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FOOD INSECURITY AND RESIDENTIAL SEGREGATION AMONG ADULTS IN
THE UNITED STATES: THE NATIONAL HEALTH AND NUTRITION
EXAMINATION SURVEY 2017- MARCH 2020 PRE-PANDEMIC DATA

By

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B.S., University of Central Florida, 2011
MPH, Tennessee State University, 2013

A Dissertation
Submitted to the Faculty of the
School of Public Health and Information Sciences of the University of Louisville in
Partial Fulfillment of the Requirements
for the Degree of

Doctor of Philosophy in Public Health Sciences

Department of Health Promotion and Behavioral Sciences
University of Louisville
Louisville, Kentucky

August 2023

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August 4, 2023

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DEDICATION

This dissertation is dedicated to
the memory of my loving Grandmother, Birdia M. Jackson
and
My family and friends who have believed, prayed, and supported me every step of the
way. The best is yet to come!

ACKNOWLEDGEMENTS

Do not be anxious about anything, but in every situation, by prayer and petition, with thanksgiving, present your requests to God. And the peace of God, which transcends all understanding, will guard your hearts and your minds in Christ Jesus. Philippians 4:6-7

Embarking on this journey to obtain my doctoral degree has come with its challenges, but has taught me many life lessons, and I am grateful for it. I would first like to thank God, for without Him, I would be nothing. My faith, strength, and determination come from Him. Secondly, I owe much gratitude to my family, friends, co-workers, and all of those whom I have crossed paths with during this experience. From each situation, I have learned a valuable lesson that helped shape the woman I am today.

To my dissertation chair, Dr. Scott LaJoie, thank you for never doubting me and always believing in me throughout this process. Your unwavering support, encouragement, and patience throughout the pandemic, life's challenges, and across-country moves during this entire process have meant so much to me, and I appreciate you for it. Dr. Kristi King, from the first class I took with you in my first semester, I knew you would be an essential part of my educational journey. Your knowledge, support, and kindness were much appreciated. Dr. Brandy Kelly-Pryor, thank you for challenging me and expanding my thinking. Your guidance and support throughout my research have added to this vital work. Thank you to Dr. Gaberiel Jones, a classmate turned dissertation committee member. Your enthusiasm and expertise in this field have made me thankful for what you have added to my committee. A special thanks to Dr. Monica Wendel, who

has always been supportive and encouraging, and all the faculty, staff, and students of SPHIS.

Additionally, I am sincerely thankful and grateful to my family and friends for their love, support, prayers, and encouragement. I can finally say yes to the questions I have been asked countless times, “Are you done with school?” “Can I call you Dr. Dre’?”. I am incredibly grateful for my mother, Princess M. Jackson, my Great Aunt, Annie M. Harvell, my little cousin Gabriel J. Jackson, and one of my closest friends Dr. Filsan A. Farah, who have been loving, patient, kind, and supportive, for what has seemed like an eternity. They listened to my research and provided valuable feedback and commentary about a topic they were learning about through me. I am also grateful for my CDC family, who have encouraged me through this process and provided support both professionally and personally.

To all those experiencing food insecurity and living in segregated communities across the country, this is for you! The fight for equality will never stop.

ABSTRACT

FOOD INSECURITY AND RESIDENTIAL SEGREGATION AMONG ADULTS IN THE UNITED STATES: THE NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY 2017- MARCH 2020 PRE-PANDEMIC DATA

Chandre' L. Chaney

August 4, 2023

Food insecurity is when a household has insufficient food supply due to limited economic resources. It is a public health issue that continues to persist. The health, social, and economic impact affects millions of people nationwide.

Residential segregation is a primary cause of inequities and health disparities. It shapes the differences in socio-economic conditions between Blacks and Whites living in the U.S. This country is segregated across racial lines in many of our most populated metropolitan cities. Americans worship in different churches, learn in disparate schools, and live in separate neighborhoods. Residential segregation has consequences that impact the economy, professional and social networks, and cause resource inequalities.

As food insecurity and residential segregation continue to plague our country, public health researchers must investigate these issues and use theory to guide them toward solutions. Using extensive data samples to understand better the impact of residential segregation on food insecurity rates across the country is essential. This study used the National Health and Nutrition Examination Survey (NHANES) 2017-March

2020 pre-pandemic data, the U.S. Census, Feeding America's Map the Meal Gap, and Brown University's Dissimilarity Index to assess food insecurity and residential segregation in adults in the U.S. Additionally, the data was used to examine food insecurity and levels of segregation across three metropolitan cities with high, medium, and low dissimilarity indices.

Variables for the study were identified from the individual, community, and societal levels of the social-ecological model. Logistic regression analyses were conducted to assess predictors of food insecurity among adults in the U.S. Findings showed statistical significance in many of the variables predicting food insecurity. Research was also conducted on local programs, policies, and interventions to combat food insecurity in the selected metropolitan cities.

This study adds to the growing body of literature on residential segregation and its association with food insecurity rates in the U.S. The findings from this research indicate the need for improvements in public health, health promotion, and education efforts regarding these issues. It can prompt the creation of better policies, programs, and interventions to address this country's growing food insecurity and residential segregation.

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CHAPTER 1: INTRODUCTION

Summary of the Problem

United States communities have been racially segregated for over a century (Power, 1983). Americans throughout the country worship in different churches, learn in disparate schools, shop in separate shopping centers, and live in distinct neighborhoods. Residential segregation has various consequences that impact the economy and social and professional networks and cause generational resource inequalities. White communities typically have more access and better opportunities for professional growth, medical care, public transportation, quality schools, and various food options. By comparison, communities of color often have limited access to similar everyday necessities (Archer, 2019).

Residential segregation is a primary cause of health disparities and shapes differences in socio-economic conditions and health status between Blacks and Whites (Williams & Collins, 2001). Public health researchers have identified significant differences in health outcomes and mortality rates related to the spatial separation of population groups and economic lines (Acevedo-Garcia et al., 2003). Residential segregation, characterized as the intentional separation of racial groups, and associated resource deprivation and perpetuation of racial inequities, is an often-neglected variable of racial disparities research (Massey & Denton, 1993). However, limited empirical evidence has created a significant void in the research literature exploring the gravity of housing segregation across specified metropolitan areas and how community and

population-level outcomes associated with segregation influence health and well-being (Owens, 2019).

The residential separation of racial groups is a form of institutional racism designed to assert White social dominance and protect Whites from interacting with Blacks daily (Williams & Collins, 2001). The federal government created the Home Owners' Loan Corporation (HOLC), establishing redlining in the 1930s. Redlining is the discriminatory practice by which housing, employment, goods, and services are withheld from people based on their race and the geographic location of their neighborhood (Locke et al., 2021). This is often compounded by financial institutions' refusal to lend and stringent loan terms in neighborhoods of color (Squires, 2011). Redlining has significantly diminished the wealth-building potential of Blacks. Today, wealth is among the largest predictors of health outcomes (Lynch et al., 2021).

Over many decades, redlining has restricted access to wealth and homeownership for racially minoritized groups. This has contributed to various adverse social outcomes for example poverty, low educational attainment, and high unemployment rates (Locke et al., 2021). Segregation in the United States has been enacted through institutional policies by zoning restrictions, federal housing programs, racial restrictions created by neighborhood associations, and discriminatory real estate and lending practices (Massey & Denton, 1993). Furthermore, segregation results in higher rates of food insecurity among Blacks in poorer neighborhoods (Burke et al., 2018; Hatch & Knight, 2019; Shannon et al., 2018). This claim is a guiding principle and a focal point of this dissertation study.

Food insecurity is a phenomenon experienced when a household has an absence of an adequate amount of food due to limited economic resources. Food insecurity is a leading cause of nutrition deficits in one's diet, diabetes, obesity, being classified as underweight, and other health-related issues in the United States (Coleman-Jensen et al., 2022). Academic researchers convey linkages between food security status and many other social determinants of health. In tandem with those efforts, policy advocates have pushed for new social safety net programs that address food insecurities (Martin-Shields & Stojetz, 2019).

Most adults who report living in food-insecure households have reported concerns about their household food supply, are unable to afford and prepare balanced meals, and often skip meals or reduce the portion size of their meals (Seligman et al., 2010). Neighborhood poverty and segregation by race and ethnicity can impact the food security status of residents in those communities (Morrissey et al., 2016). Lower-income areas typically have an abundance of meat markets with poorer quality protein and convenience and liquor stores than opposing areas of affluence with individuals who have higher incomes. This translates into fewer natural and organic food stores, fruit and vegetable produce markets, traditional supermarkets, and fresh bakeries (Moore & Diez Roux, 2006; Morland et al., 2002).

While research has shown a strong linkage between health outcomes and residential segregation (Chang, 2006; LaVeist, 1993; Mehra et al., 2019; White & Borrell, 2011), there is limited research on segregation and its impact on food insecurity in specific metropolitan cities. This research is essential because it allows for a closer inspection of the myriad of factors and proposed local solutions. City-specific data is

needed mainly due to using nationally representative samples and Census Tracts in other studies examining food insecurity and its impact in different geographic areas. There continues to be a lack of local research and data collection surrounding food insecurity and residential segregation.

Purpose

The motivation for this study is to identify factors and predictors from an adapted social-ecological model (SEM) linking residential segregation and food insecurity in adults in the U.S. The utilization of this conceptual framework will seek to guide this research and identify factors within the denoted levels of the model. This study will examine these factors using data from the 2017 through March 2020 pre-pandemic National Health and Nutrition Examination Survey (NHANES), the 2020 U.S. Census, Feeding America's Map the Meal Gap, and Brown University's Dissimilarity Index. NHANES is a survey deployed throughout communities that collects the nutritional and health status of individuals across all age groups throughout the U.S. NHANES data collection was suspended in March 2020 due to the COVID-19 global pandemic. As an outcome, the 2019 and 2020 collection years were not completed. Therefore, 2019 through March 2020 data was combined with 2017 and 2018 data to form a nationally representative sample. The total number of participants surveyed was 15,560, of which 9,693 were adults. Of the 9,693 adults, 3,422 were 60 and older. Both subsets of study participants were used for this study for the inclusion of the community-level variables, which were targeted specifically for individuals 60 and older.

The Dissimilarity Index measures segregation between two racial-ethnic groups across neighborhoods. The index ranges between 0 to 100 and measures the integration or

separation of groups around neighborhoods in metropolitan areas or cities (Census Scope, n.d.). The higher the score a city is given, the more segregated it is. For example, if a city has a score of 87 measuring Black-White segregation, 87% of Blacks would need to move for that city to be integrated.

The NHANES and dissimilarity index data enabled a macro-level analysis of food insecurity and residential segregation. Additionally, the dissimilarity index guided the selection of representative metropolitan areas to be explored at the micro- and meso-levels.

Study Aims

Aim 1: To identify predictors of food insecurity at individual, community, and societal levels.

Aim 2: To assess the congruence of national and local food insecurity data gathered from three metropolitan areas.

Aim 3: To describe public health interventions offered in metropolitan areas with high, medium, or low dissimilarity index scores.

Relational Research Questions

1. To what degree do the social-ecological model's individual, community, and societal levels predict food insecurity among adults in the U.S.?
2. Using the social-ecological model's individual, community, and societal levels, can specific groups and factors be identified that are most likely to experience food insecurity?

Hypotheses to be Tested

H₁: The social-ecological model's individual, community, and societal levels will correlate significantly with food insecurity in adults in the U.S.

H_{2a}: Race will have a statistically significant association and correlate with predicting food insecurity in adults in the U.S.

H_{2b}: Ethnicity will have a statistically significant association and correlate with predicting food insecurity in adults in the U.S.

H₃: Persons without a high school diploma will most likely experience food insecurity than those with a high school diploma or higher.

H₄: Women will most likely experience food insecurity more than their male counterparts.

H₅: Households ever receiving SNAP benefits will likely experience food insecurity more than households never receiving SNAP benefits.

Descriptive Research Questions

3. Do metropolitan areas with higher scores on the dissimilarity index have higher rates of food insecurity?
4. What have metropolitan areas with high, medium, and low dissimilarity indices done to address food insecurity?

Significance

Researchers across many disciplines have conducted studies to explore the relationship between health status and outcomes concerning food insecurity. Generally, studies conclude that poorer health outcomes, including hypertension, diabetes, heart disease, and obesity, are more common in areas where food insecurity is highest.

Typically, these studies are conducted at the state or federal level (Liu & Eicher-Miller, 2021; Stuff et al., 2007; Vijayaraghavan et al., 2011); one often overlooked variable is the degree to which communities are segregated. This dissertation will delve into the impact of residential segregation, often the legacy of Jim Crow-era laws, on food security status among adults in the U.S. As the American population becomes more diverse and affordable housing options unattainable, it is essential to recognize how residential segregation affects food insecurity and subsequent health outcomes. Considering food insecurity and residential segregation from micro-, meso-, and macro-levels, this study will illuminate new insights useful for city planners, health promoters, policy, and lawmakers at the federal, state, and local levels.

Summary

To live where and how we want is the dream of millions of Americans. This dream has been deferred for many due to residential segregation and the inability to live amongst those of different racial and ethnic, and economic backgrounds. Being denied the ability to live in communities with adequate healthcare facilities, well-paying jobs, public transportation, and healthy food options should be a right of Americans. Studies have examined food insecurity and race, while others have considered the association between race and residential segregation. Few studies have sought to expand the knowledge base of food insecurity and residential segregation, especially in specific metropolitan cities.

A better understanding of the triad of food insecurity, racial inequality, and residential segregation will result in recommendations for urban planning grounded in health equity science. This study builds on several studies of food insecurity and the

social-ecological model (Goldberg, 2013), racial and income segregation and food insecurity in the United States (Caldwell, 2015), residential segregation and health outcomes (Freeman Anderson, 2016), race and housing segregation in Dallas (Ugokwe, 1992) and racial residential segregation and access to health care coverage (Freeman Anderson, 2011). This dissertation explores the connection between residential segregation and its impact on food insecurity among adults in the U.S. from 2017 to pre-pandemic 2020.

CHAPTER 2: LITERATURE REVIEW

This review begins with a look at residential segregation. I discuss how residential segregation is measured and provide descriptive data on the extent of segregation in America. Next, I describe how food insecurity research is conducted and how prevalent food insecurity is across the country. Lastly, I investigate how vital residential segregation research is when exploring food insecurity.

Literature exploring these topics is bound and mainly focuses on national-level data. A small but significant number of studies examine metropolitan cities and the impact on residential segregation and food insecurity (Caldwell, 2015; Ugokwe, 1992). Both national and local data are considered.

The History of Housing in the United States

From the early to mid-1900s, many Whites fought to prevent Blacks from living in integrated neighborhoods (Woods, 2018). These practices have continued throughout the 20th century. Policymakers at the federal, state, and local levels, alongside real estate and housing moguls, developed ways of racial exclusion that segregated metropolitan areas (Erickson & Highsmith, 2018). Redlining, blockbusting, and zoning continue to divide communities along the Black and White color line. This has caused debilitating impacts on Blacks in cities across the United States, particularly in terms of missed opportunities for economic prosperity and wealth-building potential through homeownership (McGrew, 2018).

The U.S. has a long history of race-restrictive housing and racial zoning. The right to choose where one wants to live without addressing the significant restrictions on one's right to own property is an injustice (Yinger, 1999). Following adopting two landmark civil rights proposals, President Lyndon Johnson's administration pursued prohibiting racial discrimination in the financing, sale, and rental of all housing units. The legislation failed in 1966 but was passed two years later (Jenkins & Peck, 2022).

After Congress passed the Fair Housing Act of 1968, it became unlawful to discriminate against Blacks as it pertains to housing. The policy was meant to decrease the frequent instances of racial segregation. Segregation continued to persist, and the policies continued to affect social and physical environments throughout Black communities due to reduced resources and investments, disengagement, and disinterest (Mokiao & Hingorani, 2021). Few substantial changes were made in the decades following the enactment of the policies. Blacks were able to make economic progress but were still largely unable to afford and gain access to housing options, either for purchase or rent, in desired areas.

Healthy and Safe Housing

Earlier in this country's history, government participation in housing existed not at a federal level but at the local level. However, in 1892 the federal government began investigating slum conditions in cities with over 200,000 residents. The government reserved roughly \$20,000 in its budget for this effort. This is the equivalent of about \$655,000 today. With limited funding for the work planned to be conducted throughout the country, a small number of investigations were completed, and little impact was made (Shepard, 2006). Just as it was identified in the late 1800s, access to healthy and safe

housing is vital in improving population health, especially among the most vulnerable. Millions of Americans across the country are exposed to unsafe living conditions living with mold, pests, lead, and radon (Tilburg, 2017). Parke and Adebayo examined health and housing during COVID-19. Their findings shed light on the existing inequities between housing, health, and vulnerable populations. They explored the struggles of persons experiencing homelessness and poorly built homes and the impact it could have on health outcomes during the lockdown. Recommendations from the research express the need for inclusivity and more community-based participatory research to establish best practices (Parke and Adebayo, 2021).

A healthy home contributes to meeting its occupants' physical, social, and psychological needs. Safe homes protect families from exposure to allergens and chemicals and help prevent unintentional injuries. Being in a healthy and safe home can promote health and wellness and improve emotional and mental health. In opposition to that, insufficient housing can add to chronic health issues, impact developmental growth, and impede proper nutritional intake (Raymond et al., 2011). Herrick and Bona found through their research that housing stress impacts blood pressure, depression, and other negative health consequences by analyzing data collected from the Behavioral Risk Factor Surveillance System (BRFSS) (Herrick and Bona, 2013). This further exhibits the importance of safe and healthy housing and its influence on both mental and physical health.

Housing Supply

The federal government played an insignificant role in housing finance until the New Deal legislation enacted by the Federal Housing Administration (FHA) starting in

1933. This legislation provided insurance on home mortgages which was presumed to eliminate the risk to banks of lending money to purchase a home. This federal intervention lowered mortgage credit and enhanced the construction of new homes. However, because the FHA did not offer insurance mortgages in predominately Black neighborhoods, builders would not sell homes to Black buyers, and banks stopped offering mortgage loans. This caused an undersupply of homes available to Blacks, who were then exploited by predatory lending practices. These predators bought inexpensive homes from White homeowners and sold them at a premium under rent-to-own contracts to Black families (Winchester, 2021). This impact has contributed to decades of an undersupply of homes for Blacks. This lessened home ownership and rental housing availability for low to moderate-income households (Basolo, 2019).

Systemic Racism

Racism is the act of assaulting an individual in the form of prejudices, biases, and having a mindset of superiority. The result of racism causes suffering and furthers racial inequities and injustices (American Nurses Association, 2021). Many Americans associate racism with blatant racial discrimination that occurred earlier in history at an individual level, but racism can look different while still negatively impacting racial and ethnic disparities (Franz et al., 2022).

Systemic racism is covert and often at the macro-level that asserts White social dominance in institutions and policies (Feagin, 2013). Current instances of racial inequalities that exist are employment opportunities, housing challenges, the criminal justice system, and education, which all uphold procedures and institutional policies preserving racial hierarchy (Franz et al., 2022). Whites benefit from the invisibility of

systemic racism because they do experience discrimination or prejudice like their counterparts. The negative outcomes from discrimination at the individual level, such as being denied a mortgage loan, is racism that directly results in economic, educational, and health outcomes for Blacks that are easy for Whites to ignore because of the different lived experiences within the same institutions (Williams et al., 2016). Segregated housing can create racial isolation costing Blacks many opportunities and further perpetuating racialized encounters and individual bias evolving into systemic racism.

Residential Segregation

During the early 1960s, most White Americans favored segregation as a principle, consenting to the segregation of neighborhoods, schools, occupations, and transportation (Schuman et al., 1985). In the 1970s, patterns of segregation changed substantially. Attitudes held by many Whites toward Blacks shifted during the Civil Rights Era. More Whites had beliefs in the importance of integration within neighborhoods (Bader & Warkensien, 2016). Even Dr. Martin Luther King Jr. himself believed that segregation was dead, and the only question remaining was its burial (King Jr, D., 1967).

Although the 1980s brought little support for principles of segregation, Whites continued with anti-Black sentiments. It is believed that some Whites were focused on negative stereotypes that Blacks lacked motivation, were sexual predators, and were of low intelligence (Bobo et al., 2012). Even though Whites rejected segregation as a principle, there was still a level of comfort not reached around Blacks living amongst them in society and being in their presence (Charles, 2003). A study reported that Blacks preferred to live in mixed-race neighborhoods and were willing to relocate to such areas (Farley et. al, 1978)

A significant level of Black and White separation still exists across cities in America. The debate about the cause of residential segregation boasts of factors such as urban structure, social preference, affordability, and discrimination (Clark, 1986). Economists and social scientists estimate that up to 70 percent of segregation is based on income; however, income alone cannot account for present-day residential segregation (Intrator et al., 2016). A small portion of the literature on residential segregation emphasizes the effects of integration concerning desegregation. These studies examine community-level indicators, while studies seeking an understanding of neighborhood effects of segregation look at the concentration of minorities as a significant barrier to integration.

Bolt and colleagues examined the concentration of minorities and the linkages between residential segregation and integration. They found that segregation and integration are a two-way relationship entailing minority groups and the host society, highlighting the importance of geographical and historical context for spatial and social outcomes. Bolt et al. cited that these policy and societal changes could impact the future assimilation of the housing market (Bolt et al., 2010).

Until the mid-1970s, America was increasingly segregated (Kushner, 1979); yet Massey and Tannen showed that this trend started reversing. They found a decrease from 40 to 21 hyper-segregated areas, a high level of segregation across multiple geographic dimensions, from 1970 to 2010 (Massey & Tannen, 2015). While residential segregation has seen a decline over the decades, it continues to be perpetuated in metropolitan areas that disproportionately house most of the nation's Black population.

A recent study in Washington, D.C., examined segregation by race and economic resources during the COVID-19 global pandemic. They studied the topics using the 2014 to 2018 American Community Survey, research collected and archived by the local Washington D.C. government, and the Index of Concentration at the Extremes measure. Rank correlation by Spearman evaluated the relationship between COVID-19-related factors and each segregation measure. Their findings showed that Blacks living in segregated neighborhoods had higher incidence and test positivity rates for COVID-19 but lower testing rates than their White counterparts. This further supports the linkage between residential segregation and its negative impact on Blacks, which can lead to poorer health outcomes even during a global pandemic and the resources it provides (Brown et al., 2021).

Dissimilarity Index

The dissimilarity index is the principal statistical method for measuring residential segregation by race (White, 1983). The dissimilarity index measures what percent of a minority group would need to move for two groups to be evenly distributed throughout an area (Napierala & Denton, 2017). Massey and Hajnal used the dissimilarity index intending to measure Black segregation in the United States from 1900 to 1990 using decennial U.S. Census data. They found that throughout the decades, segregation patterns evolved but were constant in minimizing contact between Whites and Blacks. The only significant change was the level at which segregation happened throughout the country (Massey & Hajnal, 1995), meaning it still impacted many minorities.

Another study utilized the dissimilarity index to assess residential segregation and racial disparities in exposure to air pollution. Woo and colleagues found high levels of

exposure in cities with increased instances of residential segregation. Inequities in exposure to pollution and unsafe living conditions shown in the study call for public health professionals and policymakers to address the gaps in pollution exposure, which can be linked to poorer health outcomes (Woo et al., 2019).

The dissimilarity index measures residential segregation across the country's metropolitan and city levels by racial-ethnic groups. Currently, the index does not measure national, regional, or state segregation. Its purpose is to look at communities and neighborhoods in the United States and calculate how much of a specified population would need to move for that area to be integrated.

For this dissertation, I examined three U.S. metropolitan areas with high, medium, and low dissimilarity scores and compared these cities against each other while also looking at other variables. The three areas chosen were the metropolitans of Detroit, Louisville, and Seattle. Their Black-White dissimilarity index scores are 74.5%, 51.6%, and 43.7%, respectively (Brown University, n.d.). This means that, for example, 74.5% of Detroit's Black residents would need to move throughout the city for Detroit to be considered integrated.

A Closer Look: Detroit, Louisville, and Seattle

Detroit is heavily divided by racial lines. The history of residential segregation is long-standing and prevalent throughout the city. Black residents live in separate and distinct areas within the city and are primarily excluded from living in the suburbs (Farley, 1993). According to the 2014 U.S. Census, 92 percent of Whites lived in the suburbs, while 81 percent of Blacks lived in the city (United States Bureau of the Census, 2014). Reardon et al. stated that top-earning Black households did not attain housing

equality with comparable-income non-Hispanic White households. They posited that their incomes do not allow them to buy their way out of disadvantaged neighborhoods (Reardon et al., 2015). Comparably, Darden et al. showed persistent financial inequalities between Blacks and Whites residing in Detroit (Darden et al., 2019).

During the late 1950s, Blacks in Louisville faced similar restrictions as other Blacks in the South regarding segregation. Their day-to-day activities, such as attending school, shopping, and living in the city, were frustrating as Louisville lacked the rigidity of enforcement of desegregation, as other cities were also experiencing segregation. There was very little public support for residential desegregation and the integration of Louisville neighborhoods. Many Whites believed they had the right to exclude Blacks from their living environments (K'Meyer, 2009).

In the summer of 1975, Jefferson County schools were ordered to desegregate by busing over 10,000 Black and White students to opposing schools, which were each the majority race. This sparked outrage, marches, and rallies that resulted in an anti-busing campaign. Nearly 12,000 protesters, who were mostly White, boycotted what they deemed liberal media for supporting the busing plan. They no longer supported the Louisville Times and the Louisville Courier-Journal and started their own news sources. The anti-busers felt stripped of their rights and were taking a stance against desegregation (Gillis, 2010).

As the population in Louisville increased, the desire of many White residents to keep their neighborhoods segregated remained as well. The demand for housing in the suburban areas of the city was on a steady incline, and housing prices, along with public attitudes, arrested the nascent efforts to desegregate. (Wright, 1980). Unnatural Causes:

In *Sickness and in Wealth* was a nationally syndicated multi-part documentary showcasing inequities as one result of segregation throughout Louisville. In episode one of the series, health status, food access, and life expectancy was discussed. It varied depending on the geographic location of residents with poorer health outcomes, less access to healthy foods, and shorter life expectancy mainly occurring in Black neighborhoods (Adelman, 2007). In 2020, 20 percent of Blacks lived in more than 75 percent Black dwellings, while 50 percent of Whites lived in more than 75 percent White neighborhoods in Louisville (Louisville Public Media, 2021).

Geographically, this is mainly neighborhoods in West Louisville in which Black families almost entirely populate, and alternatively, East Louisville, which White families highly inhabit. The Ninth Street Divide, referred to by Louisville residents, shows a stark difference between the waterfront, downtown, and a booming economy. As you begin to travel west, you will see high crime rates, poverty, abandoned properties, pawn shops, and a lack of economic development, as seen on the opposite side of town (Louisville Political Review, 2021).

In Seattle, many neighborhoods see intense real estate demands and profitable growth while racial inequalities continue dividing Black and White residents (Hess, 2020). Although Seattle has a small Black population, 6.8% compared to the national average of 13.6% of Blacks, high-wage earners still live in highly segregated neighborhoods. Unlike Louisville or Detroit, Black citizens in Seattle live more often in the suburbs because they cannot afford the rising cost of living in gentrified downtown neighborhoods (Turner, 2008; United States Census Bureau, 2021).

Residential Segregation and Food Insecurity

Food insecurity and residential segregation are associated with disparities in health, wages, healthy food options, educational attainment, and employment (Drewnowski, 2022). Food is more than just calories; housing is more than just a place to live. Residential segregation and gentrification perpetuate conditions throughout food-related health disparities, food deserts, and access issues (Alkon et al., 2020).

Structural racism in food security can be observed in areas around the country with stringent regulations and harsh penalties concerning food and social assistance programs. Racism both causes and reinforces food insecurity, contributing to economic and social insecurities (Bowen et al., 2021).

Mokiao and Hingorani's study of food security status illustrates how structural racism is a driving cause of health inequities in minorities. Their research found that food insecurity disproportionately affects individuals with kidney disease and patients on dialysis. Adults and children receiving dialysis reported 16% and 64% food insecurity rates, respectively. They also cited that residential segregation in neighborhoods is a persistent form of structural racism, making it difficult for residents to access quality, nutritious food, and healthcare. This translates into a higher occurrence of chronic and end-stage kidney disease in Blacks. The oppression of Black people has made some progress, but many practices remain today, resulting in food insecurity, residential segregation, and many other health inequities (Mokiao & Hingorani, 2021).

Food insecurity, expectedly, remains high in Black households that receive food assistance. This is due, in part, to low educational attainment, low income, and living in food deserts. Jones and colleagues deployed and analyzed results from a mail-in survey

from a majority Black community in Knoxville, Tennessee, classified as a food desert. They found that many residents received food from food banks and churches and could not afford food from supermarkets. Moreover, just over 50% of participants were food insecure by the U. S. Department of Agriculture's definition (Jones et al., 2022).

Food Insecurity

Food insecurity occurs as a direct result of a household having a shortage of food due to limited monetary funds (Gunderson & Ziliak, 2015). It is also “when the availability of nutritious foods or the ability to obtain food in ways acceptable in society is in doubt” (Anderson, 1990, p. 1559). Becoming food insecure occurs when there is doubt regarding future access and food availability, scarcity in the type of food needed for healthy living, and using means deemed not socially acceptable to obtain food (National Research Council, 2005; Weiser et al., 2009). Some socially unacceptable ways of securing food include buying food on credit, visiting a soup kitchen, borrowing money to purchase food, and relying on family and friends for meals (Smith & Roberts, 2008).

Most adults who reported living in food insecure households state that they worried about the diminishing amount of food supply and the inability to afford balanced meals. They were also missing meals or snacks and reducing the portions of their meals. The nutrition community has developed a concept around food security and quality, including environmental components (Ingram, 2020). Hunger, “the uneasy or painful sensation caused by a lack of food,” is a probable, although not inevitable, outcome of food insecurity (Anderson, 1990, p. 1559). The Household Hunger Scale has been recognized as a measure of household hunger in areas that are food insecure and experiencing hunger (Nkegbe et al., 2017).

Hunger and food insecurity are interconnected but vary in many ways (Kendall et al., 1996). Food insecurity is perceptible as a social and financial issue resulting in limited access to food within a specified household. Hunger is individual and a physiological notion that can stem from food insecurity (National Research Council, 2006; Nord et al., 2009). The Economic Research Service of the Department of Agriculture defines food security as access by household persons to food sufficient to live a healthy life, taking into account available safe and healthy food options and the capacity to access foods in socially acceptable methods (USDA, 2023). This should be done without looting, utilizing emergency food banks and pantries, social services programs, and foraging (Anderson, 1990).

Currently published research by the USDA conveys that in 2021, 13.5 million households throughout the U.S. experienced being food insecure during some time that year. In conjunction with that, households with incomes classified as below the federal poverty line, which is \$27,479 for four family members, reported increased instances of food insecurity in comparison to the U.S. average. Joining them were households with minors where women were the head of the home, people who lived by themselves, and households whose residents were Black (Coleman-Jensen et al., 2022). In 1995 the USDA began tracking food insecurity. The rates have steadily increased, with rates expected to climb during and after the COVID-19 pandemic with the rising cost of goods and services (Pereira & Oliveira, 2020). Being able to provide and maintain an adequate amount of food for a household is becoming more difficult.

Gender Differences and Food Insecurity

Food insecurity is associated with gender, with exceptionally high rates among women who are non-White. Counter-intuitively, perhaps, obesity is also more common among the food insecure. This is likely due to the lack of high-quality calories and nutrients (Kaiser et al., 2004).

Babaunte et al. (2008) analyzed the determinants of vulnerability to food insecurity among households headed by either males or females. Households headed by females were more likely to be impoverished, vulnerable, and susceptible to food insecurity in comparison to male-headed households. Their paper concludes that more attention to gender differences in food security is needed and that policies and programs should be designed with gender in mind. Knowledge of those most likely to experience food insecurity would be vital for local and governmental agencies to create effective strategies to address food security issues in present and future times (Babaunte et al., 2008).

Educational Attainment Linkage to Food Insecurity

Individuals struggling with food security face many physical, mental, and economic barriers. One barrier that impacts food security at an individual level is educational attainment. Lower education levels can impact many facets of an individual's life. It also widens the gap in food security status in vulnerable populations with insufficient resources.

In a study of food security status and chronic disease diagnosis among low-income individuals, Seligman, and associates found that low educational attainment was significantly associated with food insecurity (Seligman et al., 2010). There is further

evidence of this relationship in Olson's research findings that exhibited that maternal education level and socio-economic status were positively associated with the food security status of school-aged children (Olson, 1999).

Lee and Frongillo explored food insecurity and educational attainment among the elderly. Their research used data from the NHANES and National Survey of the Elderly in New York State. Less education, older age, higher food assistance program participation, and more poverty were all significantly associated with food insecurity (Lee & Frongillo, 2001).

Racial and Ethnic Disparities and Food Insecurity

Minority race, low income, lower educational levels, and female-headed households have all been associated with food insecurity (Franklin et al., 2012). According to Franklin and associates, rates of food insecurity are highest among those who identify as non-Hispanic Blacks. Compared to non-Hispanic Whites, Hispanic, Black, and Latino households tend to have higher levels of food insecurity. These groups also have increased rates of food insecurity than other ethnic groups, such as Asians (Kaiser et al., 2003). Native Americans living in the Midwest have the country's highest food insecurity rates. Berryhill et al. report that 58 percent of their sample of Native Americans had low food security, and 72.1 percent said that they were not eating because of a lack of financial resources (Berryhill et al., 2018; Kilanowski, 2012). Increasing federal food assistance funds and targeted-based programs could significantly reduce this burden.

Family Income and Food Insecurity

Food insecurity is jointly associated with household income. It is reported that poorer households are about three times more likely to experience food insecurity than others (Nord & Kantor, 2006). Food insecurity exceeds more than 45 percent of poor or lower-income households. These households are at substantial risk of experiencing future food insecurities than households with better financial resources (Armour et al., 2008; Stevens, 2010). Casey et al. discovered that food insecurity was prevalent among families of White and Mexican American children with incomes up to 100 percent of the Federal Poverty Level (Casey et al., 2006).

Households with lower incomes and the implementation of a nutrition-based program to address food insecurity were evaluated by Gregson et al. They found that environmental and social change was needed to sustain food security for low-income individuals. Furthermore, they concluded that local, state, and national policy changes were essential for improving food security status (Gregson et al., 2001). In a data sample representative of adults with low socio-economic status in the U.S., a high prevalence of food insecurity was reported, which can often lead to other barriers, such as housing stability, especially regarding the location of the housing (Kushel et al., 2006).

Historical Perspective of Measuring Food Insecurity

During the early 1980s, the federal government took an interest in the growing hunger problem in the U.S. and wanted to start capturing data surrounding this issue. From there, a more extensive discussion surrounding the social perspective of hunger and physiological hunger began. Around this timeframe, the Food and Nutrition Services (FNS) and National Center for Health Statistics (NCHS) worked to develop a

standardized measure to assess if a person was food secure or insecure (Kendall et al., 2006). A panel of subject matter experts was gathered in 1994 by the federal government's Center for Survey Methods Research. While together, the group developed the survey to assess food insecurity, tested the survey in the field, and made any necessary changes to the survey. After the previous steps were complete, the survey was deployed for the first time in 1995 to 45,000 interviewees and was analyzed in July of that year by the FNS (USDA, 2007).

The food security questionnaire was developed through the work of many disciplines. Several studies have focused on the origination of the survey (Andrews et al., 1998; Kendall et al., 1996; Morteza et al., 2013; Radimer et al., 1990). The results of their research created what is referred to today as the U.S. Food Security Survey Module (USFSSM). The Radimer et al. study delved into finding and explaining a theoretical framework for utilizing a food insecurity research-based measure. Through their research, they developed indicators that could assess hunger. In the process came about the definition of hunger from the researchers, which is stated, as “the inability to acquire or consume an adequate quality or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so” (Radimer et al., 1990, p. 1546). This definition assisted in the conceptualization of what it is to be food insecure in several ways. Additionally, it delineates hunger, adversely including its social aspects. The studies have been incorporated into the USFSSM and are mentioned in the measurement tool.

The validity of the food insecurity and hunger measurement tool was assessed by Kendall et al. Their assessment was based on the study conducted by Radimer et al.,

which resulted in differences between households experiencing increasing food insecurity and hunger (Kendall et al., 1996). Andrews et al. further operationalized the concept of food insecurity in their research (Andrews et al., 1998). These three studies advised how food insecurity should be measured on the National Health and Nutrition Examination Survey. Experts also assisted in developing a notion that measures hunger through various group conditions.

Measurement

During the mid-1990s, the United States Department of Agriculture (USDA) and the United States Department of Health and Human Services (DHHS) worked together in researching food insecurity. They created the U.S. Household Food Security Survey Module (USFSSM). The 18-item USDA Food Security Questionnaire that is presently used is primarily consistent with what was created initially. The U.S. Census Bureau decided to incorporate the food security measure in its Current Population Survey (CPS) questionnaire beginning in 1995 (Himmelgreen & Romero-Daza, 2013).

The USFSSM survey collects information about the whole household through an in-person interview with 18 questions. This interview determines food security status by the following scores: zero denotes high food security for the household, one to two points is marked as marginal food security, three to seven points are classified as low food security, and lastly, points ranging from eight through 18 indicates deficient food security. The households with scores of zero to two are categorized as “food secure.” The others with scores of three to 18 are classified as “food insecure” (USDA, 2022). Collapsing the additional four categories is common in food insecurity research (Bickel et al., 2000).

The expression “food insecure without hunger” came about prior to 2006 and was commonly used in the description of households that were experiencing low food security. Also used was “food insecure with hunger,” which detailed households classified as having inadequate food security. Adjustments to questions on whether hunger was initially being captured were implemented in the mid-2000s based on recommendations by the decisions of the Committee on National Statistics. The change is reflected in the new labels regarding food insecurity (National Research Council, 2006; Pelletier et al., 2012).

Also taking place in 2006, were changes made to the wording of most questions that read, “...because there was not enough money for food.” The order of the questions was thought to be improved to reduce the cognitive burden of participants. This was achieved by asking household questions, followed by adult and child-referenced items. There was also the removal of follow-up food security questions and the creation of labels to specify ranges of food insecurity and security by the USDA, which were newly introduced (UDSA, 2012). With the revisions, no changes were made to the classification of household food insecurity (Nord, 2010).

Supplementary to the USFSSM are other versions of the food security surveys. A standard version is the Adult Food Security Survey which is equivalent but excludes the eight queries that pertain to children in the household and is administered to households where children do not reside. The benefits of using the 10-question USFSSM are a more direct comparison of data for households with and without minors, decreased burden on the interviewee, and avoidance of the sensitivity of asking questions about food insecurity and young children.

Sample items on the USFSSM survey are: “I could not afford to eat balanced meals,” “I was worried whether our food would run out before we got money to buy more,” and “Did you or the other adults in your household ever cut the size of your meals or skip meals because there was not enough money for food?”

Reliability of the U.S. Household Food Security Survey Module

Reliability is the consistency and stability of a measure used to collect data during the research process (Cook, 2013). Multiple studies and reports sought to determine the reliability of the USFSSM survey (Andrews et al., 1998; Hamilton et al., 1997; Kendall et al., 1996; Nothwehr, 2014; Radimer et al., 1990). Kendall et al. determined the individual, children, and household hunger and food insecurity measures typically had internal consistency scores of 0.86, 0.85, and 0.84, respectively (Kendall et al., 1996). Additionally, Radimer et al. detailed three measures for hunger pertaining to children, women, and households, which had a satisfactory internal consistency of 0.89, 0.92, and 0.91, respectively (Radimer et al., 1990).

Hamilton’s USDA report determined that the past years’ measurement scale shared estimated values of reliability ranging from 0.86 to 0.93. The measurements used were Spearman’s and Rulon’s split-half, test-retest, and Cronbach’s alpha. Cronbach’s alpha typically determines if a single item on a scale is appropriate for that scale. At the same time, Spearman and Rulon’s test is commonly used to estimate the correlation of the data between different types of tests (Hamilton et al., 1997). Lastly, the test and retest reliability seeks to understand the consistency and stability of a defined measure (Cook, 2013). The results from the test and retest implied the reliability of the USFSSM. A split-half test was conducted mainly due to the household scales being skewed. Nearly 57

percent of households had a raw score of zero, denoting the prevalence of high food security (Hamilton et al., 1997).

The reliability of test-retest was demonstrated by nearly 1,100 re-interviews that had rigorous quality control measures and were completed precisely a week after the CPS interviews in April 1995. Further, predictive validity has been shown in studies of food insecurity and health outcomes (Goldberg, 2013). Based on these findings, the USDA, the DHHS, and the U.S. Census Bureau accepted the USFSSM as the primary measure of food security (Andrews et al., 1998).

Validity of the U.S. Household Food Security Survey Module

Validity testing determines whether a designated tool is capable of measuring what exactly it was designed to measure. Four research studies explored the validity of the USFSSM (Goldberg & Mawn, 2015; Hamilton et al., 1997; Kendall et al., 1996; Radimer et al., 1990). In other research studies, four types of validity, criterion, face, construct, and content validity, were tested, contributing to the development of the USFSSM.

Women interviewed in a qualitative study about hunger indicators helped to address face validity. Through the detailed interviews, content validity was accepted and provided a deeper comprehension of the occurrence of hunger among the participants. Pretesting of the intended survey instruments was completed in the designated sample of 20 low socioeconomic-status women. As improvements resulted from the interviews, researchers implemented changes that included eliminating phrases such as “skipped meals” and “nutritious diet” because they caused confusion and were often misunderstood. (Kendall et al., 1996; Radimer et al., 1990).

Kendall et al. have sought to address criterion validity in their research by targeting diverse populations from all economic backgrounds. The readiness and accessibility of food in a household, demographic variables, and the consumption of produce differed between the four groups of their study. This difference was accounted for primarily based on their food security situation. The findings of this study supported the use of what is known as the Radimer/Cornell hunger scale.

Kendall et al. (1996) also verified criterion validity. They did so by conducting a comparison of the measurement tool to benchmarks related to food insecurity. Those factors included sustenance, demographics, overall health, and the frequency of consuming nutrient-dense foods (Kendall et al., 1996).

Lastly, construct validity assists in measuring if and how competently the measurement scale demonstrates the defined conceptualization of one being food insecure (Trochim et al., 2015). In one particular study, construct validity concerning food security was explored by Radimer et al. They compared sub-scales created for the measurement of hunger with the many predictors associated with hunger (Radimer et al., 1990). Significant differences were found in group averages of money spent on food, income, and coping tactics of people classified as “non-hungry” or “hungry.” Participants who reported being hungry had lower incomes, spent considerably less of their money buying food, and were not equipped to deal with the struggles of being food insecure.

Factors and Predictability of Food Insecurity

Many studies make use of the 18-item USFSSM, while others modify it by using between three to six items from the survey (Armour et al., 2008; Stevens, 2010). Of these studies that shorten the survey, they are typically in increments of three, four, and six

items given to study participants. The USFSSM six-item questionnaire is validated (Cook, 2013). One research study targeting food insecurity in children utilized the four-item scale modified from the USFSSM for study participants (Smith & Richards, 2008). A few other studies deployed abbreviated questionnaires stemming from the 18 USFSSM items. Limitations cited in their publications listed the amended version and its possible limiting effect on their research (Adams et al., 2003; Usfar et al., 2007).

Several studies have shown predictors of food insecurity and the effects and outcomes resulting from becoming food insecure. Obesity, location, healthcare utilization, maternal feeding habits, and children's health are among the factors shown to be related to being food insecure (Dykstra, 2016; Kushel et al., 2006; Ma et al., 2008; Potochnick et al., 2017; Ricks et al., 2016). Additional work has shown that food insecurity is predictive of various behaviors and outcomes, including alcohol use and smoking status (Armour et al., 2008), head of household demographic makeup (Stevens, 2010), SNAP benefit nutrition and education (Eicher-Miller et al., 2009), the birthplace of the mother in the home (Potochnick et al., 2017), stability of housing, and affordable transportation and food (Stevens, 2010).

Further research is required to explore predictors of food insecurity and their association with residential segregation.

Theoretical Framework: The Social-Ecological Model

The social-ecological model (SEM) focuses on the importance of multi-level influences on various health issues and outcomes. It is a conceptual framework that considers the complexities of the different factors on individuals. Developed by Bronfenbrenner in 1986, it was first used to study the external powers that are associated

with the sufficiency that families can cultivate a healthy environment for the upbringing of adolescents. Bronfenbrenner was researching the effects of intrafamilial and extrafamilial processes (Bronfenbrenner, 1986). Bronfenbrenner identified levels of the environmental system which are the micro-, meso-, exo-, and macro-systems (Bronfenbrenner, 1994).

McLeroy et al. (1988) instituted the social-ecological lens on health that distinctly varies from the Bronfenbrenner model, specifically focusing on health promotion. Their model examines individual and social environmental factors. This is related to planning, conducting, and assessing health promotion interventions. Through McLeroy et al. and their revised framework, health promotion should target five main spheres of influence. The spheres of influence are the intrapersonal level, interpersonal level, organizational level, community level, and lastly, the policy level. The researchers shared that “the model gathers that proper changes in a person’s social setting will bring about innovations in that person and contributions and backing of persons at large is vital for executing the meaningful change in the environment.” Environmental and individual change is not independent of each other but compliments the outcome of the other opposing factor (McLeroy et al., 1988).

Stokols (1992) has published literature regarding the SEM and its relevance to health promotion and the social ecology of individuals. Stokols observed that prior to the 1990s, a large number of interventions and programs that businesses and communities implemented were done on an individual level. Stokols encouraged interventions at the micro- (micro-interventions), macro- (macro-interventions), and meso- (meso-interventions) levels. Direct patient populations are micro-interventions, international,

national, and state interventions that inform public health and policy are macro-interventions, and wellness programs at the organizational and community level are meso-interventions (Stokols, 2000). Individuals and their environment are intertwined and should ultimately be considered upon addressing general health, health promotion, and public health obstacles.

The subsequent studies are instances of research incorporating a multi-faceted SEM framework to understand better health disparities, health-related issues, and their possible outcomes. The social ecological model has been used in studies regarding chronic illness management, evaluating the effectiveness of nutrition and health education programs, influenza vaccine adoption, safe sex practices, and repeat adolescent pregnancy (Gregson et al., 2001; Kumar et al., 2012; Larios et al., 2009; Naar-King et al., 2006; Raneri & Wiemann, 2007). Koren and Mawn also used SEM as a framework to increase understanding of variables surrounding unintentional pregnancy among married women (Koren & Mawn, 2010).

McLeroy et al.'s version of SEM will be used as the framework for this dissertation because it is rooted in health promotion and considers a person's environment when examining public health issues. Allowing the social-ecological model to guide this research will allow for the consideration of contextual variables when looking at associated factors of food insecurity. This research adds to the literature of other studies that have examined food insecurity from a SEM approach (Eisenmann, 2011). The individual sphere and its ability to connect with the other spheres, community and societal, will be examined to decide if the SEM clarifies food insecurity and residential segregation in adults in the U.S.

Many studies have adapted the social ecological model for their specific research purposes. A 2015 study conducted by the Centers for Disease Control and Prevention used four levels of the model in a health promotion program to represent a multi-level intervention for the prevention of colorectal cancer.

Schroeder & Smaldone applied the SEM to create a conceptual analysis for combating food insecurity. Their study concluded that the SEM could support efforts to reduce food insecurity through guided nursing research and addressing the three levels of the model (Schroeder & Smaldone, 2015).

Individual Level of the Social-Ecological Model

The individual level of the SEM views personal characteristics that influence behavior, such as attitudes, beliefs, knowledge, demographic factors, and personality traits (Figure 1, modified SEM model; McLeroy et al., 1988). Numerous studies at this level examine the relationship linking food insecurity and being overweight or obese. Brown et al. pointed out the abundance of food insecurity and obesity-related research but the absence of policy consideration to effectively reduce concerns (Brown et al., 2019). In another study, Smith and Richards reported that many adolescents experiencing homelessness were overweight, although there was not enough food available to them (Smith & Richards, 2008). There was limited access to food and insufficient knowledge, which contributed to the youth overeating when they had the opportunity to avoid hunger. Another study of women who reside in California yielded results that non-Hispanic Whites who were food insecure were much less probable to be obese than their counterparts. However, for all women who participated in the study, obesity steadily increased with the gravity of their food insecurity status (Adams et al., 2003). The

findings of these studies are consistent with past studies showing a relationship between obesity and food insecurity (Casey et al., 2006; Crawford & Webb, 2011; Jyoti et al., 2005; Kaiser et al., 2003; Olson, 1999; Townsend et al., 2001; Zhong et al., 2022).

Intriguingly, Gundersen et al. established that adolescents who were experiencing food insecurity were not more prone to obesity compared to children who lived in households considered to be food secure (Gundersen et al., 2009). Their findings contradict many other researchers that convey a relationship strong between being food insecure and obese.

The individual level of the SEM has explored associations between tobacco usage, unemployment or underemployment, lack of adequate health insurance, poor health, depression, demographic factors such as being black and single, and socio-economic factors such as education level and household income above the federal poverty level and food insecurity (Armour et al., 2008; De Marco et al., 2009; Eicher-Miller et al., 2009; Huddlestone-Casas et al., 2009; Laraia et al., 2006; Seligman et al., 2010; Webb et al., 2008). This research targeted several populations, including pregnant women, children, and adults. The research for the studies included various people ranging from adults 60 and older, poor adults 18 to 65, and female heads of households (Eicher-Miller et al., 2009; Seligman et al., 2010; Webb et al., 2008). Multiple studies show that impairments in the functional capabilities of the elderly are statistically significant when living in households experiencing food insecurity (Lee, 2022; Lee & Frongillo, 2001; Srivastava & Muhammad, 2022).

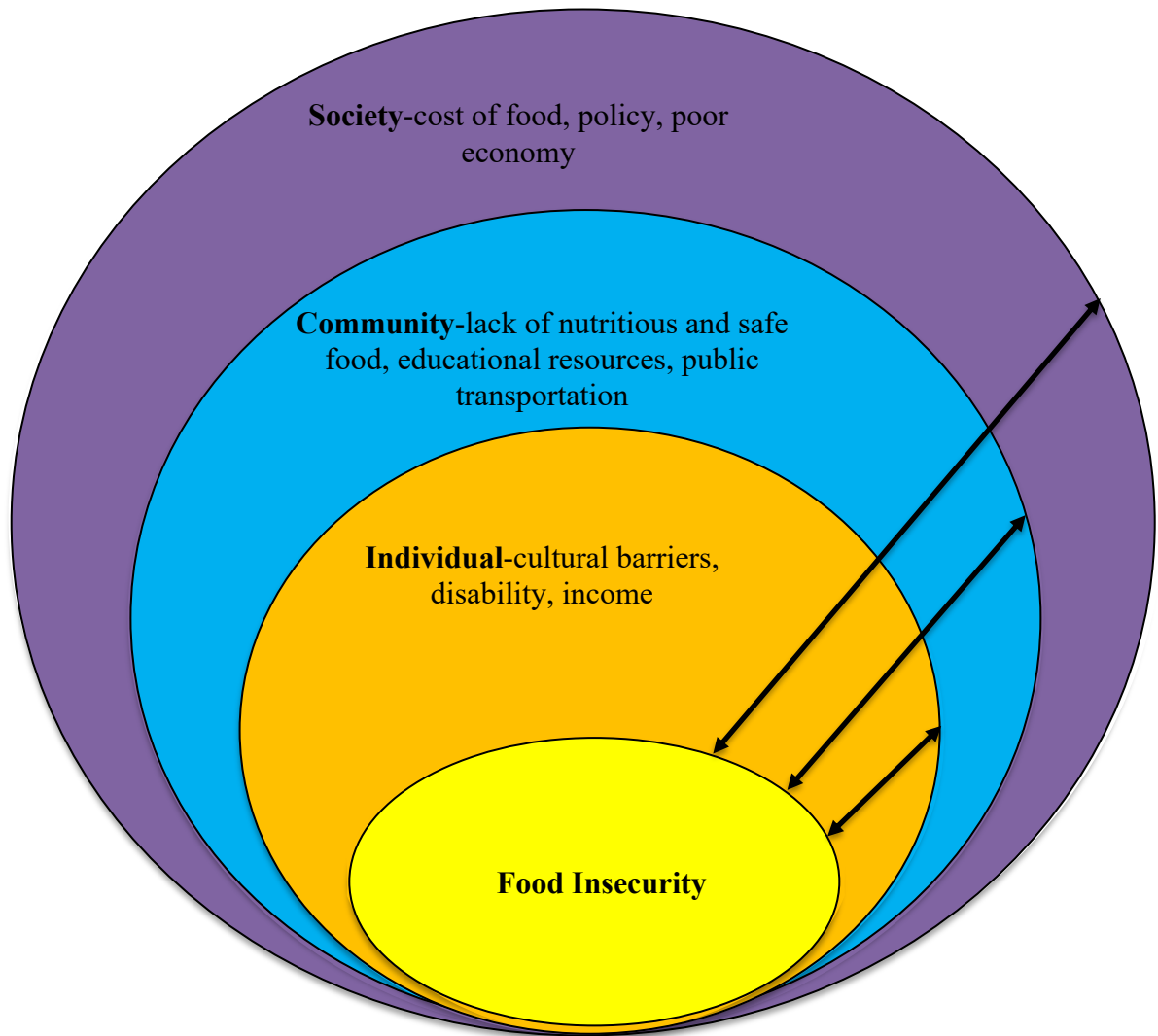


Figure 1. Factors that Influence Food Insecurity Using an Adapted Social-Ecological Model

(Derived from McLeroy et al.'s and Schroeder & Smaldone's social-ecological model)

Individual Factors: race/ethnicity, age, educational attainment, marital status, gender, family poverty

Community Factors: government/community meals delivered; senior/community center meals

Societal: household SNAP benefits ever received, currently receiving SNAP

Community Level of the Social-Ecological Model

The community level includes organizations and groups, social and professional networks, standards, and social norms (informal and formal). A plethora of research has used community variables such as geographical location and the stability of housing (De Marco et al., 2009; Garasky et al., 2004; Kushel et al., 2006; Long et al., 2020; Ma et al., 2008; Nord, 2002; Nord, 2010; Olberholser & Tuttle, 2004; Sharkey et al., 2011; Stevens, 2010).

Stevens indicated in his study that transportation and housing impacted young mothers and their ability to find healthy and nutritious food options (Stevens, 2010). Olberholser and Tuttle's research on food insecurity were found to be equal in urban and rural counties throughout the state of Maryland. Nord in his research found that being food insecure was more common in rural and large-scale cities than it was when compared to more suburban communities (Olberholser & Tuttle, 2004; Nord, 2010). Sharkey et al. investigated and discovered that food insecurity rates were more significant in rural areas versus urban areas concerning women (Sharkey et al., 2011).

The climate in a geographical location is also a variable studied and researched at the community level of the SEM. Nord and colleague discovered that the four seasons and food insecurity was associated with children and families. Being food insecure increased in locations with high heating costs during cold winters and high cooling expenses during hot summers (Nord & Kantor, 2006). Knowles et al. found similar findings in their study. They reported chronic stress of parents with children and the reoccurring reality of deciding to pay a utility bill or feed their family (Knowles et al., 2016).

Societal Level of the Social-Ecological Model

The societal level of the SEM includes federal, state, and local laws and policies that promote organizational behavior and individual practices. Study variables include food assistance programs and economic assistance. Oberhosler and Tuttle found that 66 percent of persons who receive food stamps with children experience food insecurity (Olberholser & Tuttle, 2004). Contrary results were reported that caregivers of children 36 months or younger who participated in supplemental nutrition programs and supplemental security income had decreased rates of food insecurity (Cook, 2013). De Marco et al. made inferences through their research regarding being enrolled in private and public financial assistance programs. Families were less susceptible to becoming food insecure (De Marco et al., 2009). Other researchers have also shared through their findings that participation in social service programs improves food insecurity rates in individuals and families alike (Ivers & Cullen, 2011; Esobi et al., 2021).

Conclusion

After reviewing the literature, it recommends an abundance of factors that are positively associated with food insecurity and residential segregation. Factors that contribute to research on both food insecurity and residential segregation are not well studied. A small body of research on residential segregation and food insecurity exists. The purpose of this dissertation is to dig deeper into the topics to better understand food insecurity among persons living in segregated neighborhoods in the U.S. As segregation remains in the U.S. and the population in metropolitan areas is growing, it is essential to understand food insecurity and its association with residential segregation.

The SEM and its predictability to identify and assess factors that contribute to one's food insecurity status is valuable for this study. While many studies highlight individual factors, few include contextual factors such as residential segregation.

The literature review suggests several individual, community, and societal influences. This study will incorporate previously identified factors of food insecurity and examine whether these factors are modified (strengthened or weakened) by the degree to which residential segregation is present. Ultimately, this study intends to argue that desegregating cities is one viable step in decreasing the prevalence of food insecurity in marginalized and vulnerable populations.

CHAPTER 3: METHODOLOGY

Design

This dissertation study used a retrospective cross-sectional design of secondary data (National Health and Nutrition Examination Survey 2017 to March 2020 pre-pandemic data). In addition, the study used Brown University's Dissimilarity Index to identify communities with varying degrees of residential segregation, the U.S. Census for demographics of those cities, and lastly, Feeding America's Map the Meal Gap for food insecurity rates. Predictors of food insecurity were identified. Statistical analyses were conducted and presented for national data and for three select cities.

The use of secondary data is common in research studies across many disciplines and has many advantages for its researchers. These large data sets have multiple variables that can provide valuable information for public health and health promotion research (Grier & Bryant, 2005). Larger data sets can typically allow researchers to generalize their findings due to complex designs. This is in comparison to smaller individual-level prospective designed research studies in which researchers usually do have that ability. Studying representative samples, the use of numerous variables, and being able to draw conclusions are also benefits to researchers who use large data sets (Cattaneo et al., 2010).

As the use of secondary data has strengths, it also has limitations. The data used in secondary studies are collected for the purpose of the original study; therefore, this

study design restricts the other researchers' control or input of the data that was originally collected (Rubin, 1997). Also, missing, or incomplete data can be a problem. They may cause a threat to internal validity. Another limitation of secondary data is the absence of unanimity in the usage of non-weighted versus weighted data (Kaiser et al., 2010). Lastly, the Census Bureau subdivides census tracts as the population continues to grow. This methodology could limit the comparison of data in the future. Despite these drawbacks, federal data offer an excellent opportunity to answer the research questions.

Relational Research Questions

1. To what degree do the social-ecological model's individual, community, and societal levels predict food insecurity among adults in the U.S.?
2. Using the social-ecological model's individual, community, and societal levels, can specific groups and factors be identified that are most likely to experience food insecurity?

Descriptive Research Questions

3. Do metropolitan areas with higher scores on the dissimilarity index have higher rates of food insecurity?
4. What have metropolitan areas with high, medium, and low dissimilarity indices done to address food insecurity?

Protection of Human Subjects

As this study used secondary data, the protection of human subjects is covered under the original data collection process. Participation in the National Health and

Nutrition Examination Survey is voluntary for its participants. The NHANES staff notifies prospective participants of their individual rights and of the confidentiality of all survey data that is collected. All information collected for the survey is confidential. All NHANES data available to researchers is de-identified by the original researchers. This study was granted approval by the Institutional Review Board (IRB) at the University of Louisville on June 23, 2023 (see Appendix B).

Instrument

The National Health and Nutrition Examination Survey is a stratified survey containing a multistage probability approach to reach civilian, non-institutionalized U.S. citizens who live within the same household. It represents all ages but oversamples Hispanics, Blacks, and persons 60 and older to reflect the changing demographics in the U.S. The NHANES began collecting data in the early 1960s and is administered by the National Center for Health Statistics of the CDC. The survey became annual in 1999, with approximately 5,000 participants every year. The NHANES provides estimates for nutrition and health status across the country (CDC, n.d.). The survey consists of physical examinations and interviews. The interview questions were related to health and diet, demographics, and socioeconomics.

The health interview segment of the NHANES is held in participants' homes and includes dental, mental, physiological, and medical measurements coupled with laboratory tests.

Sample collection occurs in multiple stages, which consist of the following listed below:

- First Stage: Primary Sampling Units (PSUs), which are counties, adjacent counties, and group tracts.
- Second Stage: Segments, which are parts of a census block within the PSUs that are chosen and stratified by the density of racial and ethnic minorities.
- Third Stage: Dwelling Units (DU), which are apartments and homes where someone physically lives within a pinpointed segment.
- Fourth Stage: People, which are individuals that have been selected from the DU.

Over a 12-month period, 15 PSUs are visited. During that time, the selection of the sample for that year is completed, and the households receive letters informing them of the process. Study participants are provided details of the visit to their residence to complete the survey that will be conducted by an assigned NHANES interviewer.

Individuals chosen to take part in the NHANES are distributed the survey in person. A trained interviewer will ask survey questions in the English or Spanish language. If languages other than English or Spanish are needed, translation services are provided to complete the questionnaire for the participant. The Blaise format is used to record all interview data by a computerized personal interviewing system.

NHANES is split into six data files, which are questionnaire, examination, laboratory, demographics, dietary, and limited access files that require additional permissions to use. This study used questionnaires and demographic data files. The questionnaire file contains data regarding the family's monthly poverty level, diet behavior and nutrition, and food insecurity. The demographic file data collects

information regarding race and ethnicity, gender, age, educational level, and marital status.

Research Study Variables

Dependent Variable

The dependent variable for the purpose of this dissertation research study is food security status of adults living in the U.S. The variable of interest looks at food insecurity of the study participant's household over the last 12 months by asking participants to complete the adult USFSSM 10-item questionnaire. The module references all adult members of the specified household. Responses to the survey questions are calculated as follows:

- 1 = score of zero, high food security
- 2 = 1 to 2, marginal food security
- 3 = 3 to 5, low food security
- 4 = 6 to 10, very low food security

Households who participated in the survey that had 2 or fewer affirmative responses are categorized as food secure, and households with 3 or more affirmative responses as food insecure. The USDA recommends collapsing categories labeling 1 as individuals who are food secure and 2 as persons who are food insecure.

Independent Variables

The ten independent variables used for this study were selected in accordance with the adapted SEM's three spheres: individual, community, and societal. Individual level factors are age, gender, education, marital status, ethnicity and race, and family

poverty level. Community-level variables used for this study include government or community meals delivered and meals eaten at senior or community centers. Lastly, societal-level variables include if a household has ever received food stamps and if a household is currently receiving food stamps. Below is a list of the variables and their nomenclature in the NHANES codebook.

Individual Level

1. Age (RIDAGEYR): interval variable in years at the time of interview. Participants age 0 to 79 were a range of variables. 80 and older are top-coded.
2. Gender (RIAGENDR): nominal variable of participants' gender: 1 = male, 2 = female.
3. Race and Ethnicity (RIDRETH1): nominal variable: 1 = Mexican American, 2 = Other Hispanic, 3 = Non-Hispanic White, 4 = Non-Hispanic Black, 5 = Other Race-Including Multi-Racial.
4. Marital Status (DMDMARTZ): ordinal variable: 1 = married, 2 = widowed, 3 = divorced, 4 = separated, 5 = never married, 6 = living with partner.
5. Family Poverty Level (INDFMMP): ordinal variable: 1 = Monthly poverty level index ≤ 1.30 (130%), 2 = $1.30 < \text{Monthly poverty level index} \leq 1.85$ (185%), 3 = Monthly poverty level index > 1.85 (185%).
6. Educational level (DMDEDUC2): ordinal variable: 1 = less than 9th grade, 2 = 9th-11th grade, 3 = high school/General Educational Development Test (GED), 4 = some college or Associates of Arts (AA), 5 = college graduate or above.

Community Level

7. Government or community meal delivered to home (DBQ301): dichotomous variable: 1 = yes and 2 = no.
8. Meal eaten at senior center or community center (DBQ330): dichotomous variable: 1 = yes and 2 = no.

Societal Level

9. Household (HH) SNAP benefits ever received in the past (FSQ165): dichotomous variable: 1 = yes and 2 = no.
10. HH SNAP benefits currently receiving (FSD230): dichotomous variable: 1 = yes and 2 = no.

Study Protocol

Preparing the 2017 through March 2020 pre-pandemic NHANES data for analysis for this study included the following series of steps. First, the variables were located in their appropriate data files. Next, the files were downloaded, saved, and converted into the proper file format, followed by merging all the datasets to create a master file. The data was then assessed, and new variables were then created. The last steps included labeling, recoding, and formatting existing variables and naming and storing the master file. For this research study, data used for analyses were from the demographic and questionnaire data files. Of the questionnaire data files, the diet behavior and nutrition, income, and food security files were used for analysis. These data files were all available for download and for public use.

Missing data may have an impact on analysis. NHANES suggests that if 10% or less of the variable is missing, it is acceptable to complete the analysis without

adjustment, but if it is more than 10%, re-evaluation may be needed based on the outcome variable. Missing and blank variables were coded as period (.) or left blank. Additionally, “refused” responses were coded as 7 or 77, or 777, and “don’t know” were coded as 9 or 99 or 999. These data were re-coded as missing by the (.) or blank, as suggested by NHANES, to not be confused with numerical values, which could cause distortion of the analytical results (CDC, .n.d.).

NHANES allowed for this dissertation to use multiple variables to examine food insecurity among adults in the U.S. The variables selected aligned with the individual, community, and societal levels of the social-ecological model. Hypotheses were developed to assist in explaining and predicting food insecurity in adults in the U.S.

Data Analysis

Various analyses were conducted to answer the relational research questions for this study. Statistical Package for the Social Sciences (SPSS) version 29 was used for all data analyses. NHANES uses complex probability sampling design techniques.

Descriptive statistics assisted in analyzing the socio-demographic data for participants of the NHANES and three metropolitan cities. Bivariate analysis and chi-square analysis were used for nominal and ordinal variables to look for group differences as it pertains to food insecurity. Predictors were used in logistical regression analyses of the dichotomous variable, food insecurity. Statistical significance was set at the p-value of 0.05 level.

Lastly, there was a thorough review of the three metropolitan cities' dissimilarity index scores, food insecurity rates, and other variables found to be associated with food insecurity and residential segregation. Interventions, policy efforts, and local

programming were researched to assess how food insecurity is addressed in the three metropolitan cities.

CHAPTER 4: RESULTS

This chapter presents the finding of this study's descriptive and inferential analyses. It starts with descriptive analyses, including the demographics of study participants, followed by hypothesis testing. All participants and participants 60 and older are examined. This is due to the community-level variables being targeted specifically to adults 60 and older.

Descriptive Analysis

Descriptive statistics were used to explore the variables which aligned with the three spheres of the adapted social-ecological model, individual, community, and society, used for this study. All adult participants 18 and older were examined. Other analyses were completed for study participants 60 and older for inclusion of the community-level variable that was specifically targeted for that population. The COVID-19 pandemic caused the suspension of data collection for NHANES in March 2020. As a result of the break, the 2019-2020 data needed to be completed and could not be presented as a national representative sample. Therefore, the 2019-2020 data were combined with the 2017-2018 cycle to create the 2017-2020 pre-pandemic data files to create a nationally representative sample. The NHANES uses complex probability for the sampling design of its data.

The values in Table 1 describe all adult study participants. The total number of participants surveyed was 15,560, of which 9,693 were adults. The mean age of adults who participated in the study was 49.59 years, and the median age was 50 years.

The following describes the NHANES adult participants used in this study. In the sample, 48.7 percent were male, and 51.3 percent were female. Race and ethnicity distributions of the study participants were composed of non-Hispanic White (34.8%), non-Hispanic Black (26.4%), Hispanic (10.2%), Mexican American (11.7%), and other, which included multi-racial (17%). This contrasts with the overall NHANES sample, which is non-Hispanic White (33.9%), non-Hispanic Black (26.3%), Hispanic (9.9%), Mexican American (12.8%), and other, which included multi-racial (17%).

Most participants (56.8 percent) reported completing some college, either obtaining an associate in arts or higher. Another 57.2 percent reported being married or living with their partner. The family monthly poverty level for study participants is as follows; 32.4 percent below or less than 130 percent federal poverty guideline, 15.3 percent between 130 and 185 percent poverty guideline, and 52.3 percent above 185 percent of the federal poverty guideline. Of the study sample, 28.3 percent of adults were reported to be food insecure.

Table 1: All Adult Study Participants Descriptive Statistics

Variables	n=9693	Percentage	%FI	%Within Variable
Food Security Status				
Food Insecure	2741	28.3	-	-
Food Secure	6952	71.7	-	-
Age				
18-44	3993	41.2	44.7	30.7
45-64	3289	33.9	35.6	29.7
65-79	1729	17.8	15.7	24.9
80+	682	7	4	16.1
Gender				
Female	4975	51.3	51.6	28.4
Male	4718	48.7	48.4	28.1
Race and Ethnicity				
Black	2555	26.4	29.9	32.1
White	3370	34.8	26.7	21.7
Hispanic	991	10.2	13.9	38.4
Mexican American	1131	11.7	15	36.3
Other, multi-race	1646	17	14.5	24.2
Marital Status				
Never Married	1795	19.5	23.9	34.7
Married, living with partner	5279	57.2	49.2	24.2
Widow/Divorce/Separated	2148	23.3	26.8	32.4
Educational Level				
Less than 9 th grade	719	7.8	13.3	48
9 th -11 th grade	1041	11.3	15.9	39.7
High school graduate/GED	2225	24.1	27.4	31.9
Some college or AA	2975	32.3	30.9	26.9
College graduate or above	2257	24.5	12.5	14.4
Family Poverty¹				
Less than 130%	2732	32.4	62.2	42.4
130%-185%	1288	15.3	16.3	23.6
Above 185%	4407	52.3	21.5	9.1

¹ The Family Poverty variable used the poverty guidelines created by the Department of Health and Human Services which uses the percentage to establish financial eligibility for federal programs annually. Common calculations are 130% below poverty and 185% above the federal poverty level.

Table 2 displays data for study participants 60 years and older, which was 3,422 of the 9,693 adult study participants. Of that, 50.6 percent were male, and 49.4 percent were female. Race and ethnicity distributions of the study participants were non-Hispanic White (43.5%), non-Hispanic Black (26.6%), Hispanic (9.7%), Mexican American (8.1%), and other, which included multi-racial (12.1%).

Study participants (51.2 percent) reported completion of some college, either an associate in arts or higher. While another 25.3 percent completed high school or received a GED. As of the time of the study, 54.5 percent reported being married or living with their partner. The age distribution is as follows; 60 to 64 (29.5%), 65 to 79 (50.5%), and 80 and older (19.9%). Of the study sample, 24.9 percent of adults were reported to be food insecure.

Table 2: Study Participants 60 and Older Descriptive Statistics

Variables	n=3422	Percentage	%FI	%Within Variable
Food Security Status				
Food Insecure	853	24.9	-	-
Food Secure	2569	75.1	-	-
Age				
60-64	1011	29.5	36.7	31
65-79	1729	50.5	50.4	24.9
80+	682	19.9	12.9	16.1
Gender				
Female	1690	49.4	49.9	25.2
Male	1732	50.6	50.1	24.7
Race and Ethnicity				
Black	909	26.6	32.2	30.3
White	1489	43.5	28	16.1
Hispanic	333	9.7	15.7	40.2
Mexican American	277	8.1	11.1	34.3
Other, multi-race	414	12.1	12.9	26.6
Marital Status				
Never Married	215	6.3	9.8	38.6
Married, living with partner	1861	54.5	44.1	20.2
Widow/Divorce/Separated	1339	39.2	46.1	29.3
Educational Level				
Less than 9 th grade	379	11.1	19.5	43.3
9 th -11 th grade	426	12.5	18.1	35.9
High school graduate/GED	862	25.3	26.1	25.5
Some college or AA	984	28.9	24.6	21
College graduate or above	759	22.3	11.7	13
Family Poverty				
Less than 130%	828	27.8	63.5	42
130%-185%	514	17.3	19.2	20.4
Above 185%	1635	54.9	17.3	5.8

At the societal level 3,863, or 43.3 percent, of all adult study participants had received SNAP benefits at some point in the past. Of the respondents, 86.8% of them were currently receiving food stamps.

Table 3: *All Adult Study Participants Descriptive Statistics at the Societal Level*

Variables	n=8912	Percentage
Ever received SNAP benefits		
Yes	3863	43.3
No	5049	56.7
Currently receiving SNAP benefits		
Yes	1889	86.8
No	288	13.2

Community-level descriptive variables (see Table 4) included whether study participants 60 and older had community or government meals delivered to them and if they had eaten meals at a senior center or community center. Findings show that 153 participants were recipients of meals delivered to them, and 220 individuals physically ate meals at a senior or community center. A total of 35.5 percent of participants had received food stamps in the past, while 91.8 percent of respondents were currently receiving food stamps.

Table 4: *Study Participants 60 and Older Descriptive Statistics at the Societal and Community Levels*

Variables	n=3422	Percentage
Comm/Govt meals delivered		
Yes	153	4.5
No	3269	95.5
Meals at Comm/Sr Center		
Yes	220	6.4
No	3201	93.6
Ever received SNAP benefits		
Yes	1114	35.5
No	2026	64.5
Currently receiving SNAP benefits		
Yes	545	91.8
No	49	8.2

Hypotheses Testing

To test the relationship between the dependent variable, food security status, and the ten independent variables, bivariate analyses, chi-square, and logistic regression were conducted. Separate domain analyses were done to ensure the analyses were completed on NHANES respondents who were 18 and older and 60 and older at the time of the study (CDC, n.d.). The tests for multicollinearity yielded results showing that the independent variables were not highly correlated with each other. Chi-square tests were conducted to establish if there were statistical associations between groups.

H₁: The social-ecological model's individual, community, and societal levels will correlate significantly with food insecurity in adults in the U.S.

The findings of this study (see Table 5) support hypothesis one for most of the variables for all adult study participants. There was no significant difference in gender (Odds Ratio [OR] = 1.01; 95% confidence interval [CI]: 0.91-1.13; $p = .814$) when associating food insecurity among all adult study participants of the NHANES. Alternatively, when looking at age and food insecurity, the odds of predicting whether a person is food secure or insecure based on age is significant (Odds Ratio [OR] = 0.99; 95% confidence interval [CI]: 0.98-0.99; $p < .001$). Overall, race and ethnicity were found to be significant when predicting food insecurity ($p < .001$). Within the race and ethnicity variable, is no significant association in Blacks ($p = .230$) or Whites ($p = .416$), but statistical significance in Hispanics (OR 1.68; 95% CI: 1.35-2.09; $p < .001$) and Mexican Americans (OR 1.59; 95% CI: 1.28-1.97; $p < .001$). Marital status ($p < .001$) was found to be significant in predicting food insecurity with study participants who are married or living with their partner (OR 0.75; 95% CI: 0.65-0.87; $p < .001$) or divorced,

widowed, or separated (OR 1.25; 95% CI: 1.05-1.50; $p = .014$). Of the study sample, all adults' educational attainment was significant in predicting food insecurity ($p < .001$). Individuals with less than a 9th education (OR 6.35; 95% CI: 4.95-8.15; $p < .001$), 9th to 11th education (OR 4.06; 95% CI: 3.25-5.08; $p < .001$), high school graduate or GED (OR 2.98; 95% CI: 2.44-3.64; $p < .001$), and some college or AA (OR 2.43; 95% CI: 2.00-2.95; $p < .001$) were all statistically significant. Having ever been a recipient of food stamps had higher odds of food insecurity in all adult study participants (OR 3.07; 95% CI: 2.73-3.46; $p < .001$)

Table 5: *Logistic Regression Predicting Food Insecurity of All Adult Study Participants*

Variables	Odds Ratio	95% C.I.	p-value
<i>Individual Level</i>			
Gender	1.01	0.91-1.13	.814
Age	0.99	0.98-0.99	<.001
Race and Ethnicity			<.001
Black	1.12	0.93-1.36	.230
White	0.93	0.77-1.12	.416
Hispanic	1.68	1.35-2.09	<.001
Mexican American	1.59	1.28-1.97	<.001
Marital Status			<.001
Married, living with partner	0.75	0.65-0.87	<.001
Widowed, Divorced, Separated	1.25	1.05-1.50	.014
Educational Level			<.001
Less than 9 th grade	6.35	4.95-8.15	<.001
9 th -11 th grade	4.06	3.25-5.08	<.001
High school graduate/GED	2.98	2.44-3.64	<.001
Some college or AA	2.43	2.00-2.95	<.001
<i>Societal Level</i>			
Ever received SNAP benefits	3.07	2.73-3.46	<.001

In summary, depending on a person's age and whether they were ethnically Hispanic or Mexican American, were not currently partnered, had less education, and received SNAP benefits, they were more likely to be food insecure than other age groups of married White or Black individuals with higher education and lower SNAP benefits usage.

Additionally, shown in Table 6, the findings of this study support hypothesis one for study participants 60 and older (see Table 6). Age was associated with food insecurity and was statistically significant (OR = 0.94; CI: 0.93-0.96; $p < .001$). There was no association between gender and food insecurity (Odds Ratio [OR] = 0.88; 95% confidence interval [CI]: 0.72-1.08; $p = .218$). Overall, race and ethnicity were found to be significant when predicting food insecurity ($p < .001$). Within the variable, there was no significant association in Blacks ($p = .092$), Whites ($p = .137$), or Mexican Americans ($p = .105$) 60 and older, but statistical significance in Hispanics (OR 0.54; 95% CI: 0.37-0.78; $p < .001$). Marital status ($p < .001$) was found to be significant in predicting food insecurity with study participants 60 and older, with high odds among those who are married or living with their partner (OR 1.92; 95% CI: 1.54-2.40; $p < .001$) or divorced, widowed, or separated (OR 1.94; 95% CI: 1.32-2.84; $p = .014$). All adults 60 and older's educational attainment was significant in predicting food insecurity ($p < .001$). Individuals with less than a 9th education were not statistically significant ($p = .558$), but 9th to 11th education (OR 0.58; 95% CI: 0.42-0.81; $p < .001$), high school graduate or GED (OR 0.40; 95% CI: 0.29-0.56; $p < .001$), and some college or AA (OR 0.16; 95% CI: 0.10-0.25; $p < .001$) were all statistically significant. Lastly, having ever reported receiving

SNAP benefits was statistically significant in predicting food insecurity study participants 60 and older (OR 0.42; 95% CI: 0.34-0.52; $p < .001$)

Table 6: *Logistic Regression Predicting Food Insecurity of Study Participants 60 and Older*

Variables	Odds Ratio	95% C.I.	p-value
<i>Individual Level</i>			
Gender	0.88	0.72-1.08	.218
Age	0.94	0.93-0.96	<.001
Race and Ethnicity			<.001
Black	0.69	0.44-1.06	.092
White	0.75	0.52-1.10	.137
Hispanic	0.54	0.37-0.78	<.001
Mexican American	1.39	0.93-2.07	.105
Marital Status			<.001
Married, living with partner	1.92	1.54-2.40	<.001
Widowed, Divorced, Separated	1.94	1.32-2.84	<.001
Educational Level			<.001
Less than 9 th grade	0.90	0.63-1.28	.558
9 th -11 th grade	0.58	0.42-0.81	.001
High school graduate/GED	0.40	0.29-0.56	<.001
Some college or AA	0.16	0.10-0.25	<.001
<i>Community Level</i>			
Comm/Govt meals delivered	0.42	0.28-0.62	<.001
Meals at Comm/Sr Center	0.93	0.63-1.39	.738
<i>Societal Level</i>			
Ever received SNAP benefits	0.42	0.34-0.52	<.001

In conclusion, of the study participants who were 60 and older, depending on age and if a study participant was Hispanic and had less education, and received SNAP benefits, they were more likely to be food insecure than other age groups of White, Black, or Mexican American individuals with higher education and lower SNAP benefits usage.

H_{2a}: Race will have a statistically significant association and correlate with predicting food insecurity in adults in the U.S.

The data supported hypothesis two a (see Table 7). The study findings suggest that the association between race and being food insecure is statistically significant $X^2 (1, n = 5925) = 81.38, p < .001$. A person who identified as being Black or White was associated with food security status.

H_{2b}: Ethnicity will have a statistically significant association and correlate with predicting food insecurity in adults in the U.S.

As seen in Table 7, the data did not support hypothesis two b. There was no statistically significant association, $X^2 (1, n = 2122) = 1.00, p = 0.317$, between being Mexican American or Hispanic and being food insecure.

Table 7: *Bivariate Findings of Individual and Societal Level Variables and Food Insecurity*

Variables	Degrees of Freedom	Chi-Square	p-value
<i>Individual Level</i>			
Race	1	81.38	<.001
Ethnicity	1	1.00	0.317
Educational Level	4	436.94	<.001
Gender	1	0.14	0.713
<i>Societal Level</i>			
Ever received SNAP benefits	1	710.21	<.001

H₃: Persons without a high school diploma will most likely experience food insecurity than those with a high school diploma or higher.

Hypothesis three was supported by the analyses conducted for this research study (see Table 7). Chi-square testing provided a significant effect, $X^2 (4, n = 9217) = 436.94, p < .001$, for overall education level and its relationship with food insecurity status.

Findings suggest that the more education a person has, the less likely they are to be food insecure. As for study participants, as the educational level increased, food insecurity rates decreased, with the highest food insecurity rates amongst individuals who had less than a 9th-grade education or who had no high school diploma or GED.

H₄: Women will most likely experience food insecurity more than their male counterparts.

On the other hand, shown in Table 7, hypothesis four was not supported. The study found that gender was not statistically significant in predicting food insecurity in male and female study participants. A 2 x 2 Pearson Chi-square analysis revealed a non-statistically significant effect of $X^2 (1, n = 9693) = 0.14, p = 0.713$.

H₅: Households ever receiving SNAP benefits will likely experience food insecurity more than households never receiving SNAP benefits.

Presented in Table 7, hypothesis five was supported by the findings of this study. The data suggest that study participants in households that ever received food stamps at some point in the past were more likely than households that never received food stamp benefits. Results from the Pearson Chi-square test were statistically significant $X^2 (1, n = 8912) = 710.21, p = < .001$.

The correlation matrix in Table 8 shows that most variables were significantly correlated. Gender was not significantly correlated. The level of correlation was $p = 0.01$.

Table 8: *Correlations of Individual and Societal Level Variables and Food Insecurity*

Variables	Mean	Std. Dev.	1	2	3	4
Food Security Status	1.28	0.45	_____			
Race and Ethnicity	3.27	1.20	-.061**			
Educational Level	3.54	1.20	-.214**	.266**		
Gender	1.51	0.50	.004	.007	.031**	
Ever received SNAP benefits	1.57	0.50	-.282**	-.015	.219**	-.054**

**Correlation is significant at the 0.01 level (2-tailed).

Summary of Findings

A total of four of the five hypotheses proposed by this study were supported by the NHANES data. Study variables that contributed to predicting food insecurity were found in the individual, community, and societal levels of the SEM. Mexican American and Hispanic younger adults were more food insecure than Blacks and Whites. The findings provide valuable information that could shape future programs and policies to address food insecurity which will be discussed in chapter 6 of this dissertation study.

CHAPTER 5: A REVIEW OF INTERVENTIONS

This chapter will explore interventions, programs, and policy initiatives throughout Detroit, Louisville, and Seattle to address food insecurity in their respective communities (see Table 10). The programs are at different levels of engagement ranging from the state level to local non-profits and churches. There are similarities in some of the interventions that are commonly used and found to be beneficial in addressing food insecurity, while others are specific to the population they are serving. There will also be a discussion of the descriptive statistics of each metropolitan area and how food insecurity rates have changed over time.

Descriptive Analysis of Metropolitan Cities

All the metropolitan cities' demographic characteristics are displayed in Table 9. The population of Blacks in each city is as follows Detroit 77.1%, Louisville 24%, and Seattle 7.1%. According to the data collected, Detroit residents were 17.6% food insecure. Louisville followed with 11.50%, and Seattle had a food insecurity rate of 8.9%. Dissimilarity indices for Detroit, Louisville, and Seattle ranged from high, medium, and low at 74.5%, 51.6%, and 43.7%, respectively. A little over one-third (33.2%) of Detroit's population lived in poverty, while 15.2% and 10.2% of Louisville and Seattle's residents live in poverty. Finally, 81.9%, 89.7%, and 95.2% of Detroit, Louisville, and Seattle's populations have high school diplomas or higher, respectively.

Table 9: *Descriptive Statistics of Metropolitan Cities*

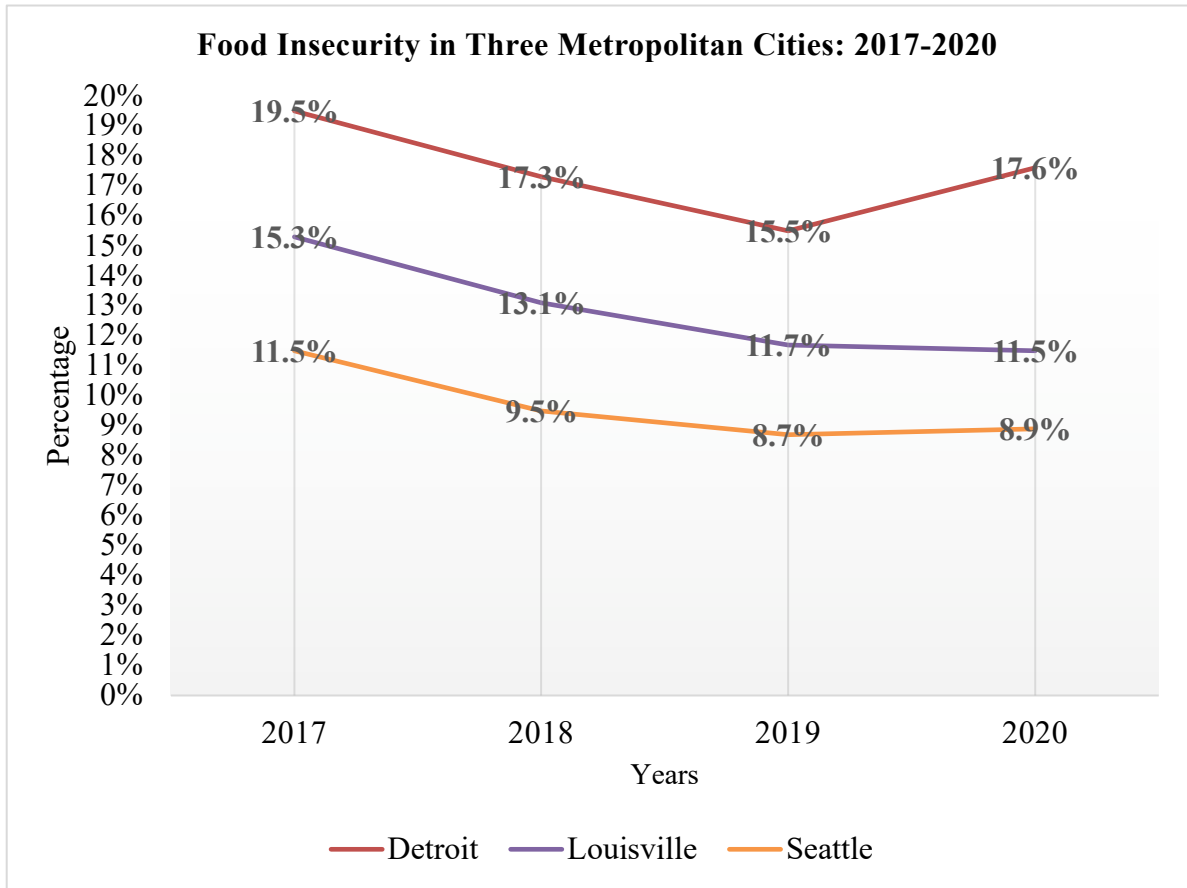
	Population	% of Pop. Black	% of Food Insecurity	Dissimilarity Index ²	% of Poverty	% High School or Higher
Detroit, MI	639,115	77.1	17.6	74.5	33.2	81.9
Louisville, KY	632,550	24	11.5	51.6	15.2	89.7
Seattle, WA	737,018	7.1	8.9	43.7	10.2	95.2

Metropolitan Cities' Food Insecurity Over Time

Each of the three metropolitan cities saw declines in food insecurity rates from 2017 to 2019. In 2017, 19.5% of Detroit's residents were food insecure. This is followed by Louisville, with 15.3% of its residents being food insecure, and lastly, Seattle at 11.5%. In the years 2018 to 2019, rates declined from 9.5% to 8.7% in Seattle, 13.1% to 11.7% in Louisville, and 17.3% to 15.5% in Detroit. In contrast, in 2020, two of the three sites saw increasing rates of food insecurity. Detroit increased to 17.6% and Seattle to 8.9%. Louisville was on the decline, down to 11.5%.

Figure 2. *Food Insecurity of Metropolitan Cities: 2017-2020*

² The Dissimilarity Index is the principal statistical method for measuring residential segregation by race and is measured from 0-100. Its purpose is to look at communities and neighborhoods and calculate how much of a specified population would need to move for that area to be integrated.



Metropolitan Cities Interventions Addressing Food Insecurity

Seattle

The Seattle Fresh Bucks Program aims to supply residents with monthly affordable fresh fruits and vegetables. The program offers eligible participants \$40 a month to use at local farmer's markets, supermarkets, and independent grocery stores using the Healthy Savings mobile device application or their physical Fresh Bucks Card. With the rising cost of food and the affordability of healthy food options, the Fresh Bucks program extended its 2022 benefits through the end of 2023 without the need to re-enroll in the program (Seattle Fresh Bucks, 2023).

A comparable program, and the most extensive matching program in the state of Washington, is the Supplement Nutrition Assistance Program (SNAP) Market Match. The program allows SNAP recipients to stretch their benefits when shopping for fresh fruits and vegetables. Participating in farmer's markets will enable customers to purchase fresh herbs, plants and seeds, mushrooms, fruits, and vegetables by matching the amount of the purchases. This match is sometimes at a one-to-one ratio. The match varies across the state. For example, some markets give participants \$2 if they spend \$2, allowing them \$4 of food for \$2, while others may offer a \$2 to \$5 match. SNAP Market Match increases the affordability of fresh produce and healthy food options for those who are food insecure and receiving food assistance (Washington State Farmers Market Association, 2023).

FamilyWorks Seattle is a local organization providing a variety of social safety net programs in the community. Besides rental and transportation assistance, they operate two food banks dedicated to providing healthy fresh foods to individuals and families experiencing hunger or food insecurity. The food banks provide a variety of nutrient-rich foods from culturally specific options, dairy products, and diabetic and low sodium selections. FamilyWorks serves recipients of their programming with dignity and simplifies their check-in process by providing a membership card like other popular supermarket chains (FamilyWorks, 2023).

FamilyWorks offers an abundance of food programs targeting a wide range of audiences. For example, they have a mobile food pantry to increase access to individuals who are food insecure but need help to make it to either of their pantries during normal distribution hours. The mobile unit visits four neighborhoods throughout North Seattle

that need these vital resources and healthy, nutritious food options. Local community organizations, churches, and other partners can request the mobile unit if they are hosting a community event. Another resource FamilyWorks offers is the Emergency “No-Cook” Food Bag. The bags are designed to accommodate those who do not have access to traditional cooking methods. The bags are complete with meals and snacks that require hot water or a simple can opener. They are available on a weekly basis in addition to a food bank visit. They can be picked up anytime a security guard is available, which is often after regular food bank operating hours (FamilyWorks, 2023).

Other individuals experiencing food insecurity may need more food but not be available during the hours needed to visit a food bank. FamilyWorks caters to them with their Text-to-Go Grocery Boxes. Clients can enroll, view groceries available for the week, and customize their items all through text messaging. They then have the option to schedule a pick-up that works with their schedule to collect their groceries, much like grab-and-go at larger supermarkets. For persons who cannot physically make it to the pantry or are homebound, FamilyWorks has a Grocery Delivery Program. More than 5,400 deliveries were made to families and seniors in 2020 during the COVID-19 pandemic. Lastly, the Weekend PowerPack Program is available to more than one-third of free and reduced lunch students in the Seattle Public School District across three elementary schools, so that these students have food over the weekend. The PowerPacks are kid-friendly and designed for children experiencing food insecurity at home who may need access to nutritious food when not in school (FamilyWorks, 2023).

Bethany Green Lake Community Church meets the needs of its local community through ministry and outreach. Throughout its 100-year history, its food bank has been its

longest-standing ministry, meeting the need of those who are suffering from hunger and food insecurity. The church's food bank is open throughout the month and available for those living in the community in need of emergency food. Families can receive bags provided through donations and supplemental items provided by Bethany. The church also prepares community meals twice a month for those who want to enjoy a cooked meal and fellowship with other community members (Bethany Community Church, 2023).

Another initiative addressing food insecurity in Seattle is Seattle Food Not Bombs (FNB). This is a volunteer lead movement that recovers otherwise discarded foods and shares vegetarian and vegan meals with individuals who are hungry while protesting poverty and war and preserving the environment. FNB provides hot meals twice weekly while opposing all forms of oppression, racism, and sexism. They promote vegan and vegetarian lifestyles while firmly believing that food should not be a privilege but a human right for all (Seattle Food Not Bombs, 2023).

The North King County community benefits from the Hunger Intervention Program (HIP), which focuses on advocacy, educational programs, and nutritious meals. They provide programs for all ages. Healthy HIP Snacks and Summer Eats provide food for school-age children who do not have access to food on weekends and during summer months when school is not in session. The meals are provided throughout north Seattle at kid-friendly sites, providing activities and freshly made meals (Hunger Intervention Program, 2020).

The HIP is also one of two north Seattle organizations providing meals specifically for their growing East African Elders. The East African Elders Program

provides authentic ethnic cuisine with program and community resources designed for this population. Lastly, HIP provides breakfast and dinner for North King County Enhanced Shelter residents to reduce the burden of food insecurity. Their goal is to remove the barrier of needing a nutritious meal as residents seek long-term housing (Hunger Intervention Program, 2020).

In 2012 the City of Seattle created the Food Action Plan (Plan) as a roadmap to guide the work of implementing food programs and policies. The first Plan was developed as a five-year blueprint to improve access to affordable and culturally specific foods, reduce food waste, and expand the opportunity to grow foods in green spaces throughout Seattle. The Plan also includes community engagement and racial equity toolkits to strengthen the local food system, healthcare, food security, and economic development. An update to the Plan is currently underway to include new priorities of food challenges created by COVID-19, food justice values, and environmental and racial injustices that impact food security. The Food Action Plan's framework will allow City departments to, over time, build an equitable and healthy food system for Seattle communities (Seattle, 2023).

Table 10: Interventions for Metropolitan Cities

Metropolitan City	Seattle, WA	Louisville, KY	Detroit, MI
Intervention			
	Seattle Fresh Bucks Program	Dare to Care Food Bank	Forgotten Harvest
	Supplement Nutrition Assistance Program (SNAP) Market Match	Kentucky Harvest	Detroit Black Community Food Security Network (DBCFSN)
	FamilyWorks Seattle	The Lord’s Kitchen	Gleaners Community Food Bank
	Bethany Green Lake Community Church	Kentucky Double Dollars	Detroit Community Markets
	Seattle Food Not Bombs (FNB)	Catholic Charities of Louisville, Inc.	Neighborhood Grocery
	Hunger Intervention Program (HIP)	The Food Literacy Project	Detroit Food Policy Council (DFPC)
	Food Action Plan (Plan)	Food in Neighborhoods (FIN) Coalition	

Louisville

Dare to Care Food Bank has provided over 21 million meals to 13 counties in Kentucky and Indiana. Through programming and health education, they not only provide food but many other services to vulnerable populations in the community. Cooking Matters is a program designed to teach people of all ages how to prepare affordable healthy meals. Dare to Care offers this program through partnerships with other local organizations that provide kitchen space or volunteers who can share their nutrition or culinary expertise. There is an array of courses offered for teens, seniors, families, and children (Dare to Care, 2023).

In 2017, Dare to Care created the Prescriptive Pantry program to improve the health of residents in the medical setting by partnering with local health clinics to provide healthy items to those who are experiencing food insecurity. This program gives medical professionals the opportunity to treat the whole patient and address medical and social problems they may be experiencing. Physicians incorporate the program into patients' visits by inquiring about their food security status and offering pantry items if needed. Examples of the items are peanut butter, whole wheat pasta, oats, and canned vegetables. This allows physicians to educate on the importance of a healthy diet and provide patients with items to take home. Lastly, Dare to Care offers the Zero Hunger Mobile Market to neighborhoods in food deserts. All residents can shop in the single-aisle design store on wheels for healthy food, fruits, and vegetables. The Mobile Market has multiple forms of payment, including SNAP benefits (Dare to Care, 2023).

Louisville Solid Waste Management suggests that nearly 29 percent of solid waste is food. Kentucky Harvest has provided over 84 million pounds of food for

Louisville and Southern Indiana since 1987. They are operating to eliminate hunger by rescuing 2.5 million pounds of food per year and delivering to nearly 80 organizations throughout various communities. Annually, Kentucky saves community organizations over 4 million dollars that can be used for other programming needs such as addiction, homelessness, and other outreach (Kentucky Harvest, n.d.).

The Lord's Kitchen has serviced those in need in Louisville for the last 30 years. They provide critical support and spiritual guidance for individuals experiencing addiction, food insecurity, and displacement. Their ministries include Hope Housing, Disaster Relief, Corner of Hope, and The Lord's Kitchen. Through partnerships with Dare to Care Food Bank, Texas Roadhouse, Kosair Charities, and other local organizations, they can provide meals to the 1 in 7 Kentuckians struggling with hunger (The Lord's Kitchen, 2020).

Kentucky Double Dollars strives to promote healthy families and communities, increase access to fresh produce for low-income individuals, provide sustainability, and increase revenue for local farmers. The program offers financial incentives to recipients of Women, Infants, and Children (WIC), SNAP, and Senior Farmers Market shopping at local farmers markets. Customers can use SNAP benefits and receive tokens for an equal or lesser amount depending on if they purchase fresh produce or meat, eggs, and dairy. Vouchers are provided to individuals participating in WIC or Seniors Farmers Market (Kentucky Double Dollars, n.d.).

The Sister Visitor Center is an emergency assistance program through Catholic Charities of Louisville, Inc. They provide financial assistance and basic human needs to Louisville residents by partnering with Area Community Ministries and Dare to Care.

Sister Visitor Center is meeting the needs of West Louisville in the Shawnee, Russell, and Portland neighborhoods. Recently, they changed their food bank model to a Pantry of Choice. It is designed like a supermarket providing those in need with a high level of dignity and pride in shopping for healthy foods for themselves and their family (Catholic Charities of Louisville, Inc., 2023).

The Food Literacy Project began in 2005, striving to bring equity and belonging to vulnerable populations by providing access to healthy foods. They provide educational programming to community members and neighborhood residents empowering them to get involved in their local food system and to taste fresh new foods. The Food Literacy Project has three initiatives which are the Field-to-Fork Clubs, the Youth Community Agriculture Project (YCAP), and the Truck Farm. Field-to-Fork is a 6 to 10-week after-school program designed to provide 3rd through 5th graders an opportunity to garden, cook, and learn about nutrition through hands-on activities. YCAP is a program for youth 16 to 21 years old that focuses on healthy and productive living through empowerment and impact on the local food system and community. The program has a special focus on residents in Central, South, and West Louisville and equips youth to cook, farm, effectively communicate, and activate change. Lastly, the Truck Farm is a mobile garden that allows the Food Literacy Project to bring the farm to neighborhoods and communities that do not have their own farms or gardens. They are also able to provide edible produce and education at community outreach events to families and neighbors (The Food Literacy Project, n.d.).

Programs such as Kentucky Double Dollars and the Sister Visitor Center are important in addressing food insecurity in Louisville. Former Louisville Mayor Jerry

Abramson also saw the importance of combating food insecurity through policy and advocacy. In the 2010 State of Food Report, there was illumination of the inequities that many residents of Jefferson County experienced (Mayor's Healthy Hometown Movement and Food in Neighborhoods Committee, 2010). Residents of West and South Louisville not only faced challenges accessing full-service grocery stores but also experienced transportation issues when having to travel outside of their community for food. These food-insecure communities were saturated with alcohol and tobacco advertising leaving residents with the negative health outcomes of their usage (Center for Health Equity, 2017). In 2011, Mayor Abramson developed the Louisville Food Policy Advisory Council (LFPAC). Community-based research was conducted, but it was difficult to get anything accomplished. The LFPAC disbanded in 2013 with the transition to a new Mayor. From the LFPAC, the Food in Neighborhoods (FIN) Coalition was birthed (Community Foundation of Louisville, 2018). FIN is a community-led food policy council focused on food access, urban agriculture, and food and agriculture justice throughout the city. A few of their advocacy efforts include addressing the Louisville store crisis with grocery stores closures in West Louisville, the Farm Bill, which provides funding for community food projects and SNAP, and the Louisville Landbank, which owns many vacant lots that could be developed for community gardens (Food in Neighborhoods, 2018).

Detroit

Forgotten Harvest delivers nearly 140,000 pounds of food per day to numerous local charities providing food to individuals and families experiencing food insecurity in the Detroit metro area. Their services are free of charge and help bridge the income gap

of thousands who are unable to provide the necessities in life and have access to fresh, nutritious food. Fresh Harvest also provides various programs for school-aged children, seniors, and veterans (Forgotten Harvest, 2021).

Five years ago, Forgotten Harvest began providing a school pantry at early childhood education centers and schools to vulnerable families experiencing food insecurity and hunger. They are meeting the need of families while bringing resources to them where they gather to provide healthy fresh food, especially on weekends and school vacations. To date, they have provided over two million meals. Their summer lunch program provides lunch throughout the summer when low-income children lose access to meals. They provide meals to key communities through partnerships targeting over 20,000 students and serving 100,000 lunches each summer throughout Detroit (Forgotten Harvest, 2021).

Healthy Food Healthy Seniors seeks to address food insecurity among the nearly 20 percent of seniors in Detroit living in poverty. Forgotten Harvest works with four food pantries focused solely on seniors providing over 250,000 pounds of nutrient-dense food annually. The veteran support program works with specific agency partners to deliver nearly 600,000 pounds of food annually. They continue to build partnerships to support the men and women who have supported the nation and are experiencing food insecurity (Forgotten Harvest, 2021).

The Detroit Black Community Food Security Network (DBCFSN) is a collaboration of programs and a farm founded to ensure that African Americans in Detroit have a voice in the local food movement because they make up a large part of the population. DBCFSN models black food sovereignty. Black food sovereignty is the belief

that individuals of African descent should have access to culturally appropriate and healthy foods. This should be done through sustainable methods of agriculture. This holistic, sustainable approach for the community will, in turn, combat chronic food insecurity in Detroit (Detroit Black Community Food Security Network, 2023).

Since 2008, DBCFSN has maintained D-Town Farm, which is the largest urban farm in Detroit. The farm is home to over seven acres of more than 30 different fruits and vegetables each year which are harvested through sustainable, regenerative methods. The farm uses rainwater retention as well as composting throughout the year. They host community events each month and provide their produce at farmers' markets and local restaurants and stores. Food N' Flava is DBCFSN's program geared toward youth 14 to 16 years old to provide food systems literacy from a Black food sovereignty and self-reliance stance. Participants of the program learn from educational classes focused on making healthy food choices when given limited options, such as school lunches. They gain additional knowledge of entrepreneurship through the marketing and selling of food products (Detroit Black Community Food Security Network, 2023).

Gleaners Community Food Bank has been serving Southeastern Michigan since 1977, striving to empower people in the community and achieve a healthy, hunger-free society through access, education, and advocacy. Gleaners use a four-step model to help those experiencing food insecurity. First, they collect donations from local manufacturers, local gardens, grocers, and retailers. The next step is for volunteers and donors to sort through the food to be prepared for distribution. Gleaners then distribute the food to more than 500 shelters, pantries, and soup kitchens. Lastly, through

partnership agencies, they can nourish the community and combat hunger (Gleaners Community Food Bank, 2019).

Through the partner pantries, Gleaners distributes over a million pounds of food each year. They also provide educational programs and mobile distributions. Meet Up and Eat Up is a school food program provided to children and families to give them access to 3 meals a day, 365 days a year. The program is supported through Share Our Strength, No Kid Hungry. Gleaners also provide a Cooking Matters course for low-income individuals and families to teach them how to cook healthy fresh meals on minimal financial resources. Cooking Matters for adults, teens, and kids is offered throughout the community along with Cooking Matter at the Store. This tour of local grocery stores provides knowledge of the cost and nutrition of everyday food items. The tours are offered in a variety of languages and have special tours for federally funded programs such as WIC (Gleaners Community Food Bank, 2019).

The Detroit Community Markets are located throughout Detroit in various neighborhoods and communities, providing local fresh food for residents. The market participates in several programs for low-income individuals giving them access to nutritious foods. Double Up Food Bucks is a program that doubles the value of SNAP benefits. Recipients can enter the farmers market and ask for \$20 to spend on eligible foods and receive an additional \$20, for a total of \$40 for locally grown fruits and vegetables (Detroit Community Markets, 2022).

Senior Market Fresh is a program for individuals 60 years or older who are 185% above the federal poverty level. The program provides fresh produce free of charge to recipients. In a similar fashion, WIC Project Fresh provides free produce to women and

children up to five years old with coupons to redeem for fruits and vegetables at the farmer's market. Lastly, Fresh Prescription is a program bringing together the food system and healthcare providers for an innovative relationship to address food insecurity in Detroit. Participants can be referred to the program by their provider with a prescription to consume more fruits and vegetables. The prescription is filled at the farmers market while also receiving nutrition counseling, education, and cooking demonstrations that hopefully encourage healthy eating habits long term (Detroit Community Market, 2022).

Neighborhood Grocery is raising money to turn an old liquor store into a grocery store and become Detroit's first Black-owned grocery store since 2014 (Green, 2014). That has not stopped the mission of its owner. They have launched a grocery box program that provides free groceries to those in need in the community. They hope to address food insecurity from recent inflation and poverty (Neighborhood Grocery, 2021).

Detroit has many community and state-level programs addressing food insecurity directly with individuals in need. In addition to the initiatives and programs, they are tackling food insecurity through policy. Beginning in 2009, the Detroit Food Policy Council (DFPC), which was created by The Detroit City Council, began working towards its mission of an equitable and sustainable food system for all Detroit residents. The council of 23 members ranging from the staff at the Mayor's Office to youth representatives, educates and promotes food security, justice, and making fresh produce accessible. Their values are comprised of five principles: justice, respect, integrity, inclusion, and transparency. Justice is for racial healing and equity, recognizing that structural and institutional systems contribute to injustices that have a trickle-down effect

on food security. Respect for everyone despite differences and integrity for both words and actions. Inclusion seeks to engage leadership and Detroit residents, especially those who are most impacted, to have a voice in combating food insecurity. Lastly, DFPC strives for transparency by being open and honest with the public and being consistent with operating within its core mission, vision, and values (Detroit Food Policy Council, 2023).

Summary of Findings

Detroit, Louisville, and Seattle had high, medium, and low dissimilarity index scores. The two highest scores, Detroit, and Louisville, had higher food insecurity rates than the lowest dissimilarity score found to be in Seattle. Each metropolitan city had numerous programs and interventions to address food insecurity in their communities. Many of the programs and organizations providing services were similar in nature, while others were targeted at specific populations. Policy and advocacy initiatives were embedded in each city's infrastructure to improve the food systems and accessibility of healthy and fresh food options for all. The findings provided insight into what cities are doing across the U.S. to reduce food insecurity and what others could do throughout the country to address food insecurity.

CHAPTER 6: DISCUSSION

The purpose of this study was to identify factors and predictors from the individual, community, and societal levels of the social-ecological model that predict food insecurity in the U.S. The study also sought to explore residential segregation and its impact on food insecurity rates in three metropolitan cities with high, medium, and low dissimilarity indices. The data used to conduct the analysis for this research were from the NHANES, U.S. Census Bureau, Feeding America's Map the Meal Gap, and Brown University's Dissimilarity Index. This chapter will highlight findings, study limitations, strengths, implications, and future research. It will answer the following research questions:

Relational Research Questions

1. To what degree do the social-ecological model's individual, community, and societal levels predict food insecurity among adults in the U.S.?
2. Using the social-ecological model's individual, community, and societal levels, can specific groups and factors be identified that are most likely to experience food insecurity?

Descriptive Research Questions

3. Do metropolitan areas with higher scores on the dissimilarity index have higher rates of food insecurity?
4. What have metropolitan areas with high, medium, and low dissimilarity indices done to address food insecurity?

The Social-Ecological Model

The results from the study showed that levels from the SEM could predict food insecurity in all adults and adults 60 and older in the U.S. Different groups and factors within the chosen variables were found to be statistically significant, showing a relationship between the variables and food insecurity, of the over 15,000 participants for the 2017- March 2020 pre-pandemic NHANES, 9,693 were used for this study as the all adult population, and 3,422 were used in the 60 and older subgroup.

In this study, nearly a third of all adult study participants reported they were food insecure. Those who were food insecure tended to have less education, were more reliant on SNAP benefits, and were non-White Hispanic persons (Dollahite et al., 2013; Nord, 2009; Flores & Amiri, 2019). Study participants 60 and older were found to be about 25 percent were food insecure. They were most likely to currently be receiving SNAP benefits and were non-White Hispanic married or living with their partner or widowed.

Residential Segregation

In the second part of my dissertation, I identified three cities with high, medium, and low dissimilarity index scores, which measure residential segregation. Seattle, with the lowest segregation rating, also had the lowest food insecurity rate among the three chosen cities. Detroit, which was the most segregated city of the three, had the highest rate of food insecurity. Louisville had less segregation than Detroit but more than Seattle, and this is the same for its food insecurity rate.

The findings showed that cities with high and medium dissimilarity index scores had similar rates of food insecurity and higher rates than Seattle, which had the lowest dissimilarity score. Descriptive statistics of socio-demographics also showed that Detroit

and Louisville had lower educational attainment, a higher percentage of poverty among its residents, and more than triple the Black population of Seattle (Cook & Frank, 2008).

Lastly, cities with high, medium, and low dissimilarity indices were found to have numerous programs and interventions to address food insecurity in their communities. There were also policy councils and advocacy groups in each city. Each municipality had many programs to cater to the needs of those experiencing food insecurity in their area. Many programs were tailored to the demographics they were serving. Detroit had a program geared toward and run by Blacks (White, 2011). Seattle also had programming for specific populations, such as Somali elders and vegans.

Study Limitations

There are several limitations to the current study. The NHANES was deployed and administered for other reasons outside of this study. Therefore, every variable may not be applicable to this research. The multiple surveys that make up the larger NHANES were not designed for the SEM, resulting in some variables needing to align with each construct. Secondary data analysis has become more prevalent in health-related research. It is crucial to understand and address common pitfalls when investigating research questions and hypotheses as it relates to datasets and their limitations with respect to bias (Cole & Trinh, 2017). Although secondary data can be rich and expansive with data, one is limited to the data that was previously collected (Chandola, 2021).

Secondly, there are limitations to self-reported data. This may impact the reliability and validity of this study (Lauritsen, 1999). The nature of the cross-design of this research poses questions regarding the relationship and causation of the variables over time (Heath et al., 1993). The variables chosen for the levels of the chosen levels of

the model were not an extensive list but were selected based on the availability of the NHANES.

Lastly, the final limitation of using the NHANES data was the possibility of not reaching the most vulnerable populations, which may be due to the location of where the data was collected. Data is collected in a person's home, which poses questions if less desirable areas were visited. All participants of the NHANES are willing to participate and are accessible. There may be populations, such as individuals experiencing homelessness, who could add valuable insight into the topics and data being collected. This results in different sub-populations that need to be accounted for who may be experiencing food insecurity.

Study Strengths

There are numerous strengths that add to the body of knowledge of food insecurity and residential segregation. The use of a large data set representing adults across the U.S. is a strength (Alotaik et al., 2017). Incorporating the dissimilarity index for metropolitan areas with high, medium, and low dissimilarity scores is also a strength. The use of the SEM in predicting food insecurity at various levels of influence was also of benefit. Findings from this study can be used to predict food insecurity in segregated communities across the U.S. and provide resource and program ideas for the most vulnerable.

Study Implications

Public Health Practice

Food insecurity being taught within the school curriculum has started to shift towards those living in residentially segregated neighborhoods. The results from this study helped in understanding those most likely to be food insecure and provided a more profound translation of this knowledge in practice as it relates to residential segregation and understanding its gravity on a national scale. There needs to be further development of this by public health practitioners. Focusing more on issues surrounding food insecurity and the impact of residential segregation. Food insecurity research often focuses on individual-level interventions. This study demonstrates the need to explore other strategies beyond the individual-level approach (Chilton & Rose, 2009). This is especially important regarding areas with high dissimilarity index scores.

In addition, undergraduate and graduate public health curricula should integrate and disseminate research findings around health-related issues of individuals who are food insecure and living in neighborhoods that are segregated. This could better prepare public health practitioners to identify vulnerable populations that are food insecure and living in segregated neighborhoods (Ivers, 2015). By doing so, they could assist in connecting people who are food insecure with resources. It is vital that residential segregation be embedded in public health curricula as it relates to food insecurity. As food prices continue to rise and become less affordable in the U.S., the issues will not subside. Advocating for adults who are food insecure and living in segregated communities starts with awareness and knowledge through education of the public health workforce.

Future Public Health Research

Further research is essential to explore food insecurity among other vulnerable populations, such as individuals with disabilities, refugees, Native Americans living on reservations, and veterans. Future research could also explore foreign-born versus American-born Blacks for possible differences between groups. Qualitative studies could provide a better understanding of factors that contribute to food insecurity in sub-populations. In addition, inquiries that focus on specific vulnerable populations could influence programming and interventions to reduce food insecurity. These influences could help in the creation of programs like those in Seattle and Detroit, that target specific populations.

Future research should explore other metropolitan areas and the influence of residential segregation on food security status. Areas with high dissimilarity scores amongst Asian-White segregation and Hispanic-White segregation could provide a great deal of insight into food insecurity and segregation in those groups. In addition, the impact of COVID-19 on food insecurity and residential segregation needs to be evaluated (Niles et al., 2020). Currently, inflation is an issue, and multi-generational housing is increasing with fewer affordable housing options; these factors could expand the body of knowledge. Research in areas with lower dissimilarity and food insecurity rates could provide best practices and a possible blueprint for communities that are highly segregated and experiencing higher food insecurity (Bonanno & Li, 2015).

Future research should also examine behavioral health-level factors that influence food insecurity. Factors not explored by this study, such as depression, substance, and alcohol use, and the consumption of fast foods should be evaluated. Additionally, access

to physical and mental health services. These behaviors and the ability to cope could significantly impact one's food security status.

The cross-sectional design of NHANES does not permit researchers to follow study participants over an extended period. A longitudinal study would allow for the examination of changes in food security status. Study findings showed that participants who received food stamps were more likely to experience food insecurity. This paradox and the participation of the SNAP program of those who are labeled food insecure in a longitudinal study could provide insightful recommendations to decrease food insecurity.

Public Health Policy

Meaningful policies that remove barriers to accessing healthy food options and promote integrated neighborhoods are needed to reduce the instance of food insecurity and residential segregation. Policymakers need to assess cities across the U.S. and see for themselves that most major metropolitan areas have high dissimilarity index scores. Those same areas likely have food insecurity rates that are higher than those that are not as segregated. There needs to be an investment in long-term programs that promote food access and housing. There is evidence that addressing the social determinants of food insecurity and engagement with government leadership can lead to a pathway out of food insecurity (Pollard & Booth, 2019).

The U.S. spends billions of dollars each year on food and nutrition programs. The programs include the National Lunch Program, Women, Infants, and Children, Supplemental Nutrition Assistance Program, and others. Despite the abundance of funding and comprehensive assistance, food insecurity is still prevalent. Chilton and Rose in their research suggest that the U.S. adopt a human rights framework to combat food

insecurity. The framework repositions the understanding of food insecurity and addresses the economic and social determinants a person may encounter. It allows for public participation and provides Americans with a mechanism to hold the policy and lawmakers accountable for making the necessary steps toward reducing food insecurity (Chilton & Rose, 2009).

The present study has identified the need for local, state, and federal governments to explore the significant impact of residential segregation. Although in the 1990s, there was an effort by the U.S. government to transform distressed public housing and create better opportunities, the housing and voucher reform deconcentrated poverty rather than desegregated communities. The lack of attention to increasing unemployment and poor educational outcomes for low-income Blacks has caused critics to label the reform as a failure (Turner et al., 2009). Through research, the government can develop meaningful policies and reduce barriers that result in unfair housing practices. Investing in populations and assisting in integrating communities will benefit current and future generations. The federal government should consider policies that provide funding for pilot programs geared towards reducing food insecurity in notable segregated areas. There should be implementation nationwide to reduce food insecurity and residential segregation over time.

In addition, policies on programs such as SNAP should to re-evaluated (Wheaton & Kwon, 2022). The focus should be on food sustainability for low-income and vulnerable populations rather than a short-term fix until they no longer meet eligibility requirements. Funding could be used to assist those with low educational attainment or other barriers in securing employment with a step-down approach to receiving benefits.

In creating policies and laws that aid and invest in people rather than a band-aid approach, individuals can learn to sustain themselves and their families long-term.

Conclusion

This research study is one of the first to examine food insecurity nationally and in select metropolitan areas with high, medium, and low scores of residential segregation in the United States through the social-ecological lens. This study examined factors such as educational attainment, family poverty level, and food stamp status to assess predictors of food insecurity. Throughout this research, there was a light shown on those living in residentially segregated communities and the impact that it had on food security status. The study findings show that living in segregated neighborhoods impacts one's food security status, amongst other factors such as income and education. These findings highlight the need for further research in the public health field in other metropolitan cities with varying dissimilarity index scores and food insecurity rates.

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APPENDIX

Appendix A: USFSSM Survey

U.S. ADULT FOOD SECURITY SURVEY MODULE: THREE-STAGE DESIGN, WITH SCREENERS Economic Research Service, USDA September 2012

Optional USDA Food Sufficiency Question/Screeners: Question HH1 (This question is optional. It is not used to calculate the Adult Food Security Scale. It may be used in conjunction with income as a preliminary screener to reduce respondent burden for high income households).

HH1. [IF ONE PERSON IN HOUSEHOLD, USE "I" IN PARENTHETICALS, OTHERWISE, USE "WE."]

Which of these statements best describes the food eaten in your household in the last 12 months: —enough of the kinds of food (I/we) want to eat; —enough, but not always the kinds of food (I/we) want; —sometimes not enough to eat; or, —often not enough to eat?

- [1] Enough of the kinds of food we want to eat
- [2] Enough but not always the kinds of food we want
- [3] Sometimes not enough to eat
- [4] Often not enough to eat
- [] DK or Refused

Household Stage 1: Questions HH2-HH4 (asked of all households; begin scale items).

[IF SINGLE ADULT IN HOUSEHOLD, USE "I," "MY," AND "YOU" IN PARENTHETICALS; OTHERWISE, USE "WE," "OUR," AND "YOUR HOUSEHOLD."]

HH2. Now I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 12 months—that is, since last (name of current month).

The first statement is “(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more.” Was that often true, sometimes true, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

HH3. “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

HH4. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

Screener for Stage 2 Adult-Referenced Questions: If affirmative response (i.e., "often true" or "sometimes true") to one or more of Questions HH2-HH4, OR, response [3] or [4] to question HH1 (if administered), then continue to ***Adult Stage 2***; otherwise skip to ***End of Adult Food Security Module***.

NOTE: In a sample similar to that of the general U.S. population, about 20 percent of households (45 percent of households with incomes less than 185 percent of poverty line) will pass this screen and continue to Adult Stage 2.

Adult Stage 2: Questions AD1-AD4 (asked of households passing the screener for Stage 2 adult-referenced questions).

AD1. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

- Yes
- No (Skip AD1a)
- DK (Skip AD1a)

AD1a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- DK

AD2. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

- Yes
- No
- DK

AD3. In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?

- Yes
- No
- DK

AD4. In the last 12 months, did you lose weight because there wasn't enough money for food?

- Yes
- No
- DK

Screeners for Stage 3 Adult-Referenced Questions: If affirmative response to one or more of questions AD1 through AD4, then continue to *Adult Stage 3*; otherwise, skip to *End of Adult Food Security Module*.

NOTE: In a sample similar to that of the general U.S. population, about 8 percent of households (20 percent of households with incomes less than 185 percent of poverty line) will pass this screen and continue to Adult Stage 3.

Adult Stage 3: Questions AD5-AD5a (asked of households passing screener for Stage 3 adult-referenced questions).

AD5. In the last 12 months, did (you/you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?

- Yes
- No (Skip AD5a)
- DK (Skip AD5a)

AD5a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- DK

Appendix B: IRB Letter

University of Louisville

Human Subjects Protection Program Office
300 East Market Street, Suite 380
Louisville, Ky 40202
P: 502. 852.5188 E: hspofc@louisville.edu

DATE:	June 23, 2023
TO:	Andrew S LaJoie, Ph.D.
FROM:	The University of Louisville Institutional Review Board
IRB NUMBER:	23.0337
STUDY TITLE:	Food Insecurity and Residential Segregation Among Adults Living in the United States: The National Health and Nutrition Examination Survey 2017-2020
REFERENCE #:	765008
DATE OF REVIEW:	06/23/2023
CONTACT FOR QUESTIONS:	Sarah Foster Merrill, MPH, swfost01@louisville.edu

An IRB member has reviewed your submission, and determined that the project described does not meet the "Common Rule" definition of human subjects' research. The IRB has classified this project as Non-Human Subjects Research (NHSR). The project may proceed.

Any changes to this project or the focus of the investigation must be submitted to the IRB to ensure that the IRB determination above still applies.

Amendments for personnel changes or study closures are not required.

Thank you,



Sarah Foster Merrill, MPH, IRB Analyst, Institutional Review Board, Member

We value your feedback; let us know how we are doing: <https://www.surveymonkey.com/r/CCLHXP>

CURRICULUM VITAE

Chandre' L. Chaney, PhD, MPH

<p>Contact</p> <p>3748 Nina Ct Loganville, GA 30052 727.365.4393 chandre87@gmail.com</p>	<p>Profile</p> <p>Dedicated, innovative, & thorough Public Health Practitioner with research, program management, emergency management, community development, & quality improvement experience.</p>
<p>Education</p> <p>University of Louisville Louisville, KY Doctor of Philosophy in Public Health Sciences (Health Promotion & Behavioral Sciences) August 2023</p>	<p>Experience</p> <p>APRIL 2023 - PRESENT Public Health Advisor Centers for Disease Control and Prevention National Center for STLT Public Health Infrastructure and Workforce, Atlanta, Georgia -Principal advisor of multi-functional program activities including complex public health programs -Management of multiple programs and projects for the Program Integrity Unit -Develop, implement, and monitor performance of internal tracking systems -Provide administrative and technical advice and support for domestic programs</p>
<p>Tennessee State University Nashville, TN Master of Public Health (Behavioral Science & Health Education) December 2013</p>	<p>APRIL 2021 – APRIL 2023 Program Deputy, Data, Analytics, & Visualization Task Force Centers for Disease Control and Prevention Center for Surveillance, Epidemiology, and Laboratory Services, Office of the Director, Atlanta, Georgia -Serve as the Program Deputy of the Data, Analytics, & Visualization Task Force (TF) -Provide executive-level management, programmatic, & operational leadership & guidance for multiple TF Leads</p>
<p>Key Skills</p>	

Data Collection & Analysis
Program Management
Health Equity
Budget Management
Strategic Planning &
Partnering

- Principal advisor of multi-functional program activities involving broad & complex range of scientific public health programs & activities in the Coronavirus Response; deployer of COVID-19 National Response located in the CDC Emergency Operations Center
- Monitor & approve TF spend plan & resource allocations, regularly brief Senior Leadership on Response activities
- Provide direction to case surveillance, modeling, laboratory, emergency department, & analytic sections
- Facilitate collaboration between programs & CIOs across the Agency
- Work with TF communications & scientific staff to review messages that are presented publicly; FOIA related inquiries
- Track & review congressional & legislative actions that may impact TF activities
- Oversee all recruitment efforts; meet with staffing & planning regularly to align needs & budget
- Provide coordination of overall administrative & program activities to ensure successful program execution for 8 TF Sections & TF OD
- Serve as liaison & respond to inquiries from staff, partners/collaborators, & the general public
- Function as technical monitor & liaison between the COR, CO, OAS, & program for a \$15M staffing contract with Booz Allen Hamilton for 60+ data analyst
- Manage 10+ staff ranging from different GS series & grade levels as a member of the Leadership Team
- Participate in numerous routine & ad hoc weekly meetings with internal & external partners, including IM Leadership
- Plan, organize, & prioritize work to accommodate changing demands & timelines, promoting teamwork, flexibility, & collaboration amongst staff
- Provide leadership & guidance to coordinate all day-to-day financial & administrative activities

- Monitor & approve TF spend plan & resource allocations including a budget of over \$100M; regularly briefing Senior Leadership on activities
- Direct, triage, & process budget requests through the Emergency Resource Request Tool for COVID funding
- Work closely with CSELS OD staff to provide input & feedback into a variety of public health program activities

MARCH 2021 – APRIL 2021

Project Director, Population Health Team | National Academy for State Health Policy, Washington, D.C.

- Lead & manage initiatives across a range of topics including health & housing, immunization rates among vulnerable populations, & hospital community benefit designed to support states in integrating public health, social services, & comprehensive health system transformation; health equity & Medicaid delivery systems
- Oversee multiple projects & across project staff funded through multi-million-dollar grants by Center for Disease Control and Prevention, Robert Wood Johnson Foundation, & Health Resources & Services Administration
- Work independently & as a part of a team to design & conduct policy studies & analyses, which include literature reviews, surveys, key informant interviews, case studies, & focus groups
- Build & maintain strong working relationships with state policy makers, program administrations, subject matter experts, federal agencies, national policy organizations, & other key stakeholders
- Present reports & updates in weekly meetings; serve as mentor to junior staff facilitating professional development

NOVEMBER 2020 – APRIL 2021

Senior Health Equity Program Manager (Contract) | Louisiana Department of Health |

Office of Community Partnerships & Health
Equity, New Orleans, Louisiana

- Lead development, implementation, & monitoring of health equity programs & initiatives
- Management of programmatic components & staff; lead program offices' equity partnerships, including securing diverse partners; tracking progress on all programmatic deliverables
- Serve as healthy equity expert across the department, serving as a resource on updated research or emerging issues which impact health equity; provide content expertise for funding proposals
- Support equity-informed data & evaluation projects, build trainings, toolkits, & plans; integrate health equity principles within staff initiatives & resources
- Conduct design & implementation of immunization program activities, webinars series, & campaigns for COVID-19 pandemic & vaccination initiatives

SEPTEMBER 2019 – SEPTEMBER 2020

Program Manager | Louisiana State University
Health Sciences Center | Louisiana Cancer
Prevention & Control Programs, Colorectal Health
Project, New Orleans, Louisiana

- Successfully co-wrote Center for Disease Control and Prevention federal grant & secured funding for 5 year cycle to increase Colorectal Cancer screenings using public health & health systems partnerships in clinical settings
- Accountable for planning, development, & management of all aspects of a quality improvement program from inception to implementation, using evidence-based interventions to increase colorectal cancer screenings
- Work collaboratively with partners, such as the American Cancer Society & Public Health Institute, to develop processes, resources, policies, & protocols for successful implementation & seamless co-management of shared staff

-Oversight and development of program resources, including clinical assessments, health system implementation plans, collaborative action plans, tracking tools, & reporting tools for continuity of purpose

-Work directly with health systems to guide clinical leadership to set goals & develop cross-functional teams to focus on the process of quality improvement to increase cancer-screening rates. Additional advantages include increased sustainability, replication, & evaluation of projects & interventions across cancers & throughout clinical systems

-Surveillance & monitoring of clinic progress, evaluation of program, & dissemination of evaluation results

-Develop & manage program timelines to ensure timely completion of program deliverables to ensure quality

& accuracy of outcomes for contractual, grant, & legislative commitments

-Responsible for hiring, training, mentoring, & supervising staff

-Work with the business office to establish & oversee contracts, manage agreements, & monitor spending in accordance with both state & federal guidelines & regulations

-Collaborate with internal leadership team to re-direct interdepartmental processes to improve program delivery across all programs including a more functional communication plan & policies

AUGUST 2016 – AUGUST 2019

Senior Community Relations Specialist |

WellCare Health Plans, Omaha, Nebraska

-Supervise, train, & coach team of Specialists; Provide guidance & support in meeting metrics & annual goals

-Network & manage partnerships to market Medicaid products to all interested eligible candidates through researching, organizing, & developing community events & health promotion & education programs

-Conduct ongoing performance tracking & success metrics for State & Leadership team; Ad-Hoc

reports; Prepare strategic trend reports to measure Key Performance Indicators increasing leadership focus on KPIs

-Create, implement, & facilitate Health Education Series for staff & community partners across the state providing Continuing Education Units for those eligible; Provide workshops pertaining to cultural competence & health equity

-Serve as a subject matter expert providing knowledge regarding past & present Public Health trends

AUGUST 2014 – AUGUST 2016

Community Outreach Oversight Coordinator |

WellCare Health Plans, Louisville, Kentucky

-Develop connections with community organizations, local churches, & associations through comprehensive initiatives designed to integrate & market WellCare Medicaid & Medicare products throughout the community

-Solicit & manage \$500 to \$20,000 sponsorships for state-wide partnerships that support programs, events, & projects to benefit Medicaid & Medicare beneficiaries; Travel to secure & cultivate collaborations; Follow up & evaluation

-Manage budget, purchase supplies/services, ensure sponsorships are processed & disbursed

-Coordinate with Community Relations, Community Advocacy, Interdisciplinary Care Team, & Marketing to strategize activities/events for particular geographic areas in underserved communities

-Research, develop, coordinate, & present curriculum for Outreach Programs to educate high risk populations

-Collect, analyze, & report data to monitor the implementation & success of community outreach

-Analyze & observe policy/contract duties & reporting through Regulatory Affairs

Certification

Six Sigma Lean Black Belt in Healthcare (LBBH)