222	72251117	581208	3
433173835	DAVE'S CHILLIN & GRILLIN	COLORADO BLVD	LOS ANGELES	CA	90041	1242	72251117	581208	3
477785133	LA FUENTE RESTAURANT & GRILL	COLORADO BLVD	LOS ANGELES	CA	90041	1164	72251117	581208	3
579668559	CAMILO'S CALIFORNIA BISTRO	COLORADO BLVD	LOS ANGELES	CA	90041	1222	72251117	581208	3
700103162	NEW YORK LIBRARY DELI	COLORADO BLVD	LOS ANGELES	CA	90041	1222	72251302	581209	3
427299696	ASLAN CATERING	COLORADO BLVD	LOS ANGELES	CA	90041	1083	72232001	581212	3
613483882	CHUCK E CHEESE'S	COLORADO BLVD	LOS ANGELES	CA	90041	1089	72251115	581222	3
697056687	BIG MAMA'S & PAPA'S PIZZERIA	COLORADO BLVD	LOS ANGELES	CA	90041	1242	72251115	581222	3
381960251	STARBUCKS	COLORADO BLVD	LOS ANGELES	CA	90041	1143	72251505	581228	3
576150601	SWORK	COLORADO BLVD	LOS ANGELES	CA	90041	1242	72251505	581228	3

Site 4. Westlake, Wilshire Blvd

LOCNUM	CONAME	STREET	CITY	STATE	ZIP	ZIP4	NAICS	SIC	RBCHI
720318018	WILSHIRE REHABILITATION CLINIC	WILSHIRE BLVD	LOS ANGELE	CA	90057	3506	62131002	804101	6
721431058	BOB BINAFARD CHIROPRACTIC	S ALVARADO ST	LOS ANGELE	CA	90057	4085	62131002	804101	6
381896901	BONITO'S SWAP MEET	S ALVARADO ST	LOS ANGELE	CA	90057	3303	45331039	593224	5
255831562	ACTIVE LIFE INC L A	WILSHIRE BLVD	LOS ANGELE	CA	90057	3598	44619901	599922	5
400822505	WI SPA	WILSHIRE BLVD	LOS ANGELE	CA	90057	3202	81211210	723119	5
718749599	EXHALE SPA	WILSHIRE BLVD	LOS ANGELE	CA	90057	3202	81211210	723119	5
439396405	LOS ANGELES MEDICAL CTR	WILSHIRE BLVD	LOS ANGELE	CA	90057		62111107	801101	5
258853068	MULTICARE HEALTH CTR	WILSHIRE BLVD	LOS ANGELE	CA	90057	3594	62111107	801101	5
439396432	WILSHIRE CENTER GERIATRIC MED	WILSHIRE BLVD	LOS ANGELE	CA	90057	3507	62111107	801101	5
719469991	MICHAEL GITTER INC	WILSHIRE BLVD	LOS ANGELE	CA	90057	3503	62111107	801101	5
409319353	FIRSTLINE HEALTH	W 8TH ST	LOS ANGELE	CA	90057	5016	62111107	801101	5
439981904	SUNG-NAE BYUN M D	W 8TH ST	LOS ANGELE	CA	90057	3905	62111107	801101	5
989179536	CASILLAS MEDICAL GROUP	W 7TH ST	LOS ANGELE	CA	90057	4023	62111107	801101	5
715924134	REYNALDO L MAKABALI INC	W 7TH ST	LOS ANGELE	CA	90057	5008	62111107	801101	5
477808232	MI DEL TORA MEDICAL CLINIC	W 6TH ST	LOS ANGELE	CA	90057	3121	62111107	801101	5
712326235	HOUSE EAR INSTITUTE	W 3RD ST	LOS ANGELE	CA	90057	1996	62111107	801101	5
712491005	AMERICAN ACADEMY	W 3RD ST	LOS ANGELE	CA	90057	1944	62111107	801101	5
624338364	LOS ANGELES MEDICAL CTR	S WESTLAKE AVE	LOS ANGELE	CA	90057	3505	62111107	801101	5
404515946	COMPREHENSIVE SURGERY CTR	S RAMPART BLVD	LOS ANGELE	CA	90057	3816	62111107	801101	5
651659328	ALVARADO EYE CARE CTR	S ALVARADO ST	LOS ANGELE	CA	90057	4010	62111107	801101	5
719464935	CLINICA MEDICA SANTA MARIA	S ALVARADO ST	LOS ANGELE	CA	90057	4009	62111107	801101	5
170215032	DE LA PENA EYE CLINIC	S ALVARADO ST	LOS ANGELE	CA	90057	2201	62111107	801101	5
170497093	SOUTHERN CA INFECTIOUS DISEASE	S ALVARADO ST	LOS ANGELE	CA	90057	2391	62111107	801101	5
170508584	ST VINCENT EYE SURGERY MED CTR	S ALVARADO ST	LOS ANGELE	CA	90057	2390	62111107	801101	5
420792475	LOS ANGELES HEALTHCARE FCU	S ALVARADO ST	LOS ANGELE	CA	90057	2394	62111107	801101	5
426281506	ONELEGACY MEDICAL	S ALVARADO ST	LOS ANGELE	CA	90057	2320	62111107	801101	5
439004841	ROBERTS NGAN-SUGARMAN MED GRP	S ALVARADO ST	LOS ANGELE	CA	90057	2390	62111107	801101	5
439634239	STEVEN KHWARG INC	S ALVARADO ST	LOS ANGELE	CA	90057	2354	62111107	801101	5
439750886	HEART CARE	S ALVARADO ST	LOS ANGELE	CA	90057	2386	62111107	801101	5
439981912	KAHN WAYMOST CHALISON-JASPER	S ALVARADO ST	LOS ANGELE	CA	90057	2391	62111107	801101	5
440584267	ARASE & HUNTER MDS	S ALVARADO ST	LOS ANGELE	CA	90057	2390	62111107	801101	5
522694447	M BUSSARAKUM INC	S ALVARADO ST	LOS ANGELE	CA	90057	2386	62111107	801101	5
707188545	GREATER LOS ANGELES A MED CORP	S ALVARADO ST	LOS ANGELE	CA	90057	2386	62111107	801101	5
715923815	ROLANDO S MERCADER INC	S ALVARADO ST	LOS ANGELE	CA	90057	2386	62111107	801101	5
715924386	AMGI	S ALVARADO ST	LOS ANGELE	CA	90057	2320	62111107	801101	5
720405028	ELITE PROVIDER URGENT CARE	S ALVARADO ST	LOS ANGELE	CA	90057	2356	62111107	801101	5
808412035	PACIFIC CARDIOTHORACIC SURG	S ALVARADO ST	LOS ANGELE	CA	90057	2390	62111107	801101	5
891441156	HARRIS & BATRA CARDIOLOGY	S ALVARADO ST	LOS ANGELE	CA	90057	2390	62111107	801101	5
170497259	VASANTH KUMAR INC	BEVERLY BLVD	LOS ANGELE	CA	90057	2268	62111107	801101	5
613524131	AUGUST	BEVERLY BLVD	LOS ANGELE	CA	90057	2272	62111107	801101	5
654779891	CHEN'S CHINESE MEDICAL CTR	BEVERLY BLVD	LOS ANGELE	CA	90057	2277	62111107	801101	5
405995323	INTEGRATIVE INDUSTRIAL CLINIC	WILSHIRE BLVD	LOS ANGELE	CA	90057	3617	62149301	801104	5
439395643	WILSHIRE PARKSIDE MED CLINIC	WILSHIRE BLVD	LOS ANGELE	CA	90057	3605	62149301	801104	5
721056868	PAJA MEDICAL GROUP	WILSHIRE BLVD	LOS ANGELE	CA	90057	3602	62149301	801104	5
382066033	PARKVIEW MEDICAL GROUP	WILSHIRE BLVD	LOS ANGELE	CA	90057	3582	62149301	801104	5
400822253	FIRST CHOICE HEALTH CARE	WILSHIRE BLVD	LOS ANGELE	CA	90057	3593	62149301	801104	5
404182844	SUNNY DENTURE	WILSHIRE BLVD	LOS ANGELE	CA	90057	3595	62149301	801104	5
435142176	SAN LUCAS MEDICAL CLINIC	WILSHIRE BLVD	LOS ANGELE	CA	90057	3595	62149301	801104	5
477807036	CENTRO MEDICO MACARTHUR PARK	WILSHIRE BLVD	LOS ANGELE	CA	90057	3503	62149301	801104	5
705969820	INDUSTRIAL HEALTHCARE PHYS MED	WILSHIRE BLVD	LOS ANGELE	CA	90057	3534	62149301	801104	5

References

Aboelata, M., Navarro, A. “Emerging issues in improving food and physical activity environments: strategies for addressing land use, transportation, and safety in 3 California-wide initiatives”. *Am J Public Health* (2010):100:2146e8.

Acemoglu, D. & Johnson, S. 2007. "Disease and Development: The Effect of Life Expectancy on Economic Growth," Journal of Political Economy, University of Chicago Press, vol. 115(6), pages 925-985, December.

American Planning Association. (APA). (2007). “Main Street: Northampton, Massachusetts”. Great Places in America: Streets. Retrieved from, https://www.planning.org/greatplaces/streets/2007/mainstreetnorthampton.htm

Arcaya, M.C., Tucker-Seeley, R.D., Kim, R., Schnake-Mahl, A., So, M., Subramanian, S.V. “Research on neighborhood effects on health in the United States: A systematic review of study characteristics”. Soc Sci Med. 2016 Nov; 168:16-29. doi: 10.1016/j.socscimed.2016.08.047. Epub 2016 Aug 28. Review. PubMed PMID: 27637089; PubMed Central PMCID: PMC5065354.

Arias, E., Escobedo, L.A., Kennedy, J., Fu, C., Cisewski, J. “U.S. Small-area Life Expectancy Estimates Project: Methodology and Results Summary”. Cdc-pdf[PDF – 8 MB]. National Center for Health Statistics. Vital Health Stat 2(181). 2018.

Assemb. Spec. Comm. on the Los Angeles Crisis. “To Rebuild is Not Enough: Final Report and Recommendations of the Assembly Special Committee on the Los Angeles Crisis”. Spec. Comm. 1992-0445-A, Reg. Sess. (1992). Retrieved from, http://www.usc.edu/libraries/archives/cityin- stress/reb/i.htm (select “The Causes of the Urban Unrest”).

Ashe, M., Graff, S., Spector, C. "Changing places: policies to make a healthy choice the easy choice." *Public Health* 125, no. 12 (2011): 889-895.

Banerjee, T., Loukaitou-Sideris, A. (1998) Urban Design Downtown: Poetics and Politics of Form (Berkeley, CA: University of California Press).

Barker, C., Francois, A., Goodman, R., & Hussain, E. (2012). Unshared bounty: How structural racism contributes to the creation and persistence of food deserts. *Racial Justice Project*.

Barton, H. Land use planning and health and well-being. Land use policy [Internet]. 2009 Dec [cited 2017 Jul 21];26:S115–23. Retrieved from, http://linkinghub.elsevier.com/retrieve/pii/S0264837709001331

Berke, E. M., Vernez-Moudon, A. (2014). Built environment change: a framework to support health-enhancing behaviour through environmental policy and health research. *J Epidemiol Community Health*, *68*(6), 586-590.

Botwinick, D., Effron, J., Huang, J. (2010). Saving mom and pop: Zoning and legislating for small and local business retention. Journal of Law and Policy. 18(2), 607-654.

Camp, N.L. "Food insecurity and food deserts". Nurse Pract. 2015 Aug 15;40(8):32-6. doi: 10.1097/01.NPR.0000453644.36533.3a. Review. PubMed PMID: 26180911.

Center for Disease Control and Prevention (CDC). (2019). "National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP): Chronic Disease Index". *NCCDPHP*.

Cerdá, M. et al. "The Relationship Between Neighborhood Poverty and Alcohol Use: Estimation by Marginal Structural Models." Vol. 21, no. 4, 2010, pp. 482–489. www.jstor.org/stable/25680578. Accessed 17 Jan. 2019.

City of Los Angeles. (2020). *"Find a Business Improvement District"*. Office of the City Clerk. Retrieved from, https://clerk.lacity.org/business-improvement-districts/find-business-improvement-district

Cobb, L.K., Appel, L.J., Franco, M., Jones-Smith, J.C., Nur, A., Anderson. C.A.M. "The Relationship of the Local Food Environment with Obesity: A Systematic Review of Methods, Study Quality, and Results." *Obesity* 23, no. 7 (2015): 1331–44. https://doi.org/10.1002/oby.21118.

Cummins, S., Curtis, S, Diez-Roux, A. V., Macintyre, S. "Understanding and representing "place" in health research: A relational approach". Soc Sci Med [Internet]. 2007 Nov (2017 Jul 20);65(9):1825–38. Retrieved from, http://linkinghub.elsevier.com/retrieve/pii/S0277953607003061

Davies, Christina, Matthew Knuiman, Terri Pikora, and Michael Rosenberg. "Health in Arts: Are Arts Settings Better than Sports Settings for Promoting Anti-Smoking Messages?" *Perspectives in Public Health* 135, no. 3 (October 16, 2013): 145–51. https://doi.org/10.1177/1757913913502475.

De Graaf, L. *The City of Black Angels: Emergence of the Los Angeles Ghetto,* 1890-1930, 39(3) Pac. Hist. Rev. 323, 331 (1970).

Ding, D., Nguyen, B., Learnihan, V., Bauman, AE., Davey, R., Jalaludin, B., Gebel, K. "Moving to an active lifestyle? A systematic review of the effects of residential relocation on walking, physical activity and travel behaviour". Br J Sports Med. 2018 Jun;52(12):789-799. doi: 10.1136/bjsports-2017-098833. Review. PubMed PMID: 29858466

Dover, V., Massengale, J. (2013). *Street design: the secret to great cities and towns*. John Wiley & Sons.

Duncan, D., Castro, M., Gortmaker, S., Aldstadt, J., Melly, S., Bennett, G. “Racial differences in the built environment—body mass index relationship? A geospatial analysis of adolescents in urban neighborhoods”.

Ewing, R., King, M.R., Raudenbush, S., & Clemente, O. J. (2005). Turning highways into main streets: two innovations in planning methodology. *Journal of the American Planning Association, 71*(3), 269-282.

Falk, J. H., & Needham, M. D. (2011). Measuring the impact of a science center on its community. Journal of Research in Science Teaching, 48(1), 1-12. doi:http://dx.doi.org/10.1002/tea.20394

Finlay, J., Esposito, M., Kim, M.H., Gomez-Lopez, I., Clarke P. (2019). “Closure of ‘third places’? Exploring potential consequences for collective health and wellbeing.” Health and Place. 60 Article Number: 102225.

Francaviglia, R. V. (1996). *Main street revisited: Time, space, and image building in small-town America*. University of Iowa Press.

Fulton, W. (1992). *Guide to California Planning*. *SOLANO PRESS BOOKS*, *288*.

Hall, P. 1988 (1996). “The City of Dreadful Night”. *Cities of Tomorrow*, p. 13–46.

“Health on Main Streets” (2019). UCLA Fielding School of Public Health: Center on Occupational & Environmental Health.

James, P., Berrigan, D., Hart, J. E., Hipp, J. A., Hoehner, C. M., Kerr, J., ... & Laden, F. (2014). Effects of buffer size and shape on associations between the built environment and energy balance. Health & place, 27, 162-170.

Kramer, D., Lakerveld, J., Stronks, K., Kunst, AE. “Uncovering How Urban Regeneration Programs May Stimulate Leisure-time Walking Among Adults in Deprived Areas: A Realist Review”. Int J Health Serv. 2017 Oct;47(4):703-724. Epub 2017 Aug 2. Review. PubMed PMID: 28764589; PubMed Central PMCID: PMC5648045

Kunstler, J. H. (1994). *Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape*. Simon and Schuster.

Kurashige, S. “The Shifting Grounds of Race: Black and Japanese Americans in The Making of Multiethnic Los Angeles” 18-19 (2010).

Liu, Jodi L., et al. “Beyond Neighborhood Food Environments: Distance Traveled to Food Establishments in 5 US Cities, 2009–2011.” Preventing Chronic Disease: Public Health Research, Practice, and Policy, vol. 12, 6 Aug. 2015, p. 9. PsycINFO. Accessed 20 Jan. 2019.

Lockwood, C. (1998) Main street goes suburban, Architectural Record, March, pp. 123–127.

Los Angeles Almanac. *"Neighborhoods of the City of Los Angeles Population and Race"*. http://www.laalmanac.com/ population/po24la.htm (Last visited October 14, 2019).
Los Angeles Business Council. (LABC). *"About Us"*. Retrieved from, https://www.labcinstitute.org/About-Us

Los Angeles County Department of Public Health. (2010). *"Life Expectancy in Los Angeles County: How Long Do We Live?*". Office of Health Assessment & Epidemiology. Retrieved from,
http://www.publichealth.lacounty.gov/epi/docs/Life%20Expectancy%20Final_web.pdf
Maantay, J. (2001). Zoning, equity, and public health. *American journal of public health*, *91*(7), 1033.

Los Angeles Department of City Planning. (2015). *"Plan for a Healthy Los Angeles"*. Retrieved from, https://planning.lacity.org/odocument/7f065983-ff10-4e76-81e5-e166c9b78a9e/Plan_for_a_Healthy_Los_Angeles.pdf

Loukaitou-Sideris, A., & Ehrenfeucht, R. (2009). *Sidewalks: Conflict and negotiation over public space*. MIT Press.

MacQuillan, E. L., Curtis, A. B., Baker, K. M., Paul, R., & Back, Y. O. (2017). Using GIS mapping to target public health interventions: examining birth outcomes across GIS techniques. *Journal of community health*, *42*(4), 633-638.

McLaughlin, I., & Kramer, K. (2012). Peer-reviewed: Food retailer licensing: An innovative approach to increasing access to healthful foods. Preventing chronic disease, 9.

Mehta, V., & Bosson, J. K. "Third places and the social life of streets." *Environment and Behavior*, *42*(6), (2010): 779-805.

Miller, K. A. (2019). Rural public library assets and socioeconomic demographics: A multi-classification study (Order No. AAI10821935). Available from PsycINFO. (2162886599; 2018-65230-097). Retrieved from https://search.proquest.com/docview/2162886599?accountid=14512

Mirialam, H., Kazerani, M., Shekofteh, M., & Razzaghi, Z. (2019). The importance of public libraries in education for health literacy: A case study on diabetic patients. *IFLA Journal*, *45*(3), 216–223. https://doi.org/10.1177/0340035219857445

Ong, P. "Beyond ZIP Codes: Unpacking the Place-Health Nexus". *UCLA Center for Neighborhood Knowledge* (2018). Lecture Fall 2018.

Papachristos, A. V., Smith, C. M., Scherer, M. L., & Fugiero, M. A. (2011). More coffee, less crime? the relationship between gentrification and neighborhood crime rates in Chicago, 1991 to 2005. *City & Community, 10*(3), 215-240. doi:http://dx.doi.org/10.1111/j.1540-6040.2011.01371.x

Park, A., Watson, N., Galloway-Gilliam, L. “Community Health Councils and Coalition for Health and Justice, South Los Angeles Health Equity Scorecard” 19, (2008).

Polsky, J.Y., Moineddin, R., R. Dunn, J.R., Glazier, R.H., & Booth, G.L. “Absolute and Relative Densities of Fast-Food versus Other Restaurants in Relation to Weight Status: Does Restaurant Mix Matter?” *Preventive Medicine* 82 (January 2016): 28–34.

Robertson, K. A. (2004). The main street approach to downtown development: An examination of the four-point program. *Journal of Architectural and Planning Research*, 55-73.

Rossen, L. M., & Pollack, K. M. (2012). Making the connection between zoning and health disparities. *Environmental justice*, *5*(3), 119-127.

Roux, L., Pratt, M., Tengs, T. O., Yore, M. M., Yanagawa, T. L., Van Den Bos, J., ... & Kohl III, H. W. (2008). Cost effectiveness of community-based physical activity interventions. *American Journal of preventive medicine*, *35*(6), 578-588.

Royal Society for Public Health. (2015). Health on the High Street [report]. Retrieved from London, UK: https://www.rsph.org.uk/our-work/campaigns/health-on-the-high-street-.html

Sallis, J. F., Cain, K.L., Millstein, R. A., Conway, T.L., Gavand, K. A., Frank, L. D., Saelens, B. E., Geremia, C. M., Chapman, J., Adams, M. A., Glanz, K., King, A. C. (2015). Microscale Audit of Pedestrian Streetscapes (MAPS). Active Living Research Organization. Retrieved from, https://activelivingresearch.org/microscale-audit-pedestrian-streetscapes

Shaffer, A. “L.A. 's Grocery Gap: The Need for a New Food Policy and Approach to Market Development”. pp 34. (2002).

Shiffman, R., Bell, R., Brown, L. J., & Elizabeth, L. (Eds.). (2012). *Beyond Zuccotti Park: freedom of assembly and the occupation of public space*. NYU Press.

Talen, E., & Jeong, H. (2019). “Does the classic American main street still exist?” An exploratory look. *Journal of Urban Design*, *24*(1), 78-98.

UCLA Fielding School of Public Health. (2019). Center for Occupational & Environmental Health. *Awaiting formal citation upon publication (September 2020).

Wachs, M. *Autos, Transit, and the Sprawl of Los Angeles: The 1920s*, 50 (3) J. Am. Plan. Assn 297, 298 (1984).

Wexler, J. D. (2004). Parks as gyms? Recreational paradigms and public health in the national parks. *American journal of law & medicine*, *30*(2-3), 155-188.

Wolshon, B., & Wahl, J. (1999). “Novi's main street: Neotraditional neighborhood planning and design.” *Journal of urban planning and development*, *125*(1), 2-16.

Wooten, H., McLaughlin, I. Chen, L. and Fry C. "Zoning and licensing to regulate the retail environment and achieve public health goals." *Duke FL & Soc. Change* 5 (2013): 65.

Zhang, Hao, & Li Yin. “A Meta-Analysis of the Literature on the Association of the Social and Built Environment with Obesity: Identifying Factors in Need of More In-Depth Research.” *American Journal of Health Promotion*, December 26, 2018, 0890117118817713. https://doi.org/10.1177/0890117118817713.