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# The Relationship Between Social Determinants and Primary Care Utilization Among Medicaid Recipients in a Managed Care Community Health Worker Program

Rachel Elaine Rosensteel  
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# Walden University

College of Health Sciences and Public Policy

This is to certify that the doctoral dissertation by

Rachel E. Rosensteel

has been found to be complete and satisfactory in all respects,  
and that any and all revisions required by  
the review committee have been made.

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Walden University  
2026

Abstract

The Relationship Between Social Determinants and Primary Care Utilization Among

Medicaid Recipients in a Managed Care Community Health Worker Program

by

Rachel E. Rosensteel

MA, Benedictine University, 2020

BA, University of Nevada, Las Vegas, 2012

Final Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

Walden University

February 2026

## Abstract

Community health worker (CHW) programs are an increasingly important strategy for addressing social determinants of health (SDOH) within Medicaid systems. However, evidence on how specific SDOH impact healthcare utilization remains limited. In this quantitative, correlational study, the relationship between SDOH factors like housing instability, food insecurity, and transportation barriers, and primary care utilization among adult Medicaid recipients aged 18–65 who participated in a Medicaid managed care organization’s CHW program in Clark County, Nevada, during 2023 were examined. Retrospective administrative data from 441 participants were analyzed using negative binomial regression to assess associations between SDOH factors and postintervention primary care visits while controlling for baseline utilization and age, and a sign test to examine changes in utilization across pre- and postenrollment periods. Results showed the overall regression model significantly predicted postintervention primary care utilization (likelihood ratio  $\chi^2(5) = 92.47, p < 0.001$ ). Transportation barriers were the only SDOH factor independently associated with higher postintervention utilization. Participants receiving transportation-related CHW support demonstrated a 34.0% higher expected rate of primary care visits. Food insecurity and housing instability were not statistically significant predictors in the fully adjusted model. The sign test indicated a statistically significant directional increase in primary care utilization following enrollment ( $z = 4.52, p < 0.001$ ). These findings highlight the value of transportation-focused CHW interventions and inform efforts to advance health equity.

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## Dedication

This dissertation is dedicated to my children, Noelle and Mark. You are my greatest gifts, my deepest purpose, and my constant inspiration. You are the reason I continue to dream, grow, and strive for more. May this work motivate you both to pursue your dreams, create positive social change, and carry forward a legacy rooted in compassion, equity, and service to others. Through dedication, perseverance, faith, and compassion, any obstacle can be overcome. Thank you for your unconditional love. To my daughter, Noelle, your intelligence, kindness, and deep sense of care for others continually renew my faith in what is possible. Through this journey, you have been my steady source of inspiration. Your patience, understanding, and support did not go unnoticed, and your encouragement helped me through the most difficult days. I am grateful for the sacrifices you made so that I could pursue my dreams. I have no doubt that you will change the world through your compassion, strength, and brilliance. You inspire me to be the best version of myself, and I hope my accomplishments encourage you to confidently chase your own dreams. Thank you for being my cheerleader, my motivation, and my best friend. To my son, Mark, who was born during this journey, you forever changed my definition of purpose. Writing this work while pregnant and then caring for a newborn required strength I had forgotten I possessed, and your presence became a constant reminder of why continuing forward mattered. Your bright smile and natural ability to bring joy to those around you gave new meaning to long nights, renewed hope to difficult days, and profound purpose to this achievement

I love you both more than words can express. This work is for you.

## Acknowledgments

This dissertation is much more than academic achievement. It reflects years of perseverance, growth, sacrifice, and support from all those who walked this journey with me. This work belongs to all of us.

I extend my deepest gratitude to my dissertation chair and committee members, Dr. Joseph Robare and Dr. Magdeline Aagard, whose mentorship, encouragement, and guidance were foundational to this work. Their belief in my abilities, steady support, invaluable feedback, and commitment to my success motivated me and strengthened my confidence as a scholar.

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I acknowledge my own resilience, perseverance, and courage in continuing my education through adversity. Even when the path was steep, the nights were long, and the dream seemed distant, I persevered. This degree represents commitment, growth, and the belief that no barrier is stronger than determination. Above all, I honor the resilience of the individuals and communities who inspired this research and hope it contributes to more equitable and compassionate systems of care.

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## Chapter 1: Introduction to the Study

### **Introduction**

In recent years, there have been advancements made to the United States health care system that were meant to improve the overall health and well-being of Americans by addressing clinical needs as well as social needs. The Affordable Care Act (ACA) of 2010 allowed for the expansion of health insurance coverage to the uninsured and under-insured (Santoro, 2025). This health care reform focused on making health care coverage more affordable for those living above the poverty line and provided Medicaid coverage to all adults who lived below 138.0% of the federal poverty line (Department of Health and Human Services [DHHS], 2022). In addition, the ACA ensured innovative and groundbreaking methods of care delivery that were meant to lower the costs of healthcare in the United States (DHHS, 2022).

While managed care organizations (MCOs) have existed since the early 1900s, the capabilities of MCO's have expanded significantly since that time. An MCO is an organization, health care company, or health plan that works towards reducing costs within the healthcare system (Kaiser Family Foundation, 2023). With the initiation of the ACA, MCOs became accountable for the members that belonged to their plans as well as for the services that they have access to. With the expansion of managed care came increases in the overall utilization of preventative care services in the United States (Namburi & Tadi, 2023). Other clinical impacts of the expansion of managed care included reductions in healthcare utilization costs, fewer hospital admissions, and reduced mortality rates (Namburi & Tadi, 2023). A basic concept of managed care

includes monitoring and controlling medical services through an interdisciplinary team approach. This team approach is used to evaluate, plan, coordinate, and assess care options for MCO members through a care management design (Namburi & Tadi, 2023). Care management teams within an MCO provide an array of services that focus on improving member health outcomes and reducing over utilization of healthcare services and controlling costs (Santoro, 2025). Care management programs within an MCO are staffed with both clinical and non-clinical professionals (Namburi & Tadi, 2023). One of the roles within the care management team is community health workers (CHWs). CHWs play an essential part of the multidisciplinary care team within some MCOs.

CHWs are frontline public health workers who are trusted members of the communities they serve (American Public Health Association, n.d.). CHWs work with at-risk individuals to improve access to care in a culturally relevant manner while also teaching others how to navigate through the health and social care systems. The work of a CHW is essential in serving at-risk and in-need populations as they focus on addressing social determinants of health (SDOH) and the causes of adverse health conditions and outcomes. They can improve outcomes, reduce disparities, and reduce health care costs (CHW Central, 2021a). Historically, CHWs have been embedded into community-based non-profit organizations. In recent years, the CHW role has expanded significantly in the healthcare industry, especially within MCO's. The role has gained popularity as the CHW model has been shown to improve public health while revealing a high return on investment (Association of State and Territorial Health Officials [ASTHO], 2022). Because CHWs are trusted individuals that are embedded in the communities they serve,

they have a unique ability to connect with and support the most vulnerable and at-risk individuals in our communities. CHWs are specially equipped to address the needs of individuals and families who live below the poverty line and experience negative social circumstances which contribute to poor health outcomes. While these vulnerable and at-risk individuals are living below the poverty line, they can qualify for Medicaid and receive CHW services and other care management supports and services through their MCO.

In this study, I examined associations between SDOH indicators and primary care utilization among Medicaid recipients who participated in a CHW program through their MCO. SDOH factors such as housing, transportation, and food insecurity directly impact health outcomes. SDOH are nonclinical factors that contribute to health status. SDOH are the conditions in which people live (CDC, n.d. b). There are many components of SDOH which include education access, health care quality, neighborhood and built environment, social and community context, and economic stability (Office of Disease Prevention and Health Promotion [ODPHP], n.d.-d). Figure 1 illustrates the domains of SDOH.

**Figure 1***SDOH Graphic*

*Note.* From, “Social Determinants of Health- Healthy People 2030” by Office of Disease Prevention and Health Promotion (ODPHP), no date.

<https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health>

Housing instability, food insecurity, and access to transportation are social factors that are included in the economic stability domain of SDOH. When people struggle with meeting their basic needs, health care can become secondary to meeting those needs (Jih et al., 2023). If a person does not know where they will sleep at night, how they will get to work tomorrow, or how they will feed their family, those factors likely become priority over going to a doctor, obtaining medications, or addressing their medical or behavioral health needs (Ferrer et al., 2022). CHWs play an essential role in addressing these needs while also improving access to health care services like seeing a primary care provider (PCP; Ruiz Escobar et al., 2021).

Research has been done on CHWs in various settings with focuses on different types of health care engagements. While studies have been done on CHWs, there is a lack of information available regarding CHWs in an MCO setting and the impact they have on PCP utilization. I sought to investigate how CHWs employed by an MCO impact PCP utilization by addressing conditions of economic stability. Specifically, CHW supports around transportation, food access, and housing were examined to assess their association with adult Medicaid recipients' primary care utilization. The target population for the study were 18–65-year-olds who received Medicaid benefits through ABC Health Insurance which is a pseudonym that is used throughout this study to protect the privacy and confidentiality of the partner organization. The target population were members of ABC Health Insurance who resided in Clark County, Nevada and were enrolled in the organization's CHW program in 2023. This study needed to be conducted to better understand the impact of CHWs in an MCO setting while examining the relationship between SDOH and primary care utilization.

According to County Health Rankings (2024), Clark County, Nevada has significantly worse health outcomes compared to other counties in Nevada and when compared to the United States as a whole. Clark County, Nevada has poorer health behaviors, clinical care, social and economic conditions, and fewer health care providers when compared to the rest of Nevada and the United States (Office of Statewide Initiatives, University of Nevada, Reno School of Medicine, 2023). Gaining insight into how SDOH needs and CHW supports are correlated with primary care utilization among Medicaid recipients in Clark County, Nevada can drive meaningful social change by

reducing barriers to care and promoting health equity within underserved communities. By highlighting the importance of CHWs in different settings and understanding which types of interventions can directly impact health outcomes, advancements and enhancements can be made to CHW programs. Potential advancements of CHW programs within health care organizations can lead to increased reach for those who are in need and improved outcomes among a larger population. Ultimately, this research can help to improve the health of Nevadans and Medicaid recipients across the country.

Throughout the following chapters, a thorough overview is provided to clarify the intent of the study along with how the research was conducted. The background of the study is presented, which includes summaries of applicable research literature, the gap in the existing research, and why the research was needed. This approach aligned with best practices in public health research, where contextualizing the study within existing literature helped clarify the relevance of the study (Stratton, 2021). Next, the research problem details evidence of the existing and relevant social problem and discusses previous research completed. The purpose of the study reveals the study intent along with the variables that were included. The research questions and hypotheses are shared, along with how the study was measured. The conceptual framework discusses the specific theory that relates to the study approach and research questions. The nature of the study reveals a rationale for the study design and the methodology that was used. A review of definitions, assumptions, scope and delimitations, limitations, and study significance is also included in the following chapters. These elements are clearly defined to enhance

transparency and rigor in the doctoral research process (Coker, 2022; Theofanidis & Fountouki, 2018).

### **Background**

The existing literature highlights the critical role of CHW interventions in addressing SDOH and how crucial addressing SDOH is to improving health outcomes. Kolak et al. (2020) conducted a national analysis to quantify neighborhood social determinants and examined their association with premature mortality in Chicago. The study found that multiple SDOH factors had a direct impact on early mortality, which highlighted the need for interventions that addressed multiple social determinants rather than singular factors. This research supports the importance of targeting SDOH to improve life expectancy and advance health outcomes.

Research continues to demonstrate the value of CHW supports in increasing access to care and improving healthcare utilization among Medicaid recipients. Gordon et al. (2023) analyzed a CHW program led by an MCO and found that engagement in outpatient services increased, but inpatient utilization was not significantly impacted. The findings highlighted the potential of MCOs to address social needs but also emphasized the challenges in reducing costs through these types of programs.

Other studies evaluated CHW programs aimed at specific populations or conditions. Blecker et al. (2020) assessed a virtual mentoring program for Medicaid patients with diabetes, which included CHWs and offered provider education remotely. The intervention improved outpatient engagement and quality metrics but did not reduce emergency department visits, hospitalizations, or healthcare costs. Ferrer et al. (2022)

demonstrated that CHW support for diabetes self-management led to improved A1C levels and disease stabilization among patients with uncontrolled diabetes. These studies highlighted that while CHWs improved care engagement and clinical outcomes, their impact on cost and utilization varied depending on program design and the unique circumstances of the individuals they worked with.

Several studies focused on embedding CHWs into clinical workflows to improve referral response times and enhance connections to care. Sanderson et al. (2021) implemented a quality improvement initiative to increase warm handoffs to CHWs in a pediatric clinic, which resulted in an increase in referrals and improved integration of social needs screening into the care setting. Stiles et al. (2020) described a Medicaid-focused initiative that embedded CHWs into pediatric primary and specialty care clinics. This initiative led to improved clinical and social outcomes for medically and socially complex children. Wennerstrom et al. (2023) examined the national landscape of CHWs in Medicaid MCOs and revealed that their roles primarily focused on clinical care support rather than addressing broader determinants at the community level. This study revealed a need for more defined roles and career pathways for CHWs.

The literature supported the integration of CHWs and SDOH interventions as effective strategies to improve access to care, coordination of care, and health outcomes among Medicaid recipients. With the integration of CHW services, the evidence consistently showed increased outpatient engagement and improved quality of care, but the findings on cost reduction and healthcare utilization were mixed. Based on the available research, there was a need for further analysis and evaluation of CHW programs

and the impact that CHWs could have on clinical outcomes by addressing SDOH in a managed care setting.

While research continuously showed that CHWs were essential in improving health outcomes for Medicaid recipients, there remained a gap in the research that specifically examined how CHWs embedded within a Medicaid MCO could impact primary care utilization by addressing SDOH needs of adult Medicaid recipients. Many studies showed the effectiveness of CHWs in community and clinical settings, but research was lacking around the unique challenges and opportunities that existed when CHWs were integrated within an MCO structure. Most existing research focused on general outcomes like reductions in emergency department utilization or improved self-management of chronic diseases, but there was limited emphasis on how CHWs directly addressed SDOH to facilitate access to ongoing primary care.

Literature lacked information on the integration of CHWs within a Medicaid managed care setting and how CHWs addressed social needs that were barriers to primary care utilization. There was also a lack of evidence to show the long-term effect of CHW interventions addressing social determinants in managed care. Few studies investigated how MCOs could impact utilization in primary and preventative care services and patient behaviors related to their health by leveraging CHWs. This gap in the research limits the ability of state and federal Medicaid agencies, as well as health plans, to develop evidence-based strategies for effectively integrating CHWs into managed care models to address SDOH, improve patient outcomes, and enhance the overall healthcare experience. Additional research is needed to understand best practices and the potential

impact of CHW programs within the managed care setting and how addressing social determinants could be associated with consistent care utilization.

A study was needed to examine how CHWs integrated within MCOs address SDOH while also improving access to care and enhancing primary care utilization. More insight was needed to understand how CHWs help Medicaid members overcome barriers to care like housing instability, transportation issues, and food insecurity. There was also a lack of guidance on how to effectively embed CHWs into Medicaid MCOs, and this type of study could help demonstrate opportunities for MCOs to integrate CHWs into their care management models. Utilization in primary care can reduce ER visits and inpatient admissions, and CHWs are essential in making that happen by addressing SDOH. This kind of research can offer data-driven recommendations for program enhancements, support health equity, and inform strategies to improve long-term health outcomes. This study can help strengthen the case for CHWs to contribute to the care delivery system within MCOs.

### **Problem Statement**

In this quantitative correlational study, I aimed to address how SDOH such as housing instability, lack of transportation, and food insecurity impacted primary care utilization among adult Medicaid recipients who were enrolled in an MCO CHW program in Clark County, Nevada in 2023. Although awareness of the impact of SDOH on overall well-being has grown, further research is needed to understand how these specific factors influence Medicaid recipients' engagement in primary care within a managed care framework. This gap in literature makes it difficult to design and

implement evidence-based practices to connect high-risk and high-need individuals to the care and services they need to live healthier lives.

There was consensus in the literature that addressing SDOH such as housing instability, transportation barriers, and food insecurity was a current and significant public health issue, especially for Medicaid populations. Kolak et al. (2020) demonstrated that multiple SDOH were associated with poorer health outcomes and premature mortality, which highlighted the need to address these factors to improve population health. Many studies emphasized the importance of integrating CHWs into Medicaid managed care and clinical settings. This integration is essential to remove barriers and connect individuals to primary care and social services (Coker et al., 2023; Goitom et al., 2021; Gordon et al., 2023).

Goitom et al. (2021) showed that primary care utilization and reductions in inpatient admissions were directly impacted through engagement with Medicaid recipients and CHWs in transitions of care. Coker et al. (2023) found that embedding CHWs in pediatric primary care settings improved engagement in preventative care services among pediatric Medicaid recipients. These findings support the need for CHWs who play a crucial role in addressing SDOH and improving health outcomes. Although the evidence to support the role of CHWs continues to grow, it remains unclear how certain social determinants related to primary care utilization and how CHWs specifically in the managed care setting are associated with primary care utilization by addressing social determinants. Additional research is needed to inform public health interventions and to promote positive social change at the community level.

## **Purpose of the Study**

The purpose of this quantitative, correlational study was to examine the relationship between SDOH, including housing instability, transportation access, and food insecurity, and primary care utilization among adult Medicaid recipients aged 18–65 in Clark County, Nevada. I focused on adults who participated in a CHW program through their Medicaid MCO during the year 2023. I used retrospective administrative data (CHW case notes, SDOH screenings, and Medicaid claims) to test whether primary care visit counts in 2023 were associated with documented SDOH needs and receipt of CHW interventions addressing those needs. The design did not test causality but instead estimated the direction and strength of associations while adjusting for covariates.

## **Research Questions and Hypotheses**

RQ1: What is the relationship between social determinants of health (housing, transportation, and food) and primary care utilization among adult Medicaid recipients ages 18-65 who participated in a Medicaid managed care organization's community health worker program in Clark County, Nevada in 2023?

*H*<sub>0</sub>1: There is no relationship between social determinants of health (housing, transportation, and food) and primary care utilization among adult Medicaid recipients ages 18-65 who participated in a Medicaid managed care organization's community health worker program in Clark County, Nevada in 2023.

*H*<sub>1</sub>1: There is a relationship between social determinants of health (housing, transportation, and food) and primary care utilization among adult Medicaid

recipients ages 18-65 who participated in a Medicaid managed care organization's community health worker program in Clark County, Nevada in 2023.

RQ2: How do social determinants of health interventions aimed at addressing housing instability, transportation assistance, and food insecurity by a Medicaid managed care organization's community health worker program impact primary care utilization among adult Medicaid recipients ages 18-65 in Clark County, Nevada in 2023?

*H<sub>0</sub>2*: There is no significant impact of social determinants of health interventions aimed at addressing housing instability, transportation assistance, and food insecurity by a Medicaid managed care organization's community health worker program impact primary care utilization among adult Medicaid recipients ages 18-65 in Clark County, Nevada in 2023.

*H<sub>1</sub>2*: There is a significant impact of social determinants of health interventions aimed at addressing housing instability, transportation assistance, and food insecurity by a Medicaid managed care organization's community health worker program impact primary care utilization among adult Medicaid recipients ages 18-65 in Clark County, Nevada in 2023.

### **Conceptual Framework for the Study**

This study was guided by the commission on social determinants of health (CSDH) conceptual framework. This framework was developed by the World Health Organization (WHO; Solar & Irwin, 2010). The CSDH framework offers a holistic approach to understanding how health outcomes are shaped by the distribution of resources and opportunities, which are influenced by social, economic, and political

conditions. This framework emphasizes the differences between structural and intermediary determinants of health (Solar & Irwin, 2010).

The structural determinants include socioeconomic factors and political influences. Political and socioeconomic factors can directly influence a person's ability to access resources (Gomez et al., 2021). The structural determinants are factors that contribute to the conditions in which people live, such as housing status, food insecurity, and access to transportation (Solar & Irwin, 2010). The intermediary determinants are any material conditions or living conditions that directly impact health outcomes. Examples of intermediary determinants include access to shelter, healthy food, and reliable transportation (Solar & Irwin, 2010). The intermediary determinants also include psychological factors, health beliefs, and access to health-related services (Solar & Irwin, 2010).

In this study, housing instability, food insecurity, and transportation access were all classified as intermediary determinants that directly impacted access to healthcare and utilization patterns in care. Medicaid MCOs and CHW programs were included in the structural determinants as they influence how various policies and organizational resources are used to support the needs of Medicaid recipients (Gomez et al., 2021). CHWs work to connect individuals to resources and services that help improve engagement in healthcare. CHWs work at the intermediary level to mitigate barriers to care by assisting with healthcare navigation and addressing SDOH (Heller, 2024).

The CSDH framework supported this study in identifying how structural determinants like Medicaid managed care systems influenced the impact of SDOH. The

interventions used to address the intermediary determinants such as housing, food, and transportation could improve health behaviors and primary care utilization (Heller, 2024). This conceptual framework supported the hypotheses that SDOH barriers were linked to lower utilization of primary care services and that CHW interventions to address social needs could positively improve primary care utilization among Medicaid recipients (Wennerstrom et al., 2023).

The CSDH framework built a foundation for this study that highlighted how organizational structures and social conditions intersected to influence health behaviors and healthcare utilization patterns. CHW interventions were organizational factors that contributed to how individuals interacted with the healthcare system. The CSDH conceptual framework emphasizes the impact of addressing SDOH and the importance of integrating CHWs into Medicaid managed care models to drive improvements in health outcomes.

### **Nature of the Study**

I used a quantitative, retrospective correlational design with secondary data from the year 2023 to examine the association between SDOH indicators such as housing instability, food insecurity, and transportation barriers, CHW supports targeting those needs, and primary care utilization among adult Medicaid recipients aged 18 to 65 in Clark County, Nevada. The target population included adult Medicaid recipients who were enrolled in ABC Health Insurance's CHW program in 2023. The purpose of this study was to examine whether utilization in primary care services changed after

individuals received support from a CHW to address their social needs within a Medicaid managed care setting.

I examined a single group of participants at two different points in time. The participant group was observed 12 months prior to receiving CHW supports and then re-examined 12 months after receiving assistance from a CHW. Data was collected retrospectively using administrative records, CHW care management documentation, and Medicaid claims data. Primary care utilization was operationalized as the count of distinct PCP encounters in the 12 months prior to enrollment in the program and then in the 12 months after program enrollment. The SDOH indicators were coded dichotomously from CHW documentation and SDOH screening tools. CHW supports were identified as documented CHW actions that addressed housing, food, or transportation needs in 2023. The design was appropriate for estimating the strength and direction of relationships in real-world program data when manipulation and randomization were not feasible. This study did not involve random assignment or manipulation of variables and therefore used a correlational design to examine naturally occurring relationships between SDOH factors, CHW interventions, and primary care utilization.

Descriptive statistics were used to summarize demographic and clinical characteristics of the sample. A Poisson regression model was initially considered to evaluate the first research question, which aimed to determine whether there was a statistically significant relationship between SDOH factors (housing, transportation, and food) and primary care utilization. Due to violation of assumptions, a negative binomial

regression model was used as an alternative to evaluate the first research question. Next, a paired  $t$  test was first considered to analyze the second research question, which aimed to determine whether there was a statistically significant relationship between the CHW intervention to address SDOH needs and primary care utilization. Due to nonnormality of the data, a nonparametric alternative was selected to compare utilization before and after participation in the CHW program. The nonparametric test did not examine causality but instead explored associations that occurred to inform future research. The independent variables were the SDOH factors, which included housing instability, transportation barriers, and food insecurity. The CHW intervention itself was also an independent variable. The dependent variable was postprimary care utilization. Covariates included age and the number of primary care visits prior to the CHW intervention or baseline primary care utilization. These tests established whether there was a statistically significant difference in primary care utilization when correlating the primary care visits before and after the CHW program. The analysis helped determine whether a CHW program within a Medicaid MCO that addressed health-related social needs led to increased utilization of primary and preventive healthcare services. Research has shown that CHWs embedded in primary care settings enhance healthcare utilization outcomes by improving social risk screening, referrals, and follow-ups (Larson et al., 2024).

This design supported my aim to better understand the impact of CHW programs within the Medicaid managed care setting. This information can help inform CHW models in the MCO setting and increase awareness around the value of addressing health-related social needs to improve health outcomes. CHWs integrated into Medicaid MCOs

have shown success in bridging gaps between members and healthcare systems, which leads to improved care coordination and access to care (Austin & Qu, 2024). Findings from this study can be used to inform CHW program development, CHW program integration into MCO settings, policy development, and can be leveraged to create healthier communities. Studies across the United States have shown that CHWs in the managed care setting are being leveraged to address SDOH needs of members, which improves outcomes and reduces costs (Wennerstrom et al., 2023).

### **Definitions**

*Access to Care:* A factor influencing whether people can obtain appropriate health services in a timely manner (Centers for Disease Control and Prevention [CDC], n.d.-a).

*Adverse Health Conditions/Outcomes:* Negative health effects or outcomes that result from disease, treatment, or other risk exposures, which may include structural or functional abnormalities, reduced quality of life, disability, or premature death (Sherwin, 1983).

*Age:* Age is often reported as age at last birthday (that is, age in completed years), often calculated by subtracting a person's date of birth from the reference date (CDC, 2025).

*CHW:* A frontline public health worker who is a trusted member of and/or has an unusually close understanding of the community served. This trusting relationship enables the worker to serve as a liaison/link/intermediary between health/social services and the community (American Public Health Association, n.d.).

*CHW Support:* Support provided by frontline public health workers (CHWs) who live in or are trusted by the community, working to connect individuals to health and social services, assist with barriers (such as housing, food, transportation), provide health education, and enhance access and care coordination (State of Missouri Department of Health & Senior Services, n.d.).

*Economic Stability:* Economic stability refers to a person's ability to earn a steady income that allows them to meet their health needs and encompasses factors such as employment, income, and the ability to afford essentials like food, housing, and healthcare (ODPHP, n.d.-a).

*Food Insecurity:* Household-level economic and social condition of limited or uncertain access to adequate food (ODPHP, n.d.-b).

*Health Care Utilization:* Health care utilization refers to the use or consumption of health care services (such as visits, procedures, medications) by individuals to diagnose, treat, manage, or prevent health conditions (Andersen, 2020).

*Health Equity:* Health equity is the state in which everyone has a fair and just opportunity to attain their highest level of health (CDC, 2024).

*Health Related Social Needs:* Health-related social needs (HRSN) are social and economic needs that individuals experience that affect their ability to maintain their health and well-being (Centers for Medicare & Medicaid Services, 2022).

*Housing Instability:* Housing instability encompasses a number of challenges, such as having trouble paying rent, overcrowding, moving frequently, or spending the bulk of household income on housing (ODPHP, n.d.-c).

*MCO:* An MCO is a health care company or a health plan that is focused on managed care as a model to limit costs, while keeping quality of care high (Cigna Healthcare, 2025).

*Outpatient Services:* Outpatient services are medical procedures or tests that can be done in a medical center without an overnight stay (PeaceHealth, 2025).

*Preventative Care Services:* Preventive and routine care is care that helps prevent health problems or finds them before they become serious (California Department of Managed Health Care, n.d.).

*Primary Care Utilization:* The extent to which individuals make use of primary care services or visits to primary care providers for preventive care, management of chronic conditions, early detection of disease, and routine follow-up (Hostetter et al., 2020).

*Quality Metrics:* Quality measures are tools that help measure or quantify healthcare processes, outcomes, patient perceptions, and organizational structure and/or systems that are associated with the ability to provide high-quality health care and/or that relate to one or more quality goals for health care (Centers for Medicare & Medicaid Services, 2024).

*SDOH:* The nonmedical factors that influence health outcomes. They are the conditions in which people are born, grow, live, work, and age. These conditions include a wide set of forces and systems that shape daily life such as economic policies and systems, development agendas, social norms, social policies, and political systems (CDC, n.d.-b).

*Social Risks:* Social risk factors are non-clinical factors that profoundly impact health risks and outcomes, and ability to act on care recommendations, such as housing and food insecurity (SIREN Network, UC San Francisco, 2021).

*Transportation Barriers:* Transportation barriers refer to obstacles that prevent individuals from getting to health-care services; these may include lack of vehicle access, inadequate or unreliable public transit, long travel distances or times, high cost of transportation, and poor transportation infrastructure. These barriers often lead to missed or delayed appointments, reduced medication adherence, and worse health outcomes (Syed et al., 2013).

*Transitions of Care:* Transitions of care refer to the movement patients make between health care practitioners and settings as their condition and care needs change during the course of a chronic or acute illness (National Transitions of Care Coalition, n.d.).

### **Assumptions**

Assumptions are accepted to be true without direct evidence proving that they are (DePaul University, n.d.). In this study there were several assumptions that the research was built upon. In this quantitative, retrospective correlational study using secondary data, several key assumptions were necessary to ensure validity and credibility of the findings. The assumptions directly supported the feasibility of using retrospective data to measure changes in primary care utilization following a CHW intervention that addressed SDOH. The research problem was based upon the assumptions which were critical to the

integrity of the research design. The following assumptions were accepted as true and supported the foundation of the study.

The first assumption was that the data that was extracted from the CHW case notes, SDOH screening tools, and Medicaid claims data were all accurate, complete, and correctly documented consistently for all participants. This assumption relied on CHWs appropriately and consistently recording social needs and intervention activities, as well as primary care utilization being correctly captured in Medicaid claims data. This assumption was crucial because the validity of the statistical analyses depended on the reliability of the secondary data sources used in the study. In managed care settings, there may be variation in documentation practices but for the purposes of this research, it was assumed that documentation was sufficiently standardized and reflective of actual identified needs, services rendered, and outcomes. Existing literature supports the need for standardized data collection and documentation practices within CHW programs (CHW Central, 2021b).

My next assumption was that the participants who were documented as receiving a CHW intervention received adequate and meaningful support and services by the CHW to specifically address their identified social need (housing, transportation, and food). This is important because I examined whether CHW support had resulted in measurable changes in their primary care utilization. This assumption is relevant because I did not take into consideration any measurements of the quality of the intervention, the reliability of the intervention, or satisfaction of the participant with the intervention. I considered whether there was a presence of or an absence of a documented intervention to address

the identified social need. This aligns with the correlational approach which lacks randomization and instead relies on naturally occurring events (Crane et al., 2020). A review of the literature found that CHW interventions that addressed both social needs and chronic conditions led to improved health outcomes and increased access to care (Berini et al., 2022).

The third assumption was that the social needs addressed by the CHW directly impacted the participants' primary care utilization behaviors. The assumption that behavior is associated with SDOH aligns with the conceptual framework along with existing literature that highlights how unaddressed social needs impact healthcare access and health outcomes (Whitman et al., 2022). There are numerous factors that influence healthcare utilization like health literacy, cultural beliefs, personal experiences and preferences, and other systemic barriers (Allen-Meares et al., 2020). However, I focused primarily on economic social determinants like housing instability, transportation access, and food insecurity. I assumed that when addressing these social determinants, there was a direct or indirect effect on primary care utilization. The 3-D Commission (2021) highlighted the importance of social determinants in shaping health behaviors and outcomes. The research emphasized the critical role CHWs can play when integrated into health systems.

The fourth assumption was that participants in the CHW program did not receive any other interventions during the sample period that would significantly influence primary care utilization. This would include external social service support, programs, or other care management services from any other entities. To isolate the observed effects of

the CHW intervention, this assumption was essential. While there was no way to confirm that no other external supports or services were provided during the sample period, it was assumed that the primary engagement source of participants was with the CHW within the MCO. Due to the retrospective approach of the study and the complex interplay of social factors, services, and influences that were likely present, there was no way to formally determine what other factors may have impacted behaviors. Schriger et al. (2024), highlighted the challenges of isolating CHW intervention effects in real-world settings. However, the research did show that structured CHW models can still show measurable outcomes when implemented consistently.

All these assumptions were essential in this study as they supported the foundation of the study. These assumptions supported the interpretation of data in a meaningful way while also guiding the methodology. These assumptions also supported alignment between the research questions, conceptual framework, and the data sources used in this study. These assumptions strengthened the foundation of the study and allowed for conclusions to be made about the relationship between social determinants, CHW engagement, and primary care utilization in adult Medicaid recipients in a managed care setting.

### **Scope and Delimitations**

The scope of this study focused on evaluating the relationship between certain SDOH like housing instability, transportation access, and food insecurity and primary care utilization of adult Medicaid recipients who participated in their MCO's CHW program in Clark County, Nevada in 2023. I did not measure change over time but

instead examined associations among SDOH, CHW supports, and primary care visits in the 12 months prior to CHW program enrollment and in the 12 months postCHW program enrollment.

This scope was chosen for several reasons. First, the identified SDOH factors that I focused on, all impact economic stability and research has shown that these SDOH factors and economic barriers are critical in a person's ability to access necessary healthcare services (Banks et al. 2021; Nichols et al., 2024). Next, I focused specifically on a CHW program that is embedded within a Medicaid MCO where most of the available research on CHWs exists within the community or the clinic setting. I addressed the gap in the research of understanding how CHWs can impact outcomes when in the managed care setting (see Austin & Qu, 2024; Wennerstrom et al., 2023). Finally, the correlational design allowed for the analysis of changes in primary care utilization within the same population in a pre- and postintervention period. This design reduced variability that may be present in other scenarios where different groups are being compared. In turn, this design strengthened the internal validity of the study (O'Shea et al., 2024).

I used retrospective secondary data from CHW care management records, SDOH screening tools, and Medicaid claims data. The use of existing administrative data ensured access to a vast, real-world data set. This type of data collection allowed for increased external validity of the study's findings (Emerson et al., 2024). This method also supported the efficiency of the study and ensured continued CHW program operations were able to continue without disruption.

This study had defined boundaries that were set to narrow the study scope and maintain a focused framework (see Emerson et al., 2024). The population included in this study were defined as adult Medicaid recipients aged 18-65 who were actively enrolled in ABC Health Insurance's CHW program in 2023 in Clark County, Nevada. The included population had at least one documented social need (housing instability, transportation barriers, or food insecurity) and received an intervention from the CHW. Excluded populations were non-Medicaid recipients, recipients outside of Clark County, Nevada, those under the age of 18 or over the age of 65, individuals without any documented engagement in the CHW program, and individuals with no identified social needs during the study period. Additionally, any individuals who received CHW services outside of the Medicaid managed care setting were excluded to maintain internal validity and to control for potential differences in service delivery.

I focused on three specific SDOH factors which included housing, transportation, and food insecurity. There are many other SDOH factors outside of the economic domain like education, employment, safety, and social support that can impact healthcare utilization. By narrowing the focus to specific social factors within the economic stability domain of SDOH, a more precise investigation was able to occur. This narrowed focus into housing, transportation, and food provided more concentrated insight into how economic stability impacts healthcare utilization (Banks et al., 2021; Nichols et al., 2024). Additionally, I examined CHW interventions within a Medicaid MCO and this study excluded any CHWs that work outside of this setting such as in a community, hospital, or faith-based setting. The organizational infrastructure of a Medicaid MCO is

significantly different compared to that of other settings. By focusing exclusively on the CHW intervention within an MCO model, the study reduced the risk of external variability (Austin & Qu, 2024).

The study was built upon a conceptual framework using the CSDH model. This framework guided the structure of the study and influenced how findings were interpreted. The CSDH framework can guide actions to address social factors that impact health outcomes (Solar & Irwin, 2010). The CSDH framework supports addressing health inequities through organizational or structural interventions that lead to improved outcomes (WHO, 2017). The framework emphasizes that social conditions are directly related to health outcomes while health status also impacts social capabilities (WHO, 2017). Over the course of life, experiences shape health over time and the CSDH framework allows for identification of the causes of health and social inequities and can lead to the identification of changes that can be made to address the negative impact of structural and intermediary contributors to poor health (Solar & Irwin, 2010).

The data used in this study included eligible participants who were enrolled in ABC Health Insurance's CHW program in the calendar year 2023. Data was included for the 12 months preintervention and 12 months postintervention periods for each participant. Depending on when in 2023, the participant enrolled in the CHW program, PCP utilization data may have been included from the years 2022, 2023, and 2024. This approach enhanced the internal consistency of the study by maintaining a standardized observation period for all participants but excluded any participants that may have been impacted by the CHW program outside of the selected sample year of 2023 (Tavakol &

Dennick, 2011). Internal consistency refers to the degree in which all parts of the study are aligned and are cohesive in a way that ensures the data that is collected accurately reflects what is intended to be measured (Tavakol & Dennick, 2011). Although the study included data from before and after the CHW engagement, it did not aim to measure longitudinal change or establish causality. I sought to understand if CHW support was associated with differences in primary care utilization.

The delimitations related to population, setting, and variables help strengthen internal validity by reducing confounding factors and ensuring that observed differences in primary care utilization were more likely associated with CHW interventions that targeted the specified social need. However, these boundaries restricted the generalizability of the findings.

External validity refers to the extent to which the results from a study can be generalized beyond the specific sample, setting, or time period of the study (Egami & Hartman, 2023). Regarding external validity, the study mostly applies to adult Medicaid populations in urban areas within the Medicaid managed care setting where there is an integrated CHW model. Generalizability is the extent that the results of the study can be applied to other populations, settings, or contexts, outside of the study sample used in this specific study (Porter, 2020). The generalizability to other areas like rural or frontier geographies, non-Medicaid populations, or CHW programs that operate in alternative settings like in a clinic or nonprofit setting may be limited. Because only three SDOH factors were examined in this study, the results are not totally representative of other social factors or influences that may impact healthcare utilization behaviors.

The findings of this study may have implications for other Medicaid managed care organizations throughout the United States. These findings may be particularly relevant to MCO's serving urban residents with similar demographic, socioeconomic, and healthcare access as the participants in this study. The lessons learned from this study can be used to inform best practices for CHW programs in managed care settings. Additional research is needed to understand the relationship between CHW interventions, SDOH needs, and primary care utilization in situations where there are differences in population, organization structure, and health care environments.

### **Limitations**

While every research study has limitations, it is important to acknowledge those limitations. By acknowledging limitations, the study findings can be better understood. The limitations of this study primarily arose from the correlational design, the nature of the use of retrospective data sources, and the complexity of measuring outcomes in real world healthcare settings. I had no control or comparison group which limited the ability to rule out other explanations for observed changes in primary care utilization beyond the CHW intervention. The outcomes of participants may have been influenced by external factors such as Medicaid policy changes, changes in community resources, shifts in community funding, or other healthcare system factors which may limit internal validity (O'Shea et al., 2024).

Given the correlational nature of the study, causal inferences are limited. Because the study was observational rather than experimentally controlled, determining causal inferences by concluding that the intervention directly caused changes in primary care

utilization was not possible (see Olier et al., 2023). External factors such as policy changes, individual-level variation, and naturally occurring changes in health status may influence primary care utilization independently of the CHW intervention. Healthcare utilization can change naturally over time due to many factors like aging, new diagnoses, recovery from illnesses, or social, environmental, political, or economic condition changes. These changes may happen separate from the measured CHW intervention (Thiese, 2021). Willingness to engage and motivation to improve can vary amongst individuals which can result in potential bias to the study findings. I attempted to control the covariates of age, and baseline primary care utilization to mitigate risk of bias. However, despite mitigation efforts, there is a potential for residual confounding (see Greenland & Morgenstern, 2001).

The scope of the study also limited the external validity. The population included in the study was restricted to adult Medicaid recipients ages 18–65 enrolled in a single MCO's CHW program in Clark County, Nevada. The findings may not be generalized to other populations, geographic regions, or CHW programs operating outside of the managed care setting. Although the specificity reduced generalizability, it strengthened program consistency and natural validity. Since I examined a large population of Medicaid recipients with high needs, high vulnerability, and occurred in an authentic environment, the results are more applicable to the real-world setting (see Shin et al., 2021).

Construct validity may also be affected by reliance on secondary data sources, because it is dependent on how well the data and the measures that were used reflect the

underlying theoretical constructs (Xu, 2025). The health-related social needs of participants were identified through CHW documentation, case notes, and SDOH screening tools. These data sources may be subject to human error or inconsistent documentation practices that can lead to underrepresentation of participant needs. Additionally, due to discomfort with disclosing information and mistrust in the healthcare system, some participants may underreport their social circumstances and needs (Nichols et al., 2024). Medicaid claims data was also used in this study and only reflected services that were billed to the MCO by a provider so may undercount primary care utilization if participants accessed care outside of the Medicaid claims system. These data limitations may result in measurement bias. However, multiple data sources were used in the study which strengthens the construct validity (see Austin & Qu, 2024).

Potential biases also must be acknowledged. In this study, selection bias was possible because traits of individuals who engage with CHWs may differ from those who disengage or never participate. Selection bias occurs when individuals who participate in a study differ in systematic ways from the target population or from those who do not participate (Greenland & Morgenstern, 2001). I minimized the risk for selection bias by including all eligible participants who received CHW interventions within the study period. Due to potential variability in CHW documentation practices or incomplete documentation, information bias may be present (see Wennerstrom et al., 2023). Information bias occurs when there are systematic errors in how study information is collected or measured (Althubaiti, 2016). I employed several strategies to address these limitations. I used multiple statistical methods to test the efficiency of the study and

included covariates to control confounders. Multiple data sources were used to improve construct validity while reducing single source bias.

Despite these limitations, acknowledging them strengthens the transparency and credibility of the study. The findings should be considered with discretion recognizing that the findings do provide valuable insights within the context of CHWs addressing SDOH needs of Medicaid recipients to impact primary care utilization.

### **Significance**

This study holds significant value in advancing public health knowledge, informing Medicaid managed care practices and policies, and fostering positive social change by addressing barriers to equitable healthcare access. By investigating the relationship between social factors like housing instability, transportation challenges, food insecurity and primary care utilization among adult Medicaid recipients, I aimed to deepen understanding of how targeted CHW interventions can enhance utilization of health services among vulnerable populations (see Nichols et al., 2024; Wennerstrom et al., 2023).

This study was grounded in the CSDH framework which emphasizes the need to address both structural and intermediary determinants of health to reduce health inequities. The CSDH framework identifies economic stability, access to services, and living conditions as key factors that influence health outcomes (Solar & Irwin, 2010). By focusing on CHW interventions that address housing, transportation, and food insecurity, this study operationalized the CSDH framework within a Medicaid managed care context. It contributes to the evidence base for integrating SDOH into care delivery

models and population health strategies which align with the framework's focus on improving health equity.

I addressed a critical gap in the literature by focusing on how CHW interventions within Medicaid managed care settings are associated with primary care utilization by addressing specific SDOH factors. Although prior research demonstrated that CHWs are essential for improving access to care and addressing SDOH, few studies have quantitatively evaluated the impact of CHW interventions within Medicaid managed care organizations. By using real-world retrospective data from a defined population, this study contributes to the research and clarifies the extent to which addressing housing, food, and transportation barriers translates into improved preventive and primary care service utilization (ASTHO, 2022, Austin & Qu, 2024). This focus not only supports the importance of the CHW role within Medicaid managed care but also strengthens the evidence base for integrating SDOH into population health strategies.

The findings of this study have the potential to inform Medicaid MCOs, healthcare providers, state and federal agencies, and policymakers. If results determine that CHW interventions addressing SDOH significantly increase primary care utilization, MCOs may be encouraged to expand and standardize CHW programs, integrate SDOH screening into care planning, and allocate resources to further develop and innovate interventions. Policymakers may also use evidence to justify policies that incentivize MCOs to invest in CHW programs as a cost-effective method to reduce avoidable emergency department visits and hospitalizations, while strengthening preventive care utilization (Geiger Gibson Program, 2023). Additionally, insights from this study can

guide the development of best practices for measuring the outcomes of CHW interventions, which is vital for program accountability and sustainability.

This study not only has academic and policy implications, but it can also contribute to positive social change. By demonstrating how CHW interventions can reduce barriers to accessing primary care among Medicaid recipients, this study may help shape initiatives that improve access to critical healthcare services for individuals who are often marginalized or disregarded due to systemic inequities. Improved access to primary care supports earlier disease detection, better management of chronic conditions, and improved overall health outcomes. By improving access to preventive care, the overall healthcare system can be positively impacted. Primary and preventative care not only reduces the burden on emergency services and the emergency care system, but it also reduces overall costs, improves health outcomes for individuals and leads to stronger and more resilient communities (Shadowen et al., 2023). These implications are bounded by the scope of the study, which is limited to adult Medicaid recipients in Clark County, Nevada. However, the lessons learned may provide relevant insights for other urban Medicaid populations across the United States.

### **Summary**

In summary, I addressed a critical gap in the literature by examining the relationship between SDOH factors like housing instability, transportation barriers, and food insecurity, and primary care utilization among Medicaid recipients who participated in a CHW program within a managed care setting in Clark County, Nevada in 2023. The research builds on existing evidence that highlights the important role of CHWs in

addressing social needs (see Johns Hopkins Center for Health Equity, 2025; Thomas et al., 2025). The research also provides new insight into how CHW interventions within the Medicaid managed care setting impact primary care utilization in adult Medicaid recipients. Through a quantitative correlational design, I examined the relationship between SDOH and primary care utilization among adult Medicaid recipients in Clark County, Nevada.

This dissertation is organized into five chapters. In the next chapter, I provide a comprehensive overview of the literature review. The review includes existing research relating to SDOH, community health workers in different settings, Medicaid managed care models, access to care, primary and preventative care gaps, and gaps in the research related to CHWs in the Medicaid managed care setting. In Chapter 3, I explore the research methodology including information on the research design, the sample population, data sources, variables, and data collection and analysis processes. Chapter 4 includes the results of the study related to the research questions and hypotheses. In the final chapter, I examine implications of the study findings along with any relevant limitations. Recommendations are also provided in Chapter 5 on how the study findings can be used to support program development, policy determinations, and future research. Additionally, I suggest how the findings promote positive social change within the public health field.

## Chapter 2: Literature Review

### **Introduction**

SDOH have been broadly accepted as key drivers of health outcomes in vulnerable populations like individuals experiencing economic hardships who are recipients of Medicaid benefits (Ferrer et al., 2022). Many of those individuals are supported by Medicaid managed care programs, and they often experience disparities in accessing primary and preventative care services which can be caused by social inequalities relating to economic stability. Economic stability is one of the major domains of SDOH (ODPHP, n.d.-a).

Medicaid recipients are disproportionately impacted by the negative effects of social determinants such as housing instability, food insecurity, and lack of transportation (DeSalvo & Leavitt, 2019). These specific economic and social factors can negatively impact health. Rates of disease are higher among those who face socioeconomic challenges and those with the greatest need for care have access to the fewest resources (Ferrer et al., 2022). Prioritization of primary care services often comes secondary to meeting basic needs or achieving social and economic stability.

In this study, I addressed the social problem that SDOH disproportionately affect Medicaid recipients, contributing to adverse health outcomes. The specific research problem in this study was the extent to which economic stability-related SDOH factors like housing, food, and transportation were associated with primary care utilization among adult Medicaid recipients enrolled in a Medicaid managed care CHW program in Clark County, Nevada in 2023.

The purpose of this quantitative correlational study was to examine the relationship between SDOH (housing, transportation, and food) and primary care utilization among adult Medicaid recipients in Clark County, Nevada who participated in a CHW program through their MCO in 2023. Instead of evaluating changes in utilization before and after CHW interventions, this study investigated whether and how the presence or severity of specific SDOH factors correlated with the frequency or likelihood of primary care utilization.

In alignment with the previous chapter, this chapter provides a narrative review of relevant literature which is organized thematically. The literature review highlights how SDOH factors impact healthcare utilization and how interventions like CHW programs have been leveraged to address those needs. It also identifies gaps in understanding the role of CHWs in Medicaid MCOs and opportunities for further research. Throughout this chapter, housing, food, and transportation remain the focal SDOH to maintain conceptual alignment.

### **Literature Search Strategy**

The purpose of the literature search was to identify peer-reviewed studies and scholarly articles that examined the relationship between SDOH factors, especially those that contribute to economic stability, and health care utilization among Medicaid recipients. The specific SDOH factors that were included in the search were *housing instability*, *food insecurity*, and *transportation barriers*. The search specifically included a focus on primary care utilization among adults. Additional focuses included studies that evaluated CHW programs and interventions, and Medicaid MCO impact.

Searches were conducted in major electronic databases including EBSCO, Academic Search Complete, APA PsycArticles, APA PsycInfo, BioMedCentral, CINAHL Plus & Medline, ProQuest, Dissertations & Theses at Walden University, F1000Research, Gale Academic OneFile Select, ICPSR-Inter-University Consortium for Political and Social Research Datasets, Kaiser Family Foundation, Library Search, National Academies Press, NTRL, PQDT Open, Project Muse, PubMed, SAGE, ScienceDirect, Taylor and Francis Online, Web of Science, and Google Scholar. These databases were chosen to include a wide range of research across multiple disciplines which included medicine, nursing, psychology, public health, interdisciplinary health services, and others. Google Scholar was used to identify any additional recently published studies and to cross check for any additional literature that may not have been included in the core databases. The reference lists within the applicable studies were also examined to identify any additional relevant studies.

A broad and diverse set of search terms was included to capture any potentially significant studies. The search terms and keywords included *Managed Care, managed care organizations, Medicaid, Medicaid Expansion, social care, social determinants of health, SDOH, social factors, social risk factors, social needs, social problems, socioeconomic conditions, healthcare engagement, primary care access, primary care engagement, primary care services, preventative care, access to care, patient engagement, community health worker, care coordinator, health workers, promotores, integrated care, care management, population health, community based interventions, health related social needs, patient navigators, health outcome measurements, social*

*screenings, and quality improvement in managed care.* As part of the search strategy, Boolean operators were used to ensure a more thorough search of the literature. The Boolean operators used included the words “and” and “or”. This allowed for a more exact search when requiring that all the terms needed to exist in the study but also allowed for a broader search when allowing any of the terms to be present. Search filters were applied to include only peer-reviewed journal articles published in the last 5 years.

Studies were included if they were relevant to the current study and examined one or more of the selected SDOH factors which included housing, food, and transportation. Other studies were included if the outcomes were directly tied to primary care utilization, engagement in health services, or other health related utilization. The selected studies focused primarily on adults, and pediatric studies were retained only when the findings were clearly transferable to adult populations. Additional studies included were those that evaluated CHW interventions within the Medicaid or the Medicaid managed care setting. Studies that were not included were those that were not peer-reviewed. Studies that focused primarily on pediatrics that lacked relevance to adults were excluded. Finally, any studies that were conducted outside of the United States were not included unless there were transferrable findings applicable to the United States.

There were hundreds of results from the various databases but limited studies focusing on CHWs in Medicaid managed care. The titles and abstracts were reviewed for relevance. For relevant studies, full text was read, and sources were selected when aligned with this study’s variables, design, or setting. Studies were organized thematically by SDOH domain (housing, food, transportation), Medicaid and managed

care, and CHW intervention. In some cases, there was an absence of available literature particularly around CHWs embedded in a managed care setting. To address this gap, multiple sources were included that highlighted results that were transferable across settings. This approach preserved focus on the three SDOH variables that were included in this study.

### **Conceptual Framework**

This study was guided by the CSDH framework. Commissioned by the WHO, the CSDH framework was articulated by Solar and Irwin (2010). The CSDH framework provides a comprehensive model for understanding how social, economic, and political factors impact health outcomes. According to the framework, SDOH are the conditions in which people are born, grow, live, work, and age (Solar & Irwin, 2010). The framework posits that these conditions are influenced by how resources are distributed across populations, power balances and imbalances, and opportunities that people have access to. The CSDH model is built upon structural and intermediary determinants. The structural determinants are political and socioeconomic factors, governance, and public policies (Solar & Irwin, 2010). Conversely, the intermediary determinants are materialistic conditions like housing, food, and transportation, and psychosocial factors, and access to health services and systems (Solar & Irwin, 2010). The structural and intermediary determinants intersect to influence equitable care delivery, individual health behaviors, and overall health outcomes. This study used a correlational design to examine the relationships between intermediary social determinants and healthcare utilization.

The CSDH framework has been applied in various public health studies to analyze health disparities and inform interventions that address social needs. Kolak et al. (2020), used neighborhood-level data to establish how multiple structural determinants such as poverty and housing instability, are associated with premature mortality. This study aligns with CSDH principles in that it identifies how social factors directly influence health outcomes, like premature mortality. Novilla et al. (2023) applied the CSDH framework when reviewing the integration of SDOH screening measures into the primary care setting. This study highlighted how various systemic barriers such as lack of resources and reimbursement policies negatively impact the intermediary determinants like food insecurity and transportation. Several studies examining Medicaid recipients have applied the CSDH framework to gain deeper insight into the complex inequities affecting access to primary care. Some of these studies have emphasized the role of Medicaid MCOs in either contributing to or addressing disparities (Jih et al., 2023; Karaca-Mandic et al., 2023). Within this study's frame, CHWs operated at the intermediary level but were impacted by structural determinants and effectively served as a bridge between social conditions and health service use. The CSDH framework has been shown to be particularly helpful in understanding how structural factors impact and interact with the intermediary factors. An example is the interplay between food insecurity or housing instability and healthcare utilization. This conceptualization aligns with the previous chapter by positioning the three focal SDOH as intermediary determinants which are hypothesized to affect primary care utilization.

## **Literature Review Related to Key Variables and Concepts**

### **Social Determinants of Health and Health Related Social Needs**

There is substantial research that exists to demonstrate that non-medical factors like income, education, housing, and access to resources shape whether and how people engage in primary and preventative care services. A national analysis of women's cancer screenings showed that SDOH and psychosocial factors were strongly associated with both the intention to screen and following through with getting screened. Asare et al. demonstrated that there was a direct link between material and social conditions and health related behaviors (2024). Their evidence showed that neighborhoods characterized by multiple social disadvantages faced significantly higher mortality rates. The complex interplay of multiple social disadvantages drove greater harm compared to single social factors which indicated the need for a multicomponent response (Kolak et al., 2020). States and health systems have increasingly prioritized SDOH into routine care practices which has shown improved cardiovascular care processes in disadvantaged communities (Bolen et al., 2022; Chisolm et al., 2019). Studies focused on primary care-based screenings have consistently shown high prevalence of health-related social needs, particularly housing, food, and transportation. These studies have also linked these unmet social needs with increased barriers to accessing care and worse health outcomes. This reinforces the need for systematic identification of social needs and the implementation of targeted interventions within clinical settings (Jih et al., 2023). These findings aligned directly with this study's focus on housing instability, food insecurity, and transportation barriers.

### ***Housing Instability***

Among the health-related social needs that make up the economic stability domain of SDOH, housing instability has been found to be one of the most prominent determinants of health. Housing instability has been consistently associated with poor health outcomes and avoidable healthcare overutilization (Rollings et al., 2022). Studies have linked diverse housing instability experiences to increased emergency department (ED) usage and higher mortality risks (Rollings et al., 2022). Homelessness has shown the strongest prospective association with frequent ED visits over 12 months (Routhier et al., 2023). Screenings that have occurred in the ED setting have revealed that patients with unstable housing are more likely to present with behavioral health crises while also showing high utilization patterns (Asthana et al., 2025). This information supports the need for routine identification of needs and tailored referral pathways (Ball et al., 2024). Other studies have demonstrated that housing instability is a predictor of poor physical health. Midlife adults and Black populations are disproportionately burdened with negative health outcomes resulting from housing instability (Bhat et al., 2022). Evidence has demonstrated that the health impact of housing instability is cumulative over time and disproportionately affects vulnerable populations (Bhat et al., 2022). The patient centered findings intersect with educational interventions that show when clinicians have the appropriate tools and the confidence to address housing needs of patients, screenings and linkage to resources increase. This suggests that workforce development and clinician training can result in more consistent and frequent action to address social needs of patients (Kim et al., 2024). The existing literature confirms that housing stability is

essential in reducing avoidable unnecessary healthcare utilization, increasing primary and preventative care utilization, and improving outcomes. The literature highlights the need for reliable and consistent screening, referral, and follow-up processes within health systems (Ball et al., 2024; Vera et al., 2022). This aligned with the current study's examination of housing instability as a key intermediary determinant.

### ***Food Insecurity***

Another highly prevalent health-related social need has been identified as food insecurity. Food insecurity has been linked to worse chronic disease control and excessive healthcare utilization (Berkowitz et al, 2019). The prevalence of food insecurity is especially high in Medicaid recipients who have heightened negative impacts from not having access to food (Kirby et al., 2021). Correlational studies have shown that medically tailored meals and prescription food models improve diet quality, reduce food insecurity, and reduce unnecessary ED utilization in Medicaid recipients (Deng et al., 2025). However, the effects on other utilization domains vary and may be dependent on factors such as clinical risks and intensity of interventions (Berkowitz & Terranova, 2024; Mayfield et al., 2024). Observational studies specific to the Medicaid Expansion population have shown that high prevalence of food insecurity has a strong association with sociodemographic and literacy factors which supports the need for targeted interventions (Brady et al., 2022). Population focused studies have indicated that food insecurity is correlated with delayed health care and lack of access to medications, higher uninsured rates, and increased ED utilization (Park et al., 2024). Additionally, research has shown that there is a significant relationship between food insecurity and

serious mental illness with co-morbidities (Michels et al., 2022). The need to integrate social and clinical care models that address complex needs at the same time is essential. In many settings, CHW programs are designed to provide this type of support (Berret-Abebe & Reed, 2024; Tuohy et al., 2024). This information supported the inclusion of food insecurity as one of the three focal SDOH in this study.

Food insecurity in the United States is typically classified using the USDA's Household Food Security Survey Module into four categories. These categories include high food security or no reported problems, marginal food security or a few indications of anxiety about food sufficiency, low food security or reduced quality and variety of diet with little or no reduction in intake, and very low food security or multiple indications of disrupted eating patterns and reduced food intake (Ostrer & Seligman, 2025). Recent research underscores that the marginal food security category is associated with meaningful risk and should be treated as an at-risk state rather than a fully food secure state (Liese, 2022). A large cohort study found that even marginal food security was associated with higher risk of premature mortality and shorter life expectancy (Ma et al., 2024). Studies that use the USDA categories reveal that worsening food security status going from marginal to low to very low is associated with significantly poorer self-rated health status and reported barriers to access to care (Ostrer & Seligman, 2025). The literature has also revealed that those with marginal to very low food security experiencing more delays in accessing health care or do not receive it at all (Park et al., 2024). Adults who experience very low food security are at the highest risk for poor health outcomes and healthcare access (Bleich et al., 2023). These findings support

analyzing food security by level in Medicaid populations and justify targeting CHW interventions not only to those with low/very low food security but also to members reporting marginal food security, who may be on the brink of entering into a lower level of food security (Ma et al., 2024).

### ***Transportation***

Transportation is a major determinant of access to care, timely care, utilization of services, and adherence to treatment plans. Studies have shown that among adults with atherosclerotic cardiovascular disease, there is a strong association between transportation issues and delayed care (Acquah et al., 2022). This is especially prevalent in Medicaid recipients, low-income groups, women, Black adults, and residents of the Southern and Midwestern parts of the United States (Acquah et al., 2022). During the COVID-19 pandemic, patients with high utilization patterns who did not have access to a vehicle and those with disabilities reported heightened transportation barriers (Cochran et al., 2022). This highlights the impact of the interplay of affordability, availability, and personal circumstances on resource and service utilization indicating a need for increased collaboration between the health and transportation sectors (Cochran et al., 2022). These patterns have been seen repeatedly in other studies across various clinical areas.

Transportation barriers result in reduced access to specialty care like neurology and significantly impact utilization of Medication Assisted Treatment (MAT) for opioid use disorder (Boyd et al., 2024). Medicaid non-emergency medical transportation is continuously perceived to be inconsistent and unreliable, which impacts the potential for those services to enhance continuity of care (Boyd et al., 2024; Kamitaki et al., 2024). In

the control of communicable diseases, lack of transportation has been linked with higher rates of sexually transmitted infections signaling how transportation is essential in access to care and has significant health implications (Jenks et al., 2023). These findings motivated this study's focus on transportation barriers as a hypothesized predictor of primary care utilization.

### **Medicaid Coverage, Managed Care, and Utilization**

Medicaid policy changes influence access to care and utilization of healthcare services for populations with high SDOH needs. Research on Medicaid Expansion has shown an increase in coverage across racial and ethnic groups along with reductions in some disparities related to access to care (Sommers et al., 2025). While inequities still exist, research has shown that system level changes are needed, and interventions must be implemented to target SDOH (Lee et al., 2021). At the patient level, regression discontinuity patterns from health centers links Medicaid eligibility to increases in primary and preventative care visits. This suggests that expansion of Medicaid coverage can enhance utilization of routine care even when continuity with a specific provider may not always be established (Liang et al., 2023). People living with disabilities have been found to have higher needs and are more at risk of being uninsured. Medicaid Expansion did increase Medicaid coverage but showed limited short-term effects on healthcare utilization which again indicates the need for interventions to remove barriers to accessing care (Dong et al., 2022). The literature shows that Medicaid recipients who are enrolled with an MCO are more likely to see a primary care provider each year compared to their fee-for-service enrolled counterparts (American Journal of Managed Care, 2023).

However, continuity with the same provider may be less stable for those enrolled in managed care (Owen et al., 2020). CHWs are intentionally deployed to address these types of gaps. The context of financing and service delivery is especially relevant as MCOs are increasingly pursuing more innovative solutions. One solution includes using SDOH bonds to support social care initiatives. However, there is still little known about the effectiveness, cost-efficiency, and impact of that type of intervention. These system level findings set the policy context in which CHW interventions operate within MCOs.

### **Community Health Workers**

Across various settings, CHWs have consistently improved engagement and processes to support the advancement of client goals. The evidence is mixed on cost savings and impact on high acuity utilization. CHWs have been effective when they are built directly into care-transition and follow-up workflows. Postdischarge models supported by CHWs that included outreach, assessment of social needs, and connections to primary care services were associated with higher rates of outpatient follow up visits and reductions in avoidable returns to the hospital among adults with complex needs (Kangovi et al., 2018). These models were successful because the CHWs worked to remove specific SDOH barriers which included transportation to their follow up appointments, assistance with scheduling, and education on why the follow up was important. This revealed that CHWs can stabilize patients in the community setting as opposed to the hospital setting by addressing non-clinical barriers to care (Kangovi et al., 2018). Other studies showed that CHW integration in Medicaid-serving models resulted in high-cost savings because of CHWs addressing social needs, scheduling primary care

appointments, and encouraging outpatient engagement (George et al., 2020). CHW integration has shown to generate health plan visible activities such as scheduled PCP visits, closed care gaps, improved quality metrics, and increased care access and effectiveness particularly when CHWs intervened to schedule appointments, provide appointment reminders, and schedule transportation to the appointments (George et al., 2020). Studies of CHWs embedded in well-child or family-centered primary care teams have shown improved engagement in preventive services, better adherence to visits, and stronger care coordination for Medicaid-insured children and those with social risk, highlighting the importance of the CHW role in making preventive care more accessible and equitable (Fiori et al., 2020; Raphael et al., 2013).

Adults with chronic conditions showed similar patterns. CHW-supported care models in Medicaid managed care, including structured outreach and coaching, have been associated with increased outpatient service use and improved quality indicators, largely because CHWs provide regular follow-up, address social barriers to care, and facilitate timely connections with clinical teams when needed (Wennerstrom et al., 2022; Wennerstrom et al., 2023). Even when ED visits and inpatient admissions were not decreased, outpatient care still increased which suggests that program modifications can be made to reduce inappropriate utilization in emergency services (Blecker et al., 2020; Ferrer et al., 2022). The type of outpatient visits that increased was primary care visits which showed that the non-clinical support provided by the CHW offered changes in healthcare related behaviors (Ferrer et al., 2022). Quality improvement initiatives that involved “warm handoffs” from clinicians to CHWs more than doubled the number of

social service referrals that were sent on behalf of the patient (Sanderson et al., 2021). This illustrates that CHW program benefits can be amplified through thoughtful and intentional workflow designs.

In the Medicaid MCO setting, evidence continues to support the integration of CHWs, although the findings remain mixed. A health plan led CHW program found that outpatient evaluation and management visits increased significantly among health plan members particularly in respect to primary care, in-person visits, and telehealth visits but there was no reduction seen in inpatient admissions or ER visits (Gordon et al., 2023). Other studies in MCO or managed care environments have shown that while integration of CHW programs can improve care coordination, outreach, and member engagement, understanding how those gains translate into measurable reductions in acute care utilization has been challenging as various factors like program duration, intensity of services, and population characteristics can impact CHW outcomes (Wennerstrom, 2023). While CHWs embedded in MCO models appear to be more effective in bolstering outpatient service engagement while addressing social needs of vulnerable populations, it remains unclear on what the return on investment is on CHW programs. There is a need for longer-term follow-up and evaluation of CHW programs, more mature program implementation, and more thorough measurement designs to fully understand the impact of these programs (Austin & Qu, 2024).

National surveys of MCOs revealed significant variation in CHW scope and program design where many focused primarily on clinical supports and referrals rather than on community level determinants. Many MCO-based CHW programs prioritize

clinical supports such as care coordination, healthcare navigation, appointment reminders, and referrals to primary care services (Moses & Benyo, 2021). The majority of MCO CHW programs lack community level focus or a primary structure centered on addressing the upstream determinants of health like housing, food, and transportation (Wennerstrom et al., 2023). Research has shown that the clinical focus of a CHW model within an MCO setting that has limited focus on broader social or structural supports limits the CHWs ability to address the root causes of health inequities and disparities (Moses & Benyo, 2021). This pattern reflects an operational focus on measurable, short-term health outcomes that align with managed care performance metrics rather than addressing the structural causes of inequity (Moses & Benyo, 2021). The variation of the CHW model across MCOs is immense due to differences in training practices, supervision models, role expectations, and scope of the role (Wennerstrom et al., 2023). These variations result in inconsistencies making CHW programs difficult to compare, analyze, and generalize. There is a general lack of CHW program standardization across MCOs especially regarding addressing SDOH (Wennerstrom et al., 2023). Research shows that MCOs that lack structured processes to screen and address SDOH needs may have reduced potential impact in reducing high-cost utilization or improving health equity (Wennerstrom et al., 2023). Based on the literature, CHW integration in an MCO setting has revealed positive outcomes but variation in scope, design, and focus means that not all MCO CHW programs are maximizing the full potential of CHWs (Wennerstrom et al., 2023). This is especially true when it comes to addressing the SDOH needs of those they serve. There is little research on CHW programs embedded in

an MCO that focuses specifically on addressing SDOH needs of Medicaid recipients rather than clinical factors.

Researchers agree that there is a need for clearer CHW role definition, equitable compensation for CHWs, and standardization of program frameworks (Wennerstrom, 2022; Wennerstrom et al., 2023; Wennerstrom et al., 2024). Other studies describe CHWs as the primary connection point between providers, health plans, community-based organizations, and the individual. This reinforces CHWs unique position to address social needs while strengthening primary care relationships within the managed care setting (Austin & Qu, 2024). The literature suggests that MCO-based CHWs are most effective in driving ambulatory and primary care utilization when they are directly intervening on member reported social needs like transportation, food, or housing and when they assist with scheduling and reminding of appointments (Gordon et al., 2023; Moses & Benyo, 2021; Wennerstrom et al., 2023). As health plans continue to identify investment opportunities into social care, the literature indicates the need for solid, tailored, evidence-based approaches to guide resource allocation efforts (Karaca-Mandic et al., 2023). Collectively, these findings justify the present study's correlational assessment of the association between CHW supports, SDOH factors, and primary care utilization within the managed care setting. Because MCO CHW programs vary widely in scope, intensity, and documentation standards, the literature has not isolated the contribution of specific SDOH interventions like housing, food, and transportation on primary care utilization, which was the focus of this study.

## Summary and Conclusions

The literature I reviewed in this chapter highlighted several important themes relevant to the study of SDOH and primary care utilization among Medicaid recipients. The research consistently demonstrated that structural and intermediary determinants are strongly associated with negative health outcomes and poor access to primary care (Jih et al., 2023; Kolak et al., 2020; Park et al., 2025). These determinants lead to inequities and disparities among low-income populations and Medicaid recipients. The evidence revealed in the research identified CHWs as key mitigators in removing barriers to care. Studies have shown that CHW interventions can improve outpatient care utilization, preventive care, and chronic disease management (Coker et al., 2023; Ferrer et al., 2022; Gordon et al., 2023). The findings related to cost reduction and reductions in hospital utilization were mixed, which indicates a need to link SDOH interventions to system level outcomes. (Blecker et al., 2020; Harrison et al., 2020). The research reinforces the unique role of Medicaid MCOs in deploying CHW programs to address SDOH. The evidence suggests that MCOs can effectively use CHWs to address SDOH needs but there continues to be gaps in understanding how these programs impact long term primary care utilization and the specific pathways through which interventions to address social needs are associated with health behaviors (Wennerstrom, 2022; Wennerstrom et al., 2023). Notably, few studies have examined CHW models embedded within Medicaid MCOs using correlational designs to understand statistical associations between risk factors and outcomes.

The gaps I identified in this chapter established the rationale for my research design and methodology. To address these gaps, the third chapter describes the quantitative correlational design, population, sampling, secondary data collection methods, and statistical analyses used to understand the relationship between SDOH factors, CHW interventions, and primary care utilization. The next chapter provides the foundation for testing my hypotheses and generating evidence that extends knowledge in public health while also contributing to positive social change.

## Chapter 3: Research Method

### **Introduction**

As I discussed in the first chapter, the research problem that guided this correlational study was the need to better understand how SDOH such as housing instability, food insecurity, and transportation barriers correlate with primary care utilization among adult Medicaid recipients and how CHW interventions embedded within an MCO address these barriers. The literature that was reviewed in the second chapter provided evidence that social determinants are strongly associated with poor health outcomes and decreased access to care. Significant gaps exist in understanding the role of CHWs within the Medicaid MCO setting and their effectiveness in addressing economic stability factors to increase primary care utilization (Berini et al., 2022; Olivas & Marcus, 2021). I aimed to address these gaps by examining the correlation between CHW interventions that target housing instability, food insecurity, and transportation barriers and primary care utilization among adult Medicaid recipients in Clark County, Nevada.

In this chapter, I explain the methodology used to investigate this research problem. The chapter outlines the quantitative correlational design of the study, the rationale for the design, and the steps taken to ensure reliability, validity, and ethical integrity of the research process. I provide a description of the research design and rationale which is followed by an explanation of the methodology which includes details about the population of interest, the sampling strategy, and the procedures used for data collection.

In this chapter, I also review the plan for analyzing data and the statistical techniques used to evaluate the study's research questions and hypotheses. The threats to validity are acknowledged and the steps taken to mitigate these threats are outlined in the chapter. Potential biases and confounders that may have influenced the results of the study are also noted. Ethical procedures will be reviewed which ensure confidentiality and protection of participant data while using secondary sources. The chapter concludes with a synthesis of the methodology along with an introduction to the fourth chapter. The information provided in the third chapter supports the fourth chapter where the results of the data analysis will be provided.

### **Research Design and Rationale**

In this study, I used a quantitative correlational design to examine the relationship between SDOH factors to include housing instability, food insecurity, and transportation barriers, and primary care utilization among adult Medicaid recipients enrolled in a CHW program through a Medicaid MCO in Clark County, Nevada in 2023. This design was most appropriate because I examined the relationship between SDOH and primary care utilization within a distinct group of adult Medicaid recipients, using existing data without manipulating variables or measuring change over time. Consistent with the CSDH framework, housing instability, food insecurity, and transportation barriers are represented as the intermediary determinants and the CHW program embedded within the Medicaid MCO, represents an organizational response to the structural determinants.

The independent variables in this study were the three SDOH factors which are housing instability, food insecurity, and transportation barriers along with the

documented CHW intervention that occurred in 2023 that addressed those needs. The dependent variable was primary care utilization which is presented as the number of primary care visits recorded in Medicaid claims data. The covariates included participant age represented in years and baseline primary care utilization. I used observational data to explore associations between these variables without manipulating conditions.

The design aligns directly with the research questions and hypotheses in this study. The first research question asked whether housing instability, food insecurity, and transportation barriers were associated with primary care utilization. Prior research has shown that housing instability is linked to reduced access to care and poor health outcomes (Nakphong et al., 2024). Similarly, food insecurity has been associated with increased healthcare utilization and poorer chronic disease management (Jordanova et al., 2024). Transportation barriers have also been shown to impact access to care among Medicaid recipients (Cochran et al., 2022; Savitz et al., 2025).

The second research question was designed to determine whether the CHW interventions addressing these factors were associated with changes in PCP utilization. CHWs have been shown to support improved access to care and health outcomes in underserved populations (Berini et al., 2022). I used a correlational design to examine whether documented CHW supports were associated with differences in primary care utilization among adult Medicaid recipients. Using retrospective program and claims data to include CHW case notes and SDOH screenings, this approach enabled analysis of naturally occurring relationships without the need for new data collection. This approach was both practical and ethical as it avoided the need for participant recruitment and

addressed the limitations of randomized trials which were not feasible due to ethical concerns around withholding beneficial services to a control group. Correlational methods are appropriate for analyzing complex, real-world interventions like those found in Medicaid MCOs. By focusing on ABC Health Insurance's CHW program, the study contributed to a limited evidence base and offers insights that may inform future program development and policy decisions aimed at reducing disparities, improving access to care, and enhancing health outcomes for Medicaid populations. Correlational studies contribute by identifying patterns and relationships that can inform future program development and policy decisions (Schneider & Rohmann, 2021).

## **Methodology**

### **Population**

The target population for this study were adult Medicaid recipients between the ages of 18 and 65 who were enrolled in ABC Health Insurance's community health worker program in Clark County, Nevada, in the year 2023. This population had income levels that were at or below 138% of the federal poverty level, qualifying them for Medicaid benefits in Nevada. They also had at least one identified SDOH which included at least one or a combination of housing instability, food insecurity, and/or transportation barriers. The population also received support with addressing their social needs through a CHW intervention in 2023.

Clark County is the largest most populated county in Nevada where approximately three quarters of Nevada's population resides. According to the Nevada Department of Health and Human Services (DHHS; 2023), there were approximately

900,000 individuals enrolled in Medicaid statewide in 2024. Of those 900,000 enrollees, 65% or 585,000 of them resided in Clark County. ABC Health Insurance is the state's largest Medicaid managed care organization serving approximately 180,000 members in Clark County (DHHS, 2023). It is estimated that 3% or approximately 5,400 enrolled members engaged in a care management program of some kind with ABC Health Insurance during the 2023 calendar year. Those individuals may have participated in other types of programs like peer support, behavioral health, or RN case management which would exclude them from this study. Additionally, of the sample population, only adults aged 18-65 are included as were those who stayed engaged in the program. The estimated sample size for this study was approximately 570 participants who participated in the CHW program in 2023 through ABC Health Insurances and had at least one documented SDOH need.

The study sample was pulled from this target population of CHW program participants. This sample group was appropriate as it focused on individuals most likely to experience barriers to care that were associated with economic instability and would benefit from CHW interventions. The outcomes measured in this population generated findings that were not only relevant to Medicaid managed care, but also to the broader public health field.

### **Sampling and Sampling Procedures**

I used a consecutive sampling strategy which is a technique used to include every eligible participant encountered during the data collection period until the target sample size is achieved (see Etikan & Bala, 2017). Consecutive sampling was appropriate

because the study aimed to include Medicaid recipients who met predefined inclusion criteria in the study. Participants must have been enrolled in the ABC Health Insurance's CHW program in Clark County, Nevada during the year 2023 and have had at least one documented social need which must include housing instability, food insecurity, and/or transportation barriers. Consecutive sampling is often used in public health research when the goal is to include all eligible individuals within a defined population or period while minimizing selection bias (Levy & Lemeshow, 2013). This strategy supported the study's aim to understand associations between CHW interventions and primary care utilization which may contribute to a better understanding of how social needs and managed care interventions can impact health service use in Medicaid populations.

Random sampling would not be feasible due to reliance on program records, claims data, and ethical limitations of excluding individuals with identified needs from receiving valuable CHW services. Sampling from administrative and claims data is a validated approach in Medicaid research and has been used to evaluate community-based interventions (ADA Health Policy Institute, 2023; Pinnock et al., 2023).

The sample was drawn from existing program, administrative, and claims data provided by ABC Health Insurance. Eligible participants were identified based on their Medicaid enrollment status with ABC Health Insurance. Eligible participants included individuals with continuous Medicaid enrollment in the 12 months prior to the study period and in the 12 months following the study period. Any lapse in coverage could have resulted in gaps and inconsistencies in the claims data. Participants were also selected based on their age, including adults ages 18-65 and the sample only included

Medicaid recipients who were enrolled in the CHW program in the year 2023. Among this group, only members who had at least one documented social need related to housing, food, or transportation were selected for this study. This information was extracted from the CHW case notes and SDOH screening tools.

Exclusion criteria included any members below the age of 18 or older than the age 65 during the time of the CHW intervention. Additional exclusions included members who had no documented SDOH need for housing, food, or transportation and had no CHW encounter addressing the need. Also, members who had incomplete or missing claims data during the study period and those who had any gaps in coverage with ABC Health Insurance during the study period were excluded from the sample. All data was de-identified prior to analysis to ensure participant confidentiality and compliance with all ethical standards. Ethical sampling of vulnerable populations requires careful attention to inclusion criteria and data protection (Kandi & Vadakedath, 2022).

A power analysis was conducted using G\*Power 3.1 to determine the minimum sample size needed to detect a statistically significant effect. Power analysis is an essential part of public health research to ensure adequate sensitivity and to avoid underpowered studies (Kang, 2021). The first research question was designed to understand the relationship between SDOH factors and primary care utilization. A Poisson regression model was initially considered to measure the relationship specified in the research question using three predictor variables which included housing, food, and transportation. Poisson regression was appropriate for modeling count data such as healthcare visits represented numerically (Islam & Chowdhury, 2017). Due to

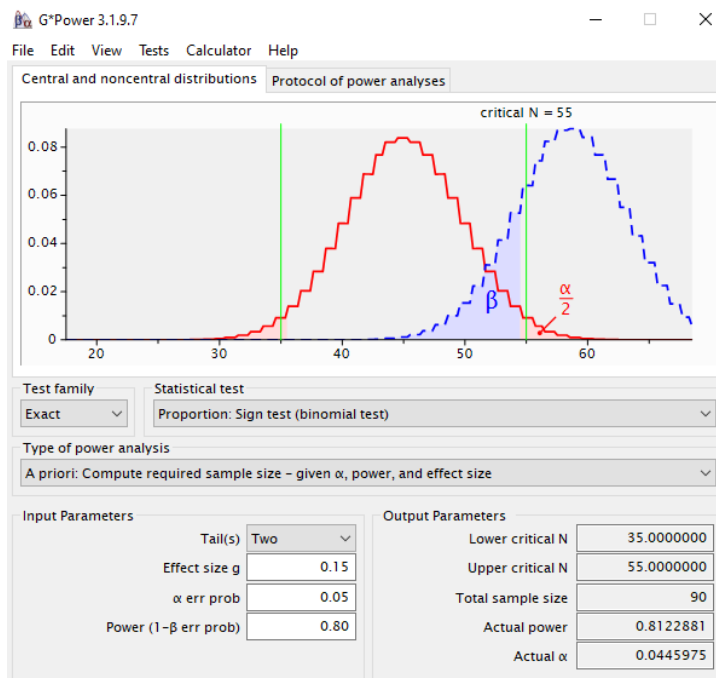
overdispersion in the data, a negative binomial regression model was used as an alternative. For the second research question, a paired  $t$  test was initially considered to evaluate pre- and postutilization data. This test would have been appropriate for comparing outcomes before and after an intervention in the same group (Talikan et al., 2024). Due to nonnormality of the data, a sign test was selected as a nonparametric alternative. Figure 2 illustrates the G\*Power output for the sign test and figure 3 shows the output for the Poisson regression and negative binomial regression.

For both tests, a medium effect size was chosen based on prior research in similar populations which has shown measurable and moderate effects of CHW interventions on care utilization. The effect size selected was 0.15 for the sign test and 1.3 for the Poisson regression or the negative binomial regression and was appropriate based on the complex and multifactorial nature of health behaviors (see Topp et al., 2021). G\*Power does not have a separate function to estimate sample size for negative binomial regression as it is an extension of the Poisson regression model so the sample estimates for both are calculated the same way through the Poisson regression method. The selected alpha level was .05. This alpha level was chosen to balance the risk of any potential errors. Statistical power was set at 80%, which is widely accepted in public health research to ensure adequate sensitivity to detect meaningful effects. The power analysis indicated a required sample size of 90 participants for the sign test and indicated a required sample size of 111 for the Poisson regression analysis. Based on the estimated number of cases that were included in data, the sample exceeded the recommended thresholds. The study had

sufficient statistical power to detect associations and differences while also enhancing external validity.

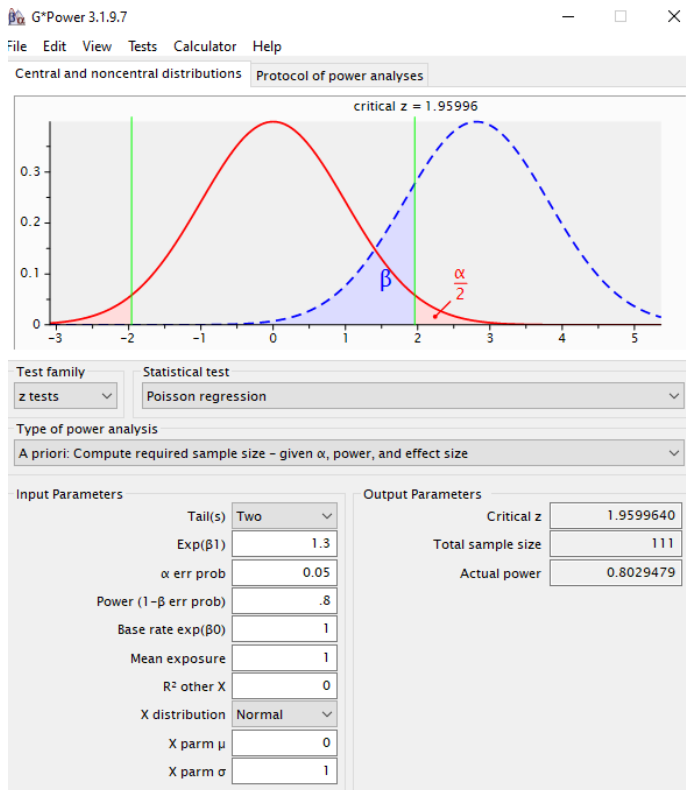
**Figure 2**

*G\* Power Analysis Sign Test*



**Figure 3**

*G\* Power Analysis Poisson Regression and Negative Binomial Regression*



### Data Analysis Plan

All statistical analyses for this study were conducted using IBM SPSS statistics version 30. SPSS was an appropriate software for this study as it provides a robust system for data cleaning, descriptive statistics, and inferential testing which includes regression models and t-tests while also adjusting for covariates (Kabir et al., 2024; Jain & Sengar, 2024).

Prior to the data analysis, the data went through a screening and cleaning process. This process will include a verification of data integrity. The CHW program data, SDOH screening data, and the Medicaid claims data was cross-checked for completeness and

accuracy. Any cases that had missing information or incomplete claims records was excluded from the data set. Missing data was assessed, and any patterns were analyzed to determine whether cases should be removed, though missing data was unlikely due to predefined inclusion and exclusion criteria. Outliers in the primary care visits will be identified using z-scores. The outliers were examined for accuracy and were retained if valid or excluded if there were data entry errors (Shi et al., 2021).

The following research questions and hypotheses were analyzed in this study:

RQ1: What is the relationship between social determinants of health (housing, transportation, and food) and primary care utilization among adult Medicaid recipients ages 18-65 who participated in a Medicaid managed care organization's community health worker program in Clark County, Nevada in 2023?

$H_01$ : There is no relationship between social determinants of health (housing, transportation, and food) and primary care utilization among adult Medicaid recipients ages 18-65 who participated in a Medicaid managed care organization's community health worker program in Clark County, Nevada in 2023.

$H_11$ : There is a relationship between social determinants of health (housing, transportation, and food) and primary care utilization among adult Medicaid recipients ages 18-65 who participated in a Medicaid managed care organization's community health worker program in Clark County, Nevada in 2023.

RQ2: How do social determinants of health interventions aimed at addressing housing instability, transportation assistance, and food insecurity by a Medicaid managed

care organization's community health worker program impact primary care utilization among adult Medicaid recipients ages 18-65 in Clark County, Nevada in 2023?

*H<sub>02</sub>*: There is no significant impact of social determinants of health interventions aimed at addressing housing instability, transportation assistance, and food insecurity by a Medicaid managed care organization's community health worker program impact primary care utilization among adult Medicaid recipients ages 18-65 in Clark County, Nevada in 2023.

*H<sub>12</sub>*: There is a significant impact of social determinants of health interventions aimed at addressing housing instability, transportation assistance, and food insecurity by a Medicaid managed care organization's community health worker program impact primary care utilization among adult Medicaid recipients ages 18-65 in Clark County, Nevada in 2023.

The descriptive statistics included the frequencies, means, and standard deviations and summarized the demographic characteristics, the prevalence of SDOH needs, and the levels of primary care utilization. The negative binomial regression was used to model count data and assess the associations between the independent variables and count-based outcomes (number of primary care visits). The sign test was used to explore if the change in primary care visits was correlated with the change in SDOH needs.

For RQ 1, I used a negative binomial regression model to assess the relationship between housing instability, food insecurity, and transportation barriers (independent variables) and primary care utilization (dependent variable). The negative binomial regression model was appropriate in this case as this method is commonly used when the

response variable is a count of something (Nuako et al., 2022). A rate ratio was used to evaluate the significance and direction of effect. The rate ratio was used to understand not just the statistical significance, but also the practical significance (Fisher et al., 2021). Initially, a Poisson regression model was planned to be used then overdispersion was detected so a negative binomial was used to address overdispersion.

For RQ 2, I used a sign test to assess whether there was a statistically significant change in primary care visits before and after participation in the CHW program. This test compared the medians of PCP visits before and after the intervention. The analysis determined the difference between each pair, then computed the medians and standard deviations of those differences. Initially a paired t-test had planned to be used, then a Shapiro-Wilk test was conducted to check for normality of paired differences and it was determined that normality was violated so a decision was made to use a sign test. Symmetry was also violated which made the Wilcoxon signed-rank test an inappropriate alternative.

The covariates in this study included age, and the baseline primary care utilization. These factors are known to contribute to health-related behaviors. These covariates also align with the CSDH framework that follows the life course and considers resource accessibility. By including these covariates, bias was reduced, and reliability of the results was improved.

The results were interpreted using various parameter estimates, confidence intervals, and probability values. The standardized coefficient ( $\beta$ ), rate ratio, and the confidence intervals were reported for the negative binomial regression. For the negative

binomial regression, the results were analyzed by examining how the predictor variables (housing, food, transportation) were associated with the count of the dependent variable. The coefficients were estimated on a log scale and represented as Incidence Rate Ratios (IRRs). The IRRs were interpreted as multiplicative change in expected count for a one-unit change in the predictor. Statistical significance was assessed using z-values and p-values. Results were reported in a table showing coefficients, standard errors, IRRs, and significance levels. A narrative interpretation of the statistical findings was included. Because overdispersion was detected in the data, a negative binomial regression model was employed to provide more accurate estimates and account for variability beyond what a Poisson model could handle.

For the sign test, statistical significance was assessed at  $\alpha = .05$ . Results were reported with the number of positive and negative differences, the test statistic, and the exact p-value. A confidence interval for the median difference was also provided. The Wilcoxon signed-rank test was deemed inappropriate due to the non-symmetrical distribution of the dataset; therefore, the sign test was selected as the nonparametric alternative. Findings also included practical significance and implications for public health and social change.

### **Threats to Validity**

#### **External Validity**

External validity refers to the degree to which the results of this study can be generalized beyond the study sample (Andrade, 2018). There were several potential threats to the external validity of this study. This study used secondary data as opposed to

using direct participant testing or surveying which limited the threats that could have been caused by test reactivity. However, in some cases, participants utilization in primary care services could have been influenced by the overall awareness of their own participation in the CHW program. This threat was addressed by acknowledging that these are plausible limitations of real-world program evaluations (see Gianfrancesco & Goldstein, 2021). I focused primarily on adult Medicaid recipients in Clark County, Nevada who were enrolled in a specific MCO's CHW program. Due to the specificity of the sample selection, this may have limited how the findings could be generalized to other populations. By clearly defining inclusion and exclusion criteria, readers can determine the applicability to other contexts (see Olsen et al., 2013). This study only examined three SDOH which included housing, food, and transportation. Since other SDOH factors were excluded from this study, the findings were limited in how they can be generalized to other SDOH domains. This was addressed by acknowledging the boundary in the delimitations and highlighting this study's primary focus on economic stability factors. Some participants may have received other social service support or care management outside of the MCO CHW intervention. This could have threatened the generalization of the impact of the CHW program. This was addressed by acknowledging the possibility of overlapping interventions and noting limitations (Gianfrancesco & Goldstein, 2021).

### **Internal Validity**

Internal validity refers to the extent to which observed changes in primary care utilization can be attributed to CHW interventions rather than other factors (Andrade,

2018). Over time, participants' health conditions and behaviors may change naturally despite receiving the CHW intervention. To address this, the correlational design that was used in this study could help by identifying patterns and associations between CHW involvement and changes in primary care utilization, while accounting for trends and individual variability without implying direct causation (Andrade, 2018). There may have been variability in CHW documentation practices or Medicaid claims coding which could have impacted the quality of the data. By extracting data from a standardized and evidence-based SDOH screening tool, this could help to reduce documentation variability. To ensure quality of the claims and SDOH data, data cleaning was performed prior to the analysis. Regression to the mean was possible if participants with extremely low or exceedingly high levels of primary care utilization prior to the intervention moved towards more average levels of utilization after the intervention. To address this, the baseline utilization was included as a covariate in the regression model (Hussain et al., 2023). Another threat to internal validity was the potential for participants to disenroll from the MCO, lose coverage, or switch to another MCO during the preintervention or postintervention period. This was addressed by applying inclusion criteria that require 12 months of continuous Medicaid enrollment with ABC Health Insurance before and after the intervention.

### **Construct Validity**

Construct validity refers to whether the study accurately measures concepts of interest (Heale & Twycross, 2021). In this study, SDOH factors were operationalized as binary indicators of housing instability, food insecurity, and transportation barriers while

primary care utilization was measured continuously as the number of PCP visits a participant had. Because only three SDOH factors were examined in this study, broader social risk factors that may be present were not included which may lead to mono-operation bias. This limitation was addressed by providing clear definitions of the constructs included and aligning them in the CSDH framework (see Hawkins et al., 2021). Relying strictly on CHW documentation and claims data from a quantitative perspective may not fully reflect the true impact of interventions. Including qualitative data would strengthen the construct validity but would be out of scope for this quantitative study (see Alavi et al., 2023).

### **Statistical Conclusion Validity**

Statistical conclusion validity refers to whether statistical tests can be used to detect true relationships (Heale & Twycross, 2021). Threats to statistical conclusion validity included violation of assumptions, error rate inflation, and confounding variables. Regression and paired t-tests assume normality, homoscedasticity, and independence. An assessment of overdispersion occurred to determine if Poisson regression should be used or if a negative binomial was more appropriate and the negative binomial was selected due to detection of overdispersion. A sign test was selected as an alternative for the paired t-test and the Wilcoxon signed-rank test since the assumptions of normality and symmetry were violated. The assumptions were tested, and transformations or alternatives were applied as needed (see Heale & Twycross, 2021). Factors like age and baseline primary care count were confounders in this study. To

address this, the confounding variables were included as covariates in the analysis to reduce bias (see Gianfrancesco & Goldstein, 2021).

### **Ethical Procedures**

I used secondary data sources that were extracted from ABC Health Insurance's CHW program case notes, SDOH screening tools, and Medicaid claims data. I obtained a data use agreement (DUA) between myself and ABC Health Insurance to ensure proper authorization to access and analyze de-identified program and claims data. This study did not involve any direct participant recruitment or interaction with participants. The data used for this study was strictly administrative, which aligns with ethical standards for secondary data use in health research (Rothstein, 2015).

While this study did not involve any direct engagement with human participants, ethical considerations for using human data was still applied. Organizational permission was obtained through ABC Health Insurance with the use of a DUA. Approval from the Institutional Review Board (IRB) at Walden University was obtained before the collection and analysis of data (IRB approval #12-15-25-1069435). This study followed ethical guidelines for research that involves human subjects and secondary data collection consistent with IRB policies for secondary analysis (see Grady et al., 2015).

This study did not involve any active recruitment of participants. As such, there were no recruitment processes that could pose ethical concerns. However, inclusion criteria in the study may have inadvertently excluded some individuals such as Medicaid recipients who disengaged from the program early. This was a limitation that is outlined

in the methodology and reflects common challenges in retrospective data studies (see Benchimol et al., 2021).

The risks to participants were minimal. Adverse findings that were identified during the data analysis were reported at the program level and were not linked to any individual participants, in accordance with ethical standards for de-identified data reporting (see McGraw et al., 2009).

The treatment of data complied with all HIPAA and IRB regulations. The data used in this study was de-identified in accordance with HIPAA regulations by ABC Health Insurance prior to the data being transferred to myself (see Baines et al., 2024). The data included variables such as age, SDOH needs, whether an intervention occurred, and number of primary care visits. These variables were all non-identifiable. The data for this study was stored on a password-protected computer that was accessible only to me. The file was stored on the computer in a password-protected folder. All data was reported through consolidated insights, and no individual data was shared. The data used for this study was accessible only by me and the dissertation chair and committee if needed. The data for this study will be destroyed five years after the completion of study to ensure compliance with IRB guidelines (Grady et al., 2015).

The organization referenced in this study is masked using an alias of ABC Health Insurance which is used throughout this study to protect the privacy and confidentiality of the organization that provided the data. Masking of the organization aligned with IRB guidelines and recommendations. I am employed by ABC Health Insurance, and I acknowledge potential ethical concerns in this case. To address this, I did not directly

extract the data myself from the organization's data warehouse. Instead, the data was drawn by a randomly assigned health informatics specialist who de-identified the data prior to sharing it with me. This approach helped mitigate conflicts of interest and ensured data integrity (see Mello et al., 2012).

The findings from this study will not be used beyond the scope of this doctoral study. As I am in a leadership position at the data provider organization, I will neutralize authority dynamics by ensuring full anonymity. The data that was extracted for this study included responses on assessments that are regularly administered by the organization for non-research purposes. The data used for this study was data that was generated as a byproduct of regular organizational operations which made it suitable for secondary analysis (see Rothstein, 2015).

This study had minimal risks for the participants since it relied on retrospective, de-identified data. Strict safeguards were provided to protect the confidentiality of the organization, the participants, and the staff referenced in this study. To minimize any ethical concerns or conflicts of interest, all IRB and HIPAA guidelines were followed (Baines et al., 2024; Grady et al., 2015).

### **Summary**

In this chapter I outlined the research design and methodology of this study which aimed to understand the impact of CHW interventions with an MCO on primary care utilization among adult Medicaid recipients in Clark County, Nevada. I provided a description of the research problem and described the rationale for using a quantitative, correlational design with secondary data. This design allowed for the assessment of

changes in primary care utilization associated with CHW interventions that addressed SDOH and is often used in health services research when randomization is not feasible (Gordon et al., 2023).

Within the methodology section of this chapter, I described the study population, sampling procedures, and data sources that were used. The target population included adult Medicaid recipients aged 18 to 65 who were enrolled in ABC Health Insurance's CHW program during the year 2023. The G power analysis confirmed that the expected sample size provided adequate statistical power which is essential for detecting meaningful effects in correlational designs (Faul et al., 2009). The data used in the analysis was extracted from CHW case notes, SDOH screening tools, and Medicaid claims databases.

The statistical method selected to answer RQ1 was a negative binomial regression which was selected due to detection of overdispersion and was used to estimate IRR's. For RQ 2, a sign test was used as a nonparametric alternative to the paired t-test to evaluate the association between CHW interventions and changes in primary care utilization by comparing pre and postintervention data without any manipulation of variables. The sign test was selected since normality and symmetry were violated. Covariates that were included to control for confounding included age, and baseline utilization. The assumptions associated with each test were considered and adjustments were made as necessary to ensure statistical conclusion validity (Heale & Twycross, 2021).

The threats to validity were considered and included internal, external, construct, and statistical conclusion validity concerns. Strategies to address the threats of validity were described. Within the chapter I also discussed ethical considerations and safeguards for confidentiality, the IRB process, the access of data, and protections to ensure compliance with HIPAA and other guidelines.

In the following chapter I present the results of the study. This includes descriptive statistics which synthesize the sample characteristics and inferential analyses which addressed the research questions and hypotheses. The findings are reported with an emphasis on the relationship between SDOH factors, CHW interventions, and primary care utilization. With the methodological framework that I outlined in chapter three, I demonstrate in chapter four whether and how the CHW interventions to address SDOH within a Medicaid MCO setting correlate with primary care utilization.

## Chapter 4: Results

### Introduction

The purpose of this quantitative, correlational study was to examine the relationship between specific SDOH factors including housing instability, food insecurity, and transportation access, and primary care utilization among adult Medicaid recipients aged 18–65 who participated in a Medicaid managed care organization’s CHW program in Clark County, Nevada, in the 2023 calendar year. In this chapter, I present the results of statistical analyses conducted using retrospective administrative data, including CHW case notes, SDOH screening data, and Medicaid claims data. The analyses were designed to estimate the direction and strength of associations between SDOH factors, CHW interventions addressing those factors, and primary care visit counts. The results of the study are reviewed in this chapter and further interpretation of the results are reviewed in Chapter 5.

I addressed two research questions. RQ1 examined the relationship between the SDOH factors including housing instability, food insecurity, and transportation barriers, and primary care utilization among adult Medicaid recipients who participated in the CHW program. The null hypothesis for this question stated that no relationship exists between the selected SDOH factors and primary care utilization, while the alternative hypothesis stated that a relationship exists. RQ2 examined the impact of CHW interventions aimed at addressing housing instability, food insecurity, and transportation access on primary care utilization. The null hypothesis stated that these interventions

have no significant impact on primary care utilization, whereas the alternative hypothesis stated that a significant impact exists.

Chapter 4 begins with a description of the data collection procedures and preparation of the dataset for analysis. Next, descriptive statistics are presented to summarize participant characteristics, SDOH variables, CHW interventions, and primary care utilization. This is followed by the presentation of statistical analyses conducted to test each research question and associated hypotheses. The chapter concludes with a summary of the findings and answers to the research questions.

### **Data Collection**

The secondary data for this study was collected retrospectively from administrative records. The data was obtained from ABC Health Insurance's internal documentation systems and claims data warehouse. The data collected included CHW case notes, standardized SDOH screening data, and Medicaid medical claims, specifically primary care visits for the 12 months prior to the CHW program enrollment date and 12 months following the CHW program enrollment date. These data sources were linked at the individual level using unique member identifiers to create the final analytic dataset. The dataset included all CHW cases from calendar year 2023 that had an SDOH need of housing, food, or transportation, had 12 months of continuous Medicaid enrollment before and after CHW program enrollment, had successful engagement with a CHW, and were between the ages of 18 and 65. For each participant, primary care visit claims were added for the 12 months before enrollment and the 12 months after enrollment, resulting in data spanning from 2022 through 2024. Data extraction and preparation were

conducted following institutional approval and in accordance with applicable data use agreements and confidentiality requirements.

No substantial discrepancies from the data collection procedures described in Chapter 3 were identified. All variables specified in the study design including demographic characteristics, SDOH factors, food insecurity, housing instability, transportation access, pre- and postintervention primary care utilization, and CHW engagement were available and complete for the analysis. The final sample consisted of 441 participants, with no missing values for the variables included in the analyses (valid  $N = 441$ ). All 441 participants had consistent values reported for each variable and were all included in the analysis with no missing values.

Descriptive statistics were calculated to summarize participant characteristics, SDOH variables, and primary care utilization. Table 1 outlines the sample characteristics summarized in the descriptive statistics. The final sample included 441 adult Medicaid recipients aged 18 to 65 years all residing in Clark County, Nevada. All 441 participants had 12 months of continuous Medicaid coverage in the 12 months prior to their participation in the CHW program and maintained their Medicaid coverage for at least 12 months following participation in the program. Age at enrollment in the CHW program (ENRL\_AGE) ranged from 18 to 64 years (range = 46), with a mean of 49.12 years ( $SD = 10.63$ , variance = 113.07). A comparable age measure (DC\_AGE) demonstrated a similar distribution ( $M = 49.18$ ,  $SD = 10.64$ ) which was the age the participant was when they completed or were discharged from the CHW program.

SDOH variables were coded as dichotomous indicators (0 = no documented need, 1 = documented need). Food insecurity was identified for 29.0% of participants ( $M = 0.29$ ,  $SD = 0.45$ ), housing instability for 44.0% of participants ( $M = 0.44$ ,  $SD = 0.50$ ), and transportation-related needs for 79.0% of participants ( $M = 0.79$ ,  $SD = 0.41$ ). These variables exhibited limited ranges (0–1), consistent with binary coding (Harris, 2021). All 441 participants received a CHW intervention to address their SDOH need which made them eligible to be included in the sample.

PCP utilization prior to the CHW intervention (PCP\_VISITS\_PRIOR) ranged from 0 to 37 visits ( $M = 4.14$ ,  $SD = 5.23$ , variance = 27.38). Postintervention PCP utilization (PCP\_VISITS\_POST) ranged from 0 to 81 visits ( $M = 6.09$ ,  $SD = 8.79$ , variance = 77.19), indicating substantial variability in utilization across participants.

**Table 1**

*Descriptive Statistics- Sample Characteristics*

	<i>N</i>	Range	Minimum	Maximum	Mean	<i>SD</i>	Variance
ENRL_AGE	441	46	18	64	49.12	10.633	113.070
FOOD	441	1	0	1	0.29	0.454	0.206
HOUSING	441	1	0	1	0.44	0.497	0.247
TRANSPORTATION	441	1	0	1	0.79	0.408	0.167
PCP_VISITS_PRIOR	441	37	0	37	4.14	5.233	27.381
PCP_VISITS_POST	441	81	0	81	6.09	8.786	77.192
DC_AGE	441	46	18	64	49.18	10.635	113.096
Valid N (listwise)	441						

I used a nonprobability convenience sample drawn from adult Medicaid beneficiaries enrolled in a single Medicaid managed care organization who participated in a CHW program during 2023 in Clark County, Nevada. As such, the sample was not intended to be statistically representative of all Medicaid recipients in Clark County,

Nevada. However, the sample is proportionally representative of the population of interest, defined as Medicaid-enrolled adults with documented SDOH needs who engage with CHW services (Stratton, 2021).

The prevalence of food insecurity, housing instability, and transportation barriers observed in this sample aligns closely with rates reported among Medicaid beneficiaries (Thorndike et al., 2025). However, caution is warranted when generalizing beyond Medicaid beneficiaries participating in CHW interventions or to populations outside of Clark County, as differences in demographic, socioeconomic, and healthcare access factors may limit applicability.

Basic univariate analyses were conducted to examine associations between proposed covariates and the outcome variable, postintervention PCP visits (PCP\_VISITS\_POST), to justify inclusion in multivariable models. Due to the non-normal distribution of the utilization data, Spearman's rank-order correlation was used (Bishara & Hittner, 2021). Results indicated a moderate positive association between baseline PCP utilization and postintervention PCP visits ( $\rho = 0.428, p < 0.001$ ), suggesting that participants with higher utilization prior to CHW engagement were more likely to have higher utilization following the intervention. Age was also positively associated with postintervention PCP visits ( $\rho = 0.173, p < 0.001$ ). The correlation between baseline PCP visits and age was not statistically significant ( $\rho = 0.054, p = 0.258$ ), indicating that these covariates were not strongly related to one another. Based on the univariate findings, baseline PCP utilization and age were retained as covariates in the

multivariable analyses to control for preexisting utilization patterns and demographic differences that could influence postintervention primary care utilization.

## Results

### Descriptive Statistics

Descriptive statistics were computed to summarize the study sample in terms of demographic characteristics, SDOH factors, and patterns of primary care utilization. The final analytic sample consisted of 441 adult Medicaid recipients, with consistent values reported for all variables included in the analyses and no missing values. Participant age at enrollment ranged from 18 to 64 years (range = 46), with a mean age of 49.12 years ( $SD = 10.63$ , variance = 113.07). The median age was 51.00 years, and the age distribution exhibited slight negative skewness (skewness =  $-0.72$ ) and minimal kurtosis (kurtosis =  $-0.22$ ), indicating a relatively stable distribution with moderate variability.

When examined across SDOH subgroups, mean age values were generally consistent. Participants without documented food needs had a mean age of 49.20 years ( $SD = 10.59$ ), compared to 48.93 years ( $SD = 10.79$ ) among those with food insecurity. Mean age among participants without housing instability was 49.27 years ( $SD = 10.82$ ), compared to 48.93 years ( $SD = 10.42$ ) among those with housing-related needs. Participants without transportation needs had a mean age of 48.65 years ( $SD = 9.68$ ), while those with transportation needs had a mean age of 49.25 years ( $SD = 10.88$ ). Across combined SDOH groupings, mean age values generally clustered in the late 40s to early 50s, with greater variability observed in smaller subgroup cells.

SDOH variables were coded dichotomously (0 = no documented need, 1 = documented need). Food insecurity was identified for 29.0% of participants ( $n = 128$ ), while 71.0% ( $n = 313$ ) had no documented food-related need. The distribution was positively skewed (skewness = 0.93), with a median and mode of 0. Housing instability was documented for 44.4% of participants ( $n = 196$ ), while 55.6% ( $n = 245$ ) had no documented housing-related need. The median and mode were both 0, with minimal skewness (skewness = 0.22). Transportation needs were the most prevalent SDOH factor in the sample, with 78.9% of participants ( $n = 348$ ) identified as having transportation-related needs and 21.1% ( $n = 93$ ) having no documented transportation need. The distribution was negatively skewed (skewness =  $-1.42$ ), with a median and mode of 1. Table 2 summarizes the categorical variable information including each of the SDOH factors.

**Table 2**

*Categorical Variable Information*

SDOH Factors		<i>N</i>	Percent
FOOD	0	313	71.0%
	1	128	29.0%
	Total	441	100.0%
HOUSING	0	245	55.6%
	1	196	44.4%
	Total	441	100.0%
TRANSPORTATION	0	93	21.1%
	1	348	78.9%
	Total	441	100.0%

Baseline primary care provider visits prior to the CHW intervention (PCP\_VISITS\_PRIOR) ranged from 0 to 37 visits, with a mean of 4.14 visits ( $SD = 5.23$ , variance = 27.38) and a median of 2.00 visits. The distribution exhibited positive

skewness (skewness = 2.60) and elevated kurtosis (kurtosis = 9.07), indicating a concentration of lower visit counts and a smaller number of participants with higher utilization. Postintervention primary care utilization (PCP\_VISITS\_POST) ranged from 0 to 81 visits, with a mean of 6.09 visits ( $SD = 8.79$ , variance = 77.19) and a median of 4.00 visits. The 95% confidence interval for the mean ranged from 5.27 to 6.91. The distribution demonstrated substantial variability, pronounced positive skewness (skewness = 4.49), and high kurtosis (kurtosis = 26.99), reflecting a wide range of utilization with the presence of high visit counts. The continuous variables are described in table 3 and include the dependent variable and the covariates.

**Table 3**

*Continuous Variable Information*

		<i>N</i>	Minimum	Maximum	Mean	Std. Dev.
Dependent variable	PCP_VISITS_POST	441	0	81	6.09	8.786
Covariate	PCP_VISITS_PRIOR	441	0	37	4.14	5.233
	ENRL_AGE	441	18	64	49.12	10.633

Normality of continuous variables was assessed using Kolmogorov–Smirnov tests with Lilliefors correction, Shapiro–Wilk tests, and visual inspection of stem-and-leaf plots. Results indicated statistically significant deviation from normality for pre and post primary care utilization and age (PCP\_VISITS\_PRIOR, PCP\_VISITS\_POST, and ENRL\_AGE were all  $p < 0.001$ ). Visual inspection confirmed right-skewed distributions for primary care utilization variables and a mildly nonnormal distribution for age. These distributional characteristics supported the use of nonparametric and count-based

statistical methods in subsequent analyses and supported the need to transition away from the paired t test and replace with a sign test (Hutson & Yu, 2023).

### **Statistical Assumptions**

RQ1 examined the relationship between SDOH factors including food insecurity, housing instability, and transportation needs, and primary care utilization following participation in a CHW program. The dependent variable, postintervention primary care provider visits (PCP\_VISITS\_POST), is represented in count data which consists of non-negative integers, satisfying a core assumption for both Poisson and negative binomial regression models (Abu et al., 2022).

A Poisson regression model was initially considered because it is commonly used for count outcomes (see Abu et al., 2022). However, Poisson regression assumes equidispersion, which means that the mean and variance of the outcome variable are approximately equal (Abu et al., 2022). Evaluation of descriptive statistics indicated that this assumption was violated. The mean of PCP\_VISITS\_POST was 6.09, while the variance was 77.19, resulting in a variance-to-mean ratio substantially greater than 1. This discrepancy indicated the presence of significant overdispersion, making the Poisson regression model inappropriate for the data.

Inspection of the primary care utilization variables revealed the presence of extreme values, with almost half of the number of participants exhibiting substantially lower or higher visit counts relative to the rest of the sample. Extreme values were identified by calculating the Z-score for each variable where  $Z = \frac{x - \text{mean}}{\text{standard deviation}}$  (primary care utilization variable, pre or post)-mean/standard deviation (University of California,

2023). If  $Z > 3$ , the data points were considered extreme values (University of California, 2023). The existence of extreme values are well documented in health services research and are common in administrative healthcare data, particularly among Medicaid populations and individuals with complex medical and social needs (Bhattarai, 2013). These values were examined and determined to reflect valid utilization patterns rather than data entry errors or measurement anomalies.

These observations were retained in the dataset. Excluding high-utilization cases would have artificially reduced variance, distorted the underlying distribution of healthcare use, and introduced bias by disproportionately removing participants with the greatest healthcare needs (Bhattarai, 2013). Instead of removing valid observations, the analytic strategy was adjusted by selecting a negative binomial regression model, which is specifically designed to accommodate overdispersed count data with substantial variability and extreme values (Bhattarai, 2013).

Due to the violation of the equidispersion assumption and the overdispersed count data likely caused by the extreme values in the dataset, negative binomial regression was selected as the primary analytic method RQ1. Negative binomial regression is designed for count data with overdispersion and addresses the equidispersion limitation of Poisson models by introducing an additional parameter to model variability (Abu et al., 2022). Other assumptions of the negative binomial regression model were also evaluated and determined to be satisfied. The assumption of independence of observations was met because each record in the dataset represented a unique Medicaid member, and each

participant contributed a single postperiod count outcome to the model, and observations were not clustered (Green, 2021).

The assumption regarding the absence of perfect multicollinearity among predictors was also examined (Green, 2021). The primary independent variables which included food insecurity, housing instability, and transportation needs represented distinct SDOH categories and were not significantly correlated with one another. Additionally, preliminary bivariate analyses indicated that baseline primary care utilization and age, which were included as covariates, were not strongly correlated with each other, supporting their simultaneous inclusion in the model (Green, 2021). The assumption of an adequate sample size was satisfied. Negative binomial regression relies on moderate to large samples to produce stable parameter estimates and reliable standard errors (Green, 2021). The final analytic sample of 441 participants was sufficient to support model estimation with multiple predictors and covariates.

RQ2 examined changes in primary care utilization before and after participation in the CHW program. A paired  $t$  test was initially considered because the analysis involved paired observations, where pre- and postintervention PCP visits were measured for the same participants at different points in time (see Knief & Forstmeier, 2021). This design satisfied assumptions related to paired data and independence of pairs. A key assumption of the paired  $t$  test is that the distribution of the difference scores is approximately normal (Knief & Forstmeier, 2021). Assessment of this assumption using both the Shapiro–Wilk test and visual inspection of distributional plots indicated

statistically significant deviations from normality ( $p < 0.001$ ; Knief & Forstmeier, 2021).

As a result, the paired  $t$  test was deemed to be inappropriate for the data.

The Wilcoxon signed-rank test was subsequently considered as a nonparametric alternative because it does not require normally distributed difference scores and is appropriate for paired data (see Welsch & Neuhäuser, 2025). However, the Wilcoxon signed-rank test assumes that the distribution of the differences between paired observations is symmetrical around the median (Welsch & Neuhäuser, 2025).

Examination of the difference scores indicated a violation of this symmetry assumption, as evidenced by substantial skewness and a notable discrepancy between the mean and median of the differences (Welsch & Neuhäuser, 2025).

Due to the violation of both normality and symmetry assumptions, a sign test was selected as the most appropriate analytic method for RQ2. The sign test requires paired observations but does not assume normality or symmetry of the difference scores, making it suitable for evaluating directional change in primary care utilization when distributional assumptions of other paired tests are not met (Hutson & Yu, 2023). The sign test requires minimal distributional assumptions and assumes that observations are paired and originate from the same subjects, that each pair is independent of other pairs, and that the outcome variable is measured at least on an ordinal scale (Hutson & Yu, 2023). These assumptions were all satisfied for the data as primary care visit counts were obtained from the same participants before and after the intervention, pairs were independent, and changes in visit counts could be classified by direction (see Hutson & Yu, 2023).

## **Statistical Analysis Findings**

### ***Research Question 1***

RQ1 aimed to determine the relationship between SDOH factors including housing instability, transportation access, and food insecurity, and primary care utilization among adult Medicaid recipients aged 18–65 who participated in a Medicaid MCO’s CHW program in Clark County, Nevada in 2023. The null hypothesis stated there is no relationship between the SDOH factors and primary care utilization among the sample population while the alternative hypothesis stated there is a relationship between the SDOH factors and primary care utilization among the sample population.

A negative binomial regression model was estimated with postintervention primary care visits (PCP\_VISITS\_POST) using count data as the dependent variable and food insecurity, housing instability, and transportation need as predictors, controlling for baseline PCP utilization (PCP\_VISITS\_PRIOR) and age at the time of enrollment in the CHW program in 2023 (ENRL\_AGE). The Omnibus Likelihood Ratio Test in the negative binomial regression revealed that the model was statistically significant relative to the intercept-only model,  $\chi^2(5) = 92.47, p < 0.001$ , indicating that the predictors collectively explained significant variation in postintervention PCP visits. The Chi-Square value was 92.47 which represented the level of improvement in model fit occurred when the predictor variables were added. Table 4 summarizes the results of the Omnibus Likelihood Ratio test. The significant Chi-Square value indicates a very strong improvement in model fit (see Hilbe, 2014). There were five degrees of freedom included in the model which is equal to the number of predictors that were added which included

the independent variables and the covariates (see Hilbe, 2014). The p-value indicates the probability of obtaining an  $\chi^2$  value of 92.47 or larger if the predictors had no real relationship with postintervention PCP visits. The  $p < 0.001$  indicates that there is less than a 0.1% chance that the improvement in model fit occurred by random chance rather than by influence from the predictors (Hilbe, 2014). The Omnibus Likelihood Ratio Test revealed that the combined set of SDOH variables and covariates significantly improved prediction of postintervention primary care utilization.

**Table 4**

*Omnibus Test*

Likelihood Ratio Chi-Square	df	Sig.
92.470	5	<0.001

*Note.* Compares the fitted model against the intercept-only model.

The overall model demonstrated adequate fit based on the deviance and Pearson Chi-square goodness of fit statistics which is shown in table 5. The ratios of deviance to degrees of freedom was 0.85 and the Pearson chi-square to degrees of freedom was 1.35. Both values were close to one and were between 0.5-2.0 indicating the negative binomial regression model was an acceptable fit for the data set

**Table 5***Goodness of Fit*

	Value	df	Value/df
Deviance	369.044	435	0.848
Scaled deviance	369.044	435	
Pearson chi-square	585.955	435	1.347
Scaled pearson chi-square	585.955	435	
Log likelihood	-1225.917	435	

Transportation access emerged as a statistically significant predictor of postintervention primary care utilization in the negative binomial regression model. The Wald test indicated that the effect of transportation access was statistically significant  $Wald \chi^2(1) = 4.88, p = 0.027$ , which demonstrated that transportation status contributed significantly to the variation in postintervention PCP visit count after adjusting for the other SDOH factors and baseline PCP utilization, and age. Participants who had a documented transportation need who received support in addressing the need, had significantly higher expected counts of postintervention PCP visits compared with those without a documented transportation need. The estimated regression coefficient for the transportation effect was  $B = -0.293$ , which corresponds to an incident rate ratio (IRR) of 0.746 for those without a transportation need. The reciprocal of this value expressed the effect in terms of those with transportation needs who received an intervention experienced 1.34 times higher expected PCP visit counts which represented a 34.0% increase in utilization relative to participants who did not have transportation barriers ( $IRR = 1/0.746 = 1.34$ ). The 95.0% confidence interval for this effect ranged from 1.03 to

1.74 which indicated that the true population effect is likely between a 3.0% and 74.0% increase in expected PCP visit counts among participants with transportation needs who received the CHW intervention. Because the confidence interval does not include 1.00, this further confirms the statistical significance of the transportation effect.

Food insecurity was not a statistically significant predictor of postintervention PCP utilization, Wald  $\chi^2(1) = 2.69, p = 0.101$ . The estimated incidence rate ratio (IRR = 1.21) suggests that participants with documented food insecurity who received the intervention had an expected PCP visit count approximately 21.0% higher than those without documented food insecurity, however, this difference was not statistically reliable, as indicated by the associated 95.0% confidence interval [0.96, 1.52], which includes the null value of 1.00. This indicates that after adjusting for housing status, transportation need, baseline PCP utilization, and age, food insecurity did not demonstrate a statistically significant association with postintervention PCP visit counts in this sample.

Housing instability was also not a statistically significant predictor of postintervention PCP utilization, Wald  $\chi^2(1) = 0.38, p = 0.540$ . The estimated IRR = 1.07 indicates that participants with documented housing instability who received the intervention had an expected PCP visit count approximately 7.0% higher than those without housing instability however, the effect was minimal and not statistically significant, as reflected in the wide 95.0% confidence interval [0.86, 1.32], which again includes 1.00. These results suggest that, when controlling for other variables in the

model, housing instability alone was not a significant determinant of postintervention primary care utilization.

Baseline PCP utilization (PCP\_VISITS\_PRIOR) emerged as a strong and statistically significant predictor of postintervention utilization, Wald  $\chi^2(1) = 51.10, p < 0.001$ . The estimated IRR = 1.08 indicates that for each additional PCP visit prior to the intervention, the expected number of postintervention PCP visits increased by approximately 8.0%, holding all other variables constant. The 95.0% confidence interval [1.06, 1.10] was narrow and above 1.00, demonstrating a robust effect. This finding indicates that individuals' baseline healthcare utilization patterns were strongly associated with their utilization following CHW engagement.

Participant age (ENRL\_AGE) was also a statistically significant predictor of postintervention PCP utilization, Wald  $\chi^2(1) = 23.08, p < 0.001$ . The estimated IRR = 1.02 indicates that for each additional year of age, the expected number of postintervention PCP visits increased by approximately 2.0%, after controlling for SDOH factors and baseline utilization. The associated 95.0% confidence interval [1.01, 1.03] confirms that this effect was small but consistent and statistically reliable.

Estimated marginal means indicated higher expected PCP visits for participants with transportation needs ( $M = 5.99, 95.0\% \text{ CI } [5.29, 6.79]$ ) compared with those without transportation needs ( $M = 4.47, 95.0\% \text{ CI } [3.54, 5.64]$ ). These results are displayed in table 6. Differences by food insecurity and housing instability were smaller and not statistically significant. Together, these results indicate that while transportation was the only SDOH factor that significantly predicted postintervention PCP utilization, baseline

utilization and age were both strong and significant covariates. Food insecurity and housing instability, although associated with modest increases in expected visit counts, did not reach statistical significance in the fully adjusted model.

**Table 6**

*Parameter Estimates*

Parameter	B	95.0% Wald Confidence Interval			Wald Chi-Square	df	Sig.	95.0% Wald Confidence Interval for Exp(B)		
		Std. Error	Lower	Upper				Exp(B)	Lower	Upper
(Intercept)	436	0.2776	-0.108	0.98	2.463	1	0.117	1.546	0.897	2.664
Food=0	0.192	1169	-0.421	0.037	2.694	1	0.101	0.825	0.656	1.038
Food=1	0 <sup>a</sup>					1		1		
Housing=0	0.066	1082	-0.278	0.146	0.375	1	0.54	0.936	0.757	1.157
Housing=1	0 <sup>a</sup>					1		1		
Transport=0	0.293	0.1328	-0.554	0.033	4.881	1	0.027	0.746	0.575	0.967
Transport=1	0 <sup>a</sup>					1		1		
PCP Visits										
Prior	0.074	0.0104	0.054	0.094	51.096	1	<0.001	1.077	1.055	1.099
Enrl Age	0.024	0.005	0.014	0.034	23.077	1	<0.001	1.024	1.014	1.034

Based on these results, the null hypothesis for RQ1 ( $H_{01}$ ) was rejected because the negative binomial model demonstrated a statistically significant improvement over the intercept only model and identified significant associations between the predictor variables and postintervention PCP utilization, providing sufficient evidence to conclude that specific SDOH factors are related to PCP utilization in the study population.  $H_{01}$  was rejected because transportation was significantly associated with postintervention PCP utilization in the adjusted model.

### ***Research Question 2***

RQ 2 sought to understand how SDOH interventions provided through the CHW program within the MCO impacted PCP utilization among adult Medicaid recipients in 2023. Pre- and postintervention PCP visits were compared using a related samples sign test. The test indicated a statistically significant change in primary care utilization following the CHW enrollment period,  $z=4.52$ ,  $p < 0.001$ . The 12-month pre- and postvisit counts were compared for each of the 441 participants. The sign test evaluated whether the median difference between the two paired measurements was zero. The  $z$  statistic is the standardized test statistic that indicates the observed pattern of change between the pre- and postvisit count which was 4.52 standard deviations away from what would be expected if there were no changes in utilization. This value is significant and the probability of observing a result this extreme by random chance is less than 0.1% ( $p < 0.001$ ). The results indicated in table 7 revealed that the median directional change in PCP utilization between the pre- and postenrollment period was not zero, showing a statistically significant difference in utilization patterns across the two periods.

**Table 7**

*Related-Samples Sign Test Summary*

Total $N$	441
Test statistic	244.000
Standard error	9.962
Standardized test statistic	4.517
Asymptotic Sig. (2-sided test)	<0.001

The null hypothesis for RQ2 ( $H_0$ ) is rejected and the alternative hypothesis is accepted because  $p < 0.001$ . The results revealed strong statistical evidence that primary care utilization change significantly after participants received CHW services. Because the sample consists of participants who already had an SDOH need and were receiving CHW support, the findings reflect changes within the context of the program without implying causality. These results demonstrate a robust association between the CHW intervention period and the utilization patterns of the adult Medicaid recipients in Clark County enrolled in the program. A hypothesis test confirmed the rejection of the null hypothesis as shown in table 8.

**Table 8**

*Hypothesis Test Summary*

Null hypothesis	Test	Sig. <sup>a,b</sup>	Decision
The median of differences between PCP_VISITS_PRIOR and PCP_VISITS_POST equals 0.	Related-Samples Sign Test	<0.001	Reject the null hypothesis

### Summary

In this chapter I presented the results of the statistical analyses conducted to examine the relationships between selected SDOH factors, CHW interventions, and primary care utilization among adult Medicaid recipients in Clark County, Nevada. The findings provide clear answers to both research questions and establish the foundation for the interpretation and implications discussed in Chapter 5.

For RQ 1, which examined the relationship between housing instability, transportation access, food insecurity, and primary care utilization, the negative binomial regression model demonstrated that the combined set of SDOH variables and covariates significantly improved prediction of postintervention primary care visits when compared to the intercept-only model,  $\chi^2(5) = 92.47, p < 0.001$ . Among the SDOH factors, transportation need emerged as the only statistically significant predictor of postintervention primary care utilization. Participants with documented transportation needs who received CHW support addressing those needs experienced a 34% higher expected rate of primary care visits compared with participants without transportation barriers. In contrast, food insecurity and housing instability were not statistically significant predictors in the fully adjusted model. Baseline primary care utilization and age were both strong and statistically significant covariates, indicating that preexisting utilization patterns and demographic factors were important determinants of postintervention utilization. These findings led to the rejection of the null hypothesis for RQ1 and acceptance of the alternative hypothesis, providing evidence that specific SDOH factors, especially transportation, are meaningfully related to primary care utilization among this population.

For RQ 2, which examined changes in primary care utilization following receipt of CHW services, the related samples sign test revealed a statistically significant increase in primary care visits after CHW intervention,  $z = 4.52, p < 0.001$ . The probability of observing a change of this magnitude by chance was less than 0.1%, providing strong evidence that utilization patterns differed between the pre- and postintervention periods.

Accordingly, the null hypothesis for RQ2 was rejected and the alternative hypothesis was accepted. While the study design does not support causal inference, the results demonstrate a robust association between the period of CHW engagement and increased primary care utilization among adult Medicaid recipients with documented SDOH needs.

Together, these findings indicate that transportation barriers play a particularly influential role in shaping access to primary care within CHW-engaged Medicaid populations and that CHW program participation is associated with significant changes in utilization behavior. In chapter 5 I build upon these results by interpreting the findings within the context of existing literature and theoretical frameworks, discussing implications for policy and practice, acknowledging study limitations, and offering recommendations for future research and program development.

## Chapter 5: Discussion, Conclusions, and Recommendations

### Introduction

The purpose of this quantitative, correlational study was to examine the relationship between specific SDOH factors which included housing instability, food insecurity, and transportation access, and primary care utilization among adult Medicaid recipients aged 18–65 who participated in a Medicaid MCO’s CHW program in Clark County, Nevada, during 2023. Using retrospective administrative data from CHW case notes, SDOH screenings, and Medicaid claims, I sought to estimate the direction and strength of associations between SDOH factors, CHW interventions, and primary care visit counts while controlling for baseline utilization and age.

The study was conducted to address persistent gaps in understanding how specific SDOH needs and CHW interventions are associated with healthcare utilization patterns among Medicaid populations. Given the increasing emphasis on addressing SDOH within Medicaid policy and managed care systems, additional evidence is needed to inform program design and resource allocation in those settings.

Findings from this study indicated that the overall regression model significantly predicted postintervention primary care utilization. Transportation emerged as the only SDOH factor that significantly predicted increased primary care utilization after CHW engagement, while food insecurity and housing instability were not statistically significant predictors in the fully adjusted model but when the factors were combined, they were significant predictors of utilization patterns when considered together in the regression model. Baseline primary care utilization and age were both strong and

statistically significant covariates. In addition, the paired analysis revealed that primary care utilization was statistically significantly higher in the postCHW enrollment period. Together, these findings suggest that transportation-related barriers, compounded social needs, and individual utilization patterns play central roles in shaping primary care engagement among adult Medicaid recipients receiving CHW support.

The remainder of this chapter provides an interpretation of these findings in relation to the study's theoretical framework and existing literature, discusses implications for practice and policy, identifies limitations, and offers recommendations for future research.

### **Interpretation of the Findings**

The purpose of this study was to examine the relationship between specific SDOH factors and primary care utilization among adult Medicaid recipients who participated in a CHW program within a Medicaid managed care organization in Clark County, Nevada. In this section, I interpret the findings in relation to the existing body of peer-reviewed literature and the conceptual framework that guided the study. Overall, the findings confirm, extend, and refine current knowledge in public health regarding the role of SDOH and CHW interventions in the Medicaid managed care setting in shaping healthcare utilization among vulnerable populations.

The most notable finding was that transportation emerged as the only SDOH factor that significantly predicted postintervention primary care utilization, even after controlling for age and baseline utilization. Participants with documented transportation

needs who received CHW support had 34.0% higher expected primary care visit counts compared with those without transportation barriers.

This result strongly confirms existing literature identifying transportation as a central determinant of access to care and healthcare engagement (see Acquah et al., 2022; Boyd et al., 2024; Cochran et al., 2022; Jenks et al., 2023). Prior studies consistently demonstrate that transportation barriers reduce timely care, interfere with continuity of care, and limit adherence to treatment plans, particularly among Medicaid recipients and other low-income and vulnerable populations.

This study adds to the literature by demonstrating that within a Medicaid MCO CHW program, targeted transportation support is associated with substantially higher engagement in primary care, even when other social risks are present. This finding aligns with the growing evidence that CHWs are most effective when they intervene on concrete access barriers such as transportation, appointment scheduling, and care navigation (see Gordon et al., 2023; Moses & Benyo, 2021; Wennerstrom et al., 2023).

Food insecurity and housing instability were not statistically significant predictors of postintervention primary care utilization in the fully adjusted model. Although both variables were associated with slight increases in expected visit counts, their effects were not statistically reliable.

This finding partially disconfirms portions of the broader literature, which consistently documents strong associations between food insecurity, housing instability, and adverse health outcomes as well as increased emergency department utilization and delayed care (see Berkowitz et al., 2019; Park et al., 2024; Rollings et al., 2022; Routhier

et al., 2023). However, it also extends current knowledge by suggesting that within the specific context of a CHW-supported Medicaid population, the direct influence of housing and food insecurity on primary care utilization may be reduced when CHW interventions are already addressing these needs.

This pattern is consistent with recent research showing that while housing and food insecurity contribute to poor outcomes, the effects of interventions on health care utilization may vary depending on program design, intensity, and population characteristics (Berkowitz & Terranova, 2024; Mayfield et al., 2024; Wennerstrom, 2023). The findings within this study suggest that transportation barriers may represent the most immediate and modifiable constraint on primary care engagement within this CHW model.

The significant increase in primary care utilization observed in the pre-/postintervention analysis further supports the role of CHWs as effective facilitators of outpatient care engagement. The sign test demonstrated a statistically significant difference in utilization patterns across the pre- and postintervention periods ( $z = 4.52, p < 0.001$ ), providing strong evidence that utilization patterns shifted during program participation. The sign test evaluates direction rather than magnitude revealing evidence of a shift in utilization patterns directionally, indicating positive changes occurring during the intervention period.

This result confirms and strengthens findings from prior studies indicating that CHW programs improve outpatient follow-up, appointment adherence, and engagement in preventive services (Ferrer et al., 2022; George et al., 2020; Gordon et al., 2023;

Kangovi et al., 2018). This study further contributes to the existing literature by offering quantitative evidence from a Medicaid MCO context and by isolating the specific SDOH pathways most closely associated with improved primary care engagement to support the identification of CHW program opportunities within Medicaid MCO's.

The findings of this study contribute meaningful new evidence to the field of public health in several important ways. First, this study provides quantitative, program-level evidence from a Medicaid MCO's CHW program which is a setting that remains underrepresented in the peer-reviewed literature despite its growing national importance. Second, the results demonstrate that transportation-related interventions may yield the strongest and most consistent returns for improving primary care utilization among Medicaid recipients with documented social needs, which can offer practical insight for prioritizing resource allocation within social care programs. Third, the study refines current understanding of how different SDOH operate within structured CHW programs, illustrating that not all social needs exert equal influence on healthcare utilization even when interventions are provided. Finally, the findings address a well-documented gap in the literature by isolating and examining SDOH-specific effects within a Medicaid MCO CHW model in an urban setting, thereby extending knowledge beyond prior studies that have mostly evaluated CHW programs in in community or clinic-based settings without distinguishing the unique contributions of housing, food, and transportation supports.

The findings of this study are consistent with the CSDH framework which emphasizes the central role of intermediary determinants including material conditions like housing, food, transportation, and access to health services, in shaping health

behaviors and health outcomes (Solar & Irwin, 2010). The CSDH framework states that these intermediary conditions serve as the most immediate pathways through which broader structural forces influence individual health behaviors, such as engagement with healthcare services (Solar & Irwin, 2010).

Transportation emerged as the most influential intermediary determinant associated with primary care utilization following CHW intervention. Participants with documented transportation needs who received CHW support demonstrated significantly higher levels of primary care engagement, indicating that transportation represents a particularly critical and modifiable SDOH barrier that can be targeted to influence care-seeking behaviors. This pattern directly reinforces the CSDH model's emphasis on material living conditions as primary drivers of healthcare access and utilization, particularly among populations experiencing socioeconomic vulnerability (Solar & Irwin, 2010).

While housing instability and food insecurity were also prevalent within the study population, their effects on postintervention primary care utilization were not statistically significant after adjustment for covariates. This finding does not contradict the CSDH framework but rather clarifies its application within the context of structured CHW programs operating inside Medicaid managed care organizations. The results indicate that transportation barriers may serve as the most immediate constraint on primary care engagement, while housing and food insecurity likely affect health outcomes through more complex, longer-term pathways not fully observable within a 1-year timeframe.

Overall, the study's results support the CSDH framework by demonstrating how targeted interventions at the intermediary level, especially those addressing transportation, can produce measurable improvements in healthcare engagement. These findings further reveal how CHWs function as critical connectors within the CSDH model, bridging social risk identification with actionable strategies that improve access to essential health services.

### **Limitations of the Study**

The limitations identified in Chapter 1 were largely confirmed during the execution of the study and are presented following the completion of the analysis. As initially stated, the correlational and observational design of the study limits internal validity (Olier et al., 2023). Although statistically significant associations were observed between transportation need, baseline utilization, age, and postintervention primary care utilization, the absence of a control group and random assignment prevents any causal inferences to be made (Olier et al., 2023). As originally anticipated, changes in primary care utilization may have been influenced by unmeasured external factors such as changes in health status, community resource availability, Medicaid policy adjustments, or broader healthcare system dynamics occurring during 2023 (O'Shea et al., 2024). These factors could not be fully isolated from the effects of CHW engagement.

The study's external validity is constrained by the narrowly defined population and setting. The sample consisted exclusively of adult Medicaid recipients aged 18–65 enrolled in a single Medicaid MCO's CHW program in Clark County, Nevada. While this enhances ecological and programmatic validity, the findings may not generalize to

other geographic regions, non-managed care Medicaid populations, privately insured individuals, or CHW programs with different structures or service models (Zhu et al., 2023).

Construct validity and measurement limitations were observed due to reliance on secondary administrative data. SDOH indicators were derived from CHW documentation and screening tools, which are subject to variability in reporting practices and potential underdocumentation or underreporting (Xu, 2025). Some participants may have underreported social needs because of discomfort or mistrust, and primary care utilization derived from claims data may undercount visits obtained outside the Medicaid billing system (Nichols et al., 2024). Although the use of multiple data sources strengthened construct validity, some degree of measurement bias remains possible (Xu, 2025). Selection and information bias could not be fully eliminated. Participants who engaged with CHW services may differ systematically from those who disengaged or never enrolled (Greenland & Morgenstern, 2001). Although all eligible participants during the study period were included to reduce selection bias, differences in engagement and documentation practices among various CHWs may have introduced information bias (Wennerstrom et al., 2023).

Distributional limitations were observed in utilization data. Primary care visit counts exhibited substantial skewness and the presence of high outliers or extreme values were present which is a pattern typical of healthcare utilization data (Bhattarai, 2013). Rather than excluding extreme values, all observations were retained to preserve the real-world characteristics of the population and avoid introducing bias through arbitrary data

trimming. Consequently, negative binomial and nonparametric methods were required, which appropriately accommodated these distributional features but limited the use of parametric approaches. Despite these limitations, the study provides meaningful and credible evidence regarding the relationship between specific SDOH factors, CHW engagement, and primary care utilization within a Medicaid managed care context.

### **Recommendations**

The findings of this study contribute important evidence regarding the relationship between specific SDOH factors including housing instability, food insecurity, and transportation access, and primary care utilization among adult Medicaid recipients participating in a CHW program within a Medicaid MCO. Several limitations and gaps identified in this study and in the broader literature suggest important directions for future research.

Future studies should examine intervention pathways that focus on specific SDOH factors using more granular measurement of both social needs and intervention structure and intensity. For this study, I relied on binary indicators of housing instability, food insecurity, and transportation need, which limited the ability to evaluate how different levels of need impacted outcomes or to measure varying levels of need and understand whether a gradient of effect existed with increasing levels of need. The literature reviewed in Chapter 2 consistently demonstrates that severity of social risk influences healthcare utilization and outcomes (see Ma et al., 2024; Ostrer & Seligman, 2025; Routhier et al., 2023). Future research employing continuous or ordinal measures of SDOH severity, along with detailed documentation of intervention type, frequency,

and duration, would allow for more precise estimation of how different SDOH domains affect primary care engagement.

Longitudinal designs extending beyond a 12-month pre- and postperiod are warranted. I examined utilization within one calendar year prior to enrollment in the CHW program and one calendar year after enrollment in the program, which limits insight into whether observed improvements in primary care utilization are sustained over time. Prior research suggests that CHW program effects may evolve as interventions mature and participant engagement stabilizes (Austin & Qu, 2024; Wennerstrom et al., 2023). Longitudinal studies following participants across multiple years would help clarify long-term utilization patterns and the durability of CHW-driven changes. Longitudinal studies may also help to support with understanding the long-term impact of housing instability and food insecurity on primary care utilization as the short-term effect was statistically insignificant when examining those variables individually.

Future research should consider incorporating comparison groups when feasible. While the present correlational design was appropriate for estimating associations in a real-world setting, inclusion of comparison groups would strengthen internal validity and allow for stronger inference regarding program influence. Quasi-experimental designs using matched Medicaid populations could address this gap while remaining consistent with ethical and operational constraints of managed care environments. Additional research is needed to identify contextual factors like demographics, disease burden, geographic access, and organizational characteristics that may impact the CHW intervention outcomes. The literature reviewed in Chapter 2 indicates that program

outcomes vary by population characteristics and by MCO program structure (see Gordon et al., 2023; Wennerstrom et al., 2023). Examining subgroup differences would provide valuable guidance for tailoring CHW programs to maximize impact among high-need populations.

Finally, further research is needed to examine the mechanisms through which transportation interventions influence primary care utilization, given that transportation was the only SDOH factor that demonstrated a statistically significant independent association in this study. Mixed-methods research incorporating qualitative interviews with participants and CHWs could illuminate how transportation assistance alters healthcare behaviors, appointment adherence, and patient–provider relationships. A mixed-methods approach would complement quantitative findings and deepen understanding of how material conditions shape healthcare engagement. Collectively, these recommendations support the continued development of evidence-based, targeted CHW interventions within Medicaid MCOs and align with national priorities to integrate social care into healthcare delivery while advancing health equity.

### **Implications**

The findings of this study have meaningful implications for positive social change at the organizational, programmatic, and population health levels, particularly within Medicaid managed care systems serving socially vulnerable populations. By empirically demonstrating how specific SDOH factors, especially transportation, are associated with primary care utilization among adult Medicaid recipients engaged in MCO CHW

programs, this study provides evidence that can inform more equitable, targeted, and effective social care strategies.

At the population level, the results support public health efforts to reduce disparities in access to primary and preventive care among Medicaid recipients by highlighting the importance of addressing transportation barriers as a mechanism for improving healthcare engagement, especially in vulnerable and at-risk populations. Transportation emerged as the most prominent SDOH factor associated with increased postintervention primary care utilization, suggesting that transportation assistance within MCO CHW programs may play a particularly important role in supporting continuity of care for low-income adults with complex social needs.

At the programmatic level, these findings offer actionable guidance for Medicaid MCOs seeking to optimize CHW program design. Specifically, allocating resources toward transportation coordination, appointment facilitation, and non-emergency medical transportation support may yield measurable improvements in outpatient engagement. Such program refinements have the potential to improve health equity by reducing missed appointments, increasing continuity with primary care providers, and supporting early intervention for chronic conditions. These types of supports lead to positive outcomes that are strongly linked to long-term health improvements and reduced healthcare disparities.

At the policy level, these findings offer relevant evidence for state Medicaid agencies and state and federal policymakers seeking to inform decisions about Medicaid financing and program design for SDOH initiatives. The observed association between

transportation-focused CHW interventions embedded within the managed care setting and improved primary care utilization provides empirical support for continued and expanded funding of Medicaid SDOH programs that address concrete access barriers. Policymakers may use this evidence to guide decisions related to reimbursement models, value-based payment structures, and allowable Medicaid benefits that support non-clinical services delivered by CHWs.

These results also reinforce the potential of Medicaid managed care as a platform for advancing health equity through target social investments. While this study does not establish causality, the observed relationships suggest that strategic SDOH investments may strengthen engagement in services among vulnerable populations when delivered through well-integrated CHW programs.

Methodologically, this study contributes to public health research by demonstrating the feasibility and value of using administrative and program-level data to evaluate the associations between SDOH interventions and healthcare utilization within real-world Medicaid settings. Empirically, the study extends existing knowledge by isolating the relative contributions of specific SDOH factors within a structured MCO based CHW model, addressing a documented gap in the literature regarding SDOH-specific effects in Medicaid managed care environments.

For practitioners and health system leaders, the findings underscore the importance of integrating CHWs into care coordination models with a strong focus on addressing material barriers, particularly transportation, that impede healthcare access. The results suggest that CHW interventions should prioritize transportation assessment,

referral, and follow-up as core components of social care workflows. Furthermore, the significant association between baseline utilization and postintervention utilization highlights the need for early identification of high-utilization members who may benefit from more intensive CHW engagement.

Collectively, these implications support health systems, policymakers, and public health professionals in designing more responsive, equitable care models that align social support services with clinical delivery. By strengthening the capacity of CHW programs in the Medicaid managed care setting to address key social barriers, particularly transportation, this study contributes to sustainable strategies for improving healthcare access and advancing positive social change among Medicaid populations.

### **Conclusion**

Throughout this study, I examined the relationship between SDOH factors, specifically housing instability, food insecurity, and transportation barriers, and primary care utilization among adult Medicaid recipients enrolled in a CHW program within a Medicaid MCO in Clark County, Nevada. Using a quantitative correlational design and secondary, retrospective, real-world administrative data, program-level evidence was generated regarding how specific social needs and CHW interventions are associated with primary care utilization in a high-risk Medicaid population in an urban setting.

The findings demonstrate that transportation barriers, when addressed through CHW intervention, were significantly associated with higher postintervention primary care utilization, even after controlling for baseline utilization and age. In contrast, housing instability and food insecurity did not emerge as statistically significant

predictors in the fully adjusted model. Additionally, the results revealed a statistically significant increase in primary care utilization following CHW engagement, providing strong evidence that participation in CHW services within the MCO setting is meaningfully associated with improved connection to primary care within this population.

Taken together, these results advance understanding of how distinct social determinants operate within structured managed care CHW programs and highlight the particularly powerful role of an MCO to provide transportation support in facilitating access to primary care. The findings from this study fill a documented gap in the literature by isolating the contributions of specific SDOH factors within a Medicaid managed care CHW model using rigorous statistical methods and program-level data.

At its core, this study demonstrates that addressing the right social barriers in the right way matters. While housing and food remain critical determinants of health, transportation emerged as the most immediate and actionable lever for improving primary care utilization among Medicaid recipients when supported through CHW intervention by their Medicaid MCO. These findings provide empirical evidence that targeted, socially informed interventions particularly around transportation supports can strengthen primary care engagement for vulnerable populations and move health systems closer to achieving equitable access to care and are especially effective when delivered by CHW programs within Medicaid MCOs.

By grounding the analysis in real-world Medicaid operations, this study offers decision-relevant evidence for health plans, CHW programs, and policymakers seeking

effective strategies to align social care with healthcare delivery. The results affirm that social care is not ancillary to healthcare, it is foundational to it. Strategic investments and program development focused on CHW-led SDOH interventions represent a powerful pathway for improving population health, strengthening primary care systems, and advancing health equity for Medicaid populations.

## References

- Abu Bakar, N. S., Jabrullah, A. H., Mohd Shaiful Jefri, M. N. S., & Jailani Anis Syakira, J. (2022). Count data models for outpatient health services utilization. *BMC Medical Research Methodology*, 22, Article 261. <https://doi.org/10.1186/s12874-022-01733-3>
- Acquah, I., Hagan, K., Valero-Elizondo, J., Javed, Z., Butt, S. A., Mahajan, S., Taha, M. B., Hyder, A. A., Mossialos, E., Cainzos-Achirica, M., & Nasir, K. (2022). Delayed medical care due to transportation barriers among adults with atherosclerotic cardiovascular disease. *American Heart Journal*, 245, 60–69. <https://doi.org/10.1016/j.ahj.2021.11.019>
- ADA Health Policy Institute. (2023). *Medicaid claims data and access to care: A research brief*. <https://www.ada.org/resources/research/health-policy-institute>
- Alavi, M., Visentin, D. C., & Cleary, M. (2023). Exploratory and confirmatory factor analysis in health sciences research: A practical guide. *Nursing & Health Sciences*, 25(1), 45–52. <https://doi.org/10.1111/nhs.13012>
- Allen-Meares, P., Lowry, B., Estrella, M., & Mansuri, S. (2020). Health literacy barriers in the health care system: Barriers and opportunities for the profession. *Health & Social Work*, 45(1), 62-64. <https://doi.org/10.1007/s10900-020-00807-1>
- Althubaiti, A. (2016). Information bias in health research: Definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, 9, 211–217. <https://doi.org/10.2147/MDH.S104807>
- American Journal of Managed Care. (2023). *Managed care strategies for improving outcomes and reducing costs*. <https://www.ajmc.com/>

American Public Health Association. (n.d.). *Community health workers*.

<https://www.apha.org/apha-communities/member-sections/community-health-workers>

Andersen, R. (2020). *Health care utilization*. In Encyclopedia of Public Health (eds). Springer.

[https://doi.org/10.1007/978-3-319-69892-2\\_991-1](https://doi.org/10.1007/978-3-319-69892-2_991-1)

Asare, M., Owusu-Sekyere, E., Elizondo, A., & Benavidez, G. A. (2024). Exploring cervical cancer screening uptake among women in the United States: Impact of social determinants of health and psychosocial determinants. *Behavioral Sciences*, 14(9), 811.

<https://doi.org/10.3390/bs14090811>

Association of State and Territorial Health Officials. (2022). *Community health workers:*

*Evidence of impact and effectiveness*. <https://www.astho.org/globalassets/pdf/community-health-workers-summary-evidence.pdf>

Asthana, S., Gago, L., Garcia, J., Beestrum, M., Pollack, T., Post, L., Barnard, C. & Goel, M. S. (2025). Housing instability screening and referral programs: A scoping review. *Joint Commission Journal on Quality and Patient Safety*, 51(1), 1-10.

<https://doi.org/10.1016/j.jcjq.2024.08.007>

Austin, S., & Qu, H. (2024a). *Community health workers and Medicaid: Improving access to care and addressing social needs*. Health Affairs Forefront.

<https://www.healthaffairs.org/doi/10.1377/forefront.2024.0215.123456/full/>

Austin, S., & Qu, H. (2024b). Community health workers bridging the gap: Connecting Medicaid members with providers, managed care, and community-based organizations. *Risk Management Healthcare Policy*, 17, 2949-2958.

<https://doi.org/10.2147/RMHP.S482855>

- Baines, R., Stevens, S., Austin, D., Anil, K., Bradwell, H., Cooper, L., Maramba, I. D., Chatterjee, A., & Leigh, S. (2024). Patient and Public Willingness to Share Personal Health Data for Third-Party or Secondary Uses: Systematic Review. *Journal of medical Internet research*, 26, e50421. <https://doi.org/10.2196/50421>
- Ball, M. A. Z., Sack, D. E., Druffner, S. A., Jones, I., Wrenn, J. O., Sexton, M. M., Shinn, M., & Hess, J. J. (2024). Characteristics and health care utilization of patients with housing instability in the ED. *JAMA Network Open*, 7(1), e248565. <https://doi.org/10.1001/jamanetworkopen.2024.8565>
- Banks, A., Bell, B., Ngendahimana, D., Embaye, M., Freedman, D., Chisolm, D. (2021). Identification of factors related to food insecurity and the implications for social determinants of health screenings. *BMC public health*, 21(1), 1410. <https://doi.org/10.1186/s12889-021-11465-6>
- Benchimol, E. I., Smeeth, L., Guttman, A., Harron, K., Moher, D., Petersen, I., Sorensen, H. T., Von Elm, E., & Langan, S. M. (2021). The REporting of studies conducted using observational routinely-collected health data (RECORD) statement. *PLOS Medicine*, 18(9), e1003761. <https://doi.org/10.1371/journal.pmed.1001885>
- Berini, C. R., Bonilha, H. S., & Simpson, A. N. (2022). Impact of community health workers on access to care for rural populations in the United States: A systematic review. *Journal of Community Health*, 47, 539–553. <https://doi.org/10.1007/s10900-021-01052-6>
- Berkowitz, S. A., & Terranova, J. (2024). Medically tailored meals to address the health consequences of food insecurity. *New England Journal of Medicine*, 309(9), 775–776. <https://doi.org/10.1056/NEJMp2313222>

Berkowitz, S. A., Basu, S., Gundersen, C., & Seligman, H. K. (2019). State-level and county-level estimates of health care costs associated with food insecurity. *Preventing Chronic Disease*, 16, 180549. <https://doi.org/10.5888/pcd16.180549>

Berrett-Abebe, J., & Reed, S. C. (2024). Exploring the relationship between food insecurity, chronic health conditions, and serious mental illness in the United States: Implications for social work. *Health and Social Work*, 49(3), 147–156. <https://doi.org/10.1093/hsw/hlae012>

Bhat, A. C., Almeida, D. M., Fenelon, A., & Santos-Lozada, A. R. (2022). A longitudinal analysis of the relationship between housing instability and physical health among midlife and aging adults in the United States. *SSM - Population Health*, 18, 101128. <https://doi.org/10.1016/j.ssmph.2022.101128>

Bhattarai, G. R. (2013). Understanding the outliers in healthcare expenditure data. *Proceedings of the Northeast SAS Users Group (NESUG)*. [https://www.lexjansen.com/nesug/nesug13/116\\_Final\\_Paper.pdf](https://www.lexjansen.com/nesug/nesug13/116_Final_Paper.pdf)

Bishara, A. J., & Hittner, J. B. (2021). Testing the significance of a correlation with nonnormal data: Comparison of Pearson, Spearman, transformation, and resampling approaches. *Psychological Methods*, 17(3), 399–417. <https://doi.org/10.1037/a0028087>

Blecker, S., Lemieux, E., Paul, M. M., Berry, C. A., Bouchonville, M. F., Arora, S., & Billings, J. (2020). Impact of a primary care provider tele-mentoring and community health worker intervention on utilization in Medicaid patients with diabetes. *Endocrine Practice*, 26(10), 1070–1076. <https://doi.org/10.4158/EP-2019-0535>

- Bleich, S. N., Koma, J. W., & Jernigan, V. B. B. (2023). The worsening problem of food insecurity. *JAMA Health Forum*, 4(11), e233456.  
<https://doi.org/10.1001/jamahealthforum.2023.4974>
- Bolen, S. D., Beverly, E. A., Khoury, S., Regan, S., Wright, J. T., Jr, Koroukian, S., Wexler, R., Rao, G., Hargraves, D., Bricker, D., Solomon, G. D., Holliday, M., Gardner-Buckshaw, S., Dworking, L., Perzynski, A. T., Littman, E., Nevar, A., Swiatkowski, S. M., Applegate, M., & Konstan, M. W. (2022). Forming Cardi-OH: A statewide collaborative to improve cardiovascular health in Ohio. *Cureus*, 14(8), e28381.  
<https://doi.org/10.7759/cureus.28381>
- Boyd, J., Carter, M., & Baus, A. (2024). Access to MAT: participants' experiences with transportation, non-emergency transportation, and telehealth. *Journal of Primary Care & Community Health*, 1–10. <https://doi.org/10.1177/21501319241233198>
- Brady, P. J., Askelson, N. M., Wright, B., Daly, E., Momany, E., McInroy, B., & Damiano, P. (2022). Food insecurity is prevalent in Iowa's Medicaid expansion population. *Journal of the Academy of Nutrition and Dietetics*, 122(2), 394–402.  
<https://doi.org/10.1016/j.jand.2021.04.011>
- California Department of Managed Health Care. (n.d.). Preventive and routine care.  
<https://www.dmhc.ca.gov/HealthCareinCalifornia/GettheBestCare/PreventiveCare.aspx>
- Centers for Disease Control and Prevention (CDC). (n.d. a). Addressing social determinants of health and chronic disease. <https://www.cdc.gov/health-equity/chronic-disease/social-determinants-of-health-and-chronic-disease/index.html>

Centers for Disease Control and Prevention (CDC). (n.d. b). Social determinants of health:

About CDC. <https://www.cdc.gov/about/priorities/why-is-addressing-sdoh-important.html>

Centers for Disease Control and Prevention. (2023). Health care access & quality.

<https://www.cdc.gov/prepyourhealth/discussionguides/healthcare.htm>

Centers for Disease Control and Prevention. (2024). What is Health Equity?

<https://www.cdc.gov/health-equity/what-is/index.html>

Centers for Disease Control and Prevention. (2025). Age — Health, United States — Sources &

definitions. <https://www.cdc.gov/nchs/hus/sources-definitions/age.htm>

Centers for Medicare & Medicaid Services. (2022). Social drivers of health and health-related

social needs [Web page]. <https://www.cms.gov/priorities/innovation/key-concepts/social-drivers-health-and-health-related-social-needs>

Centers for Medicare & Medicaid Services. (2024). Quality measures.

<https://www.cms.gov/medicare/quality/measures>

CHW Central. (2021a). Community health workers: The state of the evidence.

<https://chwcentral.org/wp-content/uploads/State-of-the-Evidence-2021-1.pdf>

CHW Central. (2021b). Community health worker documentation and data systems: Best

practices and recommendations. <https://chwcentral.org/resources>

Cigna Healthcare. (2025). What is managed care? [https://www.cigna.com/knowledge-](https://www.cigna.com/knowledge-center/what-is-managed-care)

[center/what-is-managed-care](https://www.cigna.com/knowledge-center/what-is-managed-care)

Cochran, A. L., McDonald, N. C., Prunkl, L., Vinella-Brusher, E., Wang, J., Oluyede, L., &

Wolfe, M. (2022). Transportation barriers to care among frequent health care users

during the COVID pandemic. *BMC Public Health*, 22(1), 1783.

<https://doi.org/10.1186/s12889-022-14149-x>

Coker, C. (2022). Delimitations in doctoral dissertations: a thematic analysis. *International Journal of Doctoral Studies*, 17(1), 141-159. <https://doi.org/10.28945/4939>

Coker, T. R., Liljenquist, K., Lowry, S. J., Fiscella, K., Weaver, M. R., Ortiz, J., LaFontaine, R., Silver, J., Salaguinto, T., Johnson, G., Friesema, L., Porrás-Javier, L., Guerra, L. J. S., & Szilagyi, P. G. (2023). Community health workers in early childhood well-child care for Medicaid-insured children: A randomized clinical trial. *JAMA*, 329(20), 1757–1767.

<https://doi.org/10.1001/jama.2023.7197>

County Health Rankings. (2024). Clark County, Nevada health outcomes. *University of Wisconsin Population Health Institute*. <https://www.countyhealthrankings.org>

Crane, M., Bohn-Goldbaum, E., Grunseit, A., & Bauman, A. (2020). Using natural experiments to improve public health evidence: A review of context and utility for obesity prevention. *Health Research Policy and Systems*, 18, Article 48. <https://doi.org/10.1186/s12961-020-00564-2>

DePaul University. (n.d.). A guide to critical thinking — Identify assumptions.

[https://condor.depaul.edu/jmaresh/think/Critical\\_Thinking\\_print.html](https://condor.depaul.edu/jmaresh/think/Critical_Thinking_print.html)

Deng, S., Hager, K., Wang, L., Cudhea, F., Wong, J., Kim, D., Mozaffarian, D. (2025).

Estimated impact of medically tailored meals on health care use and expenditures in 50 US states. *Health Affairs*, 44(4). <https://doi.org/10.1377/hlthaff.2024.01307>

Dong, X., Gindling, T. H., & Miller, N. A. (2022). Effects of the Medicaid expansion under the Affordable Care Act on health insurance coverage, health care access, and use for people

with disabilities. *Disabilities and Health Journal*, 15(1).

<https://doi.org/10.1016/j.dhjo.2021.101180>

Egami, N., & Hartman, E. (2023). Elements of external validity: Framework, design, and analysis. *American Political Science Review*, 117(3), 1070–1088.

<https://doi.org/10.1017/S0003055422000880>

Emerson, S. D., McLinden, T., Sereda, P., Yonkman, A. M., Trigg, J., Peterson, S., Hogg, R. S., Salters, K. A., Lima, V. D., & Barrios, R. (2024). Secondary use of routinely collected administrative health data for epidemiologic research: Answering research questions using data collected for a different purpose. *International journal of population data science*, 9(1), 2407. <https://doi.org/10.23889/ijpds.v9i1.2407>

Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, 5(6), 00149. <https://doi.org/10.15406/bbij.2017.05.00149>

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G\*Power 3.1: tests for correlation and regression analyses. *Behavior research methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>

Ferrer, R. L., Schlenker, C. G., Cruz, I., Noel, P. H., Palmer, R. F., Poursani, R., & Jaen, C. R. (2022). Community health workers as trust builders and healers: A cohort study in primary care. *Annals of Family Medicine*, 20(5), 438–445.

<https://doi.org/10.1370/afm.2848>

Fiori, K. P., Rehm, C. D., Sanderson, D., Braganza, S., Parsons, A., Chodon, T., Whiskey, R., Bernard, P., & Rinke, M. L. (2020). Integrating social needs screening and community

- health workers in primary care: The community linkage to care program. *Clinical pediatrics*, 59(6), 547–556. <https://doi.org/10.1177/0009922820908589>
- Fisher, K. A., Griffith, L. E., Gruneir, A., Upshur, R., Perez, R., Favotto, L., Nguyen, F., Markle-Reid, M., & Ploeg, J. (2021). Effect of socio-demographic and health factors on the association between multimorbidity and acute care service use: Population-based survey linked to health administrative data. *BMC Health Services Research*, 21(1), 62. <https://doi.org/10.1186/s12913-020-06032-5>
- Geiger Gibson Program. (2023). Integrating social determinants of health into Medicaid managed care: Challenges and opportunities. *Milken Institute School of Public Health, George Washington University*. <https://geigergibson.publichealth.gwu.edu/sites/g/files/zaxdzs4421/files/2023-08/rwjf-mmc-sdoh-final-report.pdf>
- George, R., Gunn, R., Wiggins, N., Rowland, R., Davis, M. M., Maes, K., Kuzma, A., & McConnell, K. J. (2020). Early Lessons and Strategies from Statewide Efforts to Integrate Community Health Workers into Medicaid. *Journal of health care for the poor and underserved*, 31(2), 845–858. <https://doi.org/10.1353/hpu.2020.0064>
- Gianfrancesco, M. A., & Goldstein, N. D. (2021). A narrative review on the validity of electronic health record-based research in epidemiology. *BMC medical research methodology*, 21(1), 234. <https://doi.org/10.1186/s12874-021-01416-5>
- Goitom, S., Jara, J., Cameron, F., Carson, S. L., Hong, C., Waltman, B., Rumburg, S., Vassar, S., Huang, D., & Brown, A. F. (2021). Whole person care transitions of care program: Evaluating a safety-net system’s role in reducing acute care utilization and increasing

primary care use for medically high-risk individuals in Los Angeles County. *Journal of General Internal Medicine*, 36(Suppl 1), S52. <https://doi.org/10.1007/s11606-021-06830-5>

Gordon, A. S., Oakes, A. H., Allender, R., Vang, L., Hennemann, B., & Chi, W. C. (2023).

Observational analysis of a generalized, health plan–led community health worker intervention in Medicaid. *Journal of Primary Care & Community Health*, 14, 1–8. <https://doi.org/10.1177/21501319231153602>

Grady, C., Eckstein, L., Berkman, B., Brock, D., Cook-Deegan, R., Fullerton, S. M., Greely, H., Hansson, M. G., Hull, S., Kim, S., Lo, B., Pentz, R., Rodriguez, L., Weil, C., Wilfond, B. S., & Wendler, D. (2015). Broad Consent for Research With Biological Samples: Workshop Conclusions. *The American journal of bioethics : AJOB*, 15(9), 34–42.

<https://doi.org/10.1080/15265161.2015.1062162>

Green, J. A. (2021). Too many zeros and/or highly skewed? A tutorial on modelling health behaviour as count data with Poisson and negative binomial regression. *Health Psychology and Behavioral Medicine*, 9(1), 436–455.

<https://doi.org/10.1080/21642850.2021.1920416>

Greenland, S., & Morgenstern, H. (2001). Confounding in health research. *Annual Review of Public Health*, 22, 189–212. <https://doi.org/10.1146/annurev.publhealth.22.1.189>

Gómez, C. A., Kleinman, D. V., Pronk, N., Wrenn Gordon, G. L., Ochiai, E., Blakey, C., Johnson, A., & Brewer, K. H. (2021). Addressing health equity and social determinants of health through Healthy People 2030. *Journal of Public Health Management and Practice*, 27(Suppl 6), S249–S257. <https://doi.org/10.1097/PHH.0000000000001297>

- Harris, M. (2021). Primer on binary logistic regression. *Family Medicine and Community Health*, 9(3), e001290. <https://doi.org/10.1136/fmch-2021-001290>
- Harrison, J. M., Oganisian, A., Grande, D. T., Mitra, N., Chhabra, M., & Chaiyachati, K. H. (2020). Economic outcomes of insurer-led care management for high-cost Medicaid patients. *American Journal of Managed Care*, 26(7), 310–316. <https://doi.org/10.37765/ajmc.2020.43769>
- Hawkins, M., Elsworth, G. R., Nolte, S., & Osborne, R. H. (2021). Validity arguments for patient-reported outcomes: justifying the intended interpretation and use of data. *Journal of Patient-Reported Outcomes*, 5, 64. <https://doi.org/10.1186/s41687-021-00332-y>
- Heale, R., & Twycross, A. (2021). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 24(3), 87–88. <https://doi.org/10.1136/ebnurs-2021-103438>
- Heller, J. C. (2024). Keeping it political and powerful: Defining the structural determinants of health. *BMJ Global Health*, 10(8), e019640. <https://doi.org/10.1136/bmjgh-2024-019640>
- Hilbe, J. M. (2014). Modeling count data. *Cambridge University Press*. <https://archive.org/details/modelingcountdat0000hilb>
- Hostetter, J., Schwarz, N., Klug, M., Wynne, J., & Basson, M. D. (2020). Primary care visits increase utilization of evidence-based preventive care interventions. *BMC Primary Care*, 21, Article 216. <https://doi.org/10.1186/s12875-020-01216-8>
- Hussain, Z., Shih, M-C., & Demirel, I. (2023). Falsification of Internal and External Validity in Observational Studies via Conditional Moment Restrictions. Proceedings of the 26th International Conference on Artificial Intelligence and Statistics (AISTATS), PMLR 206. <https://proceedings.mlr.press/v206/hussain23a/hussain23a.pdf>

- Hutson, A. D., & Yu, H. (2023). The sign test, paired data, and asymmetric dependence: A cautionary tale. *The American Statistician*, 77(1), 35–40.  
<https://doi.org/10.1080/00031305.2022.2110938>
- Islam, M. A., & Chowdhury, R. I. (2017). A generalized right truncated bivariate Poisson regression model with applications to health data. *PLOS ONE*, 12(6), e0178153.  
<https://doi.org/10.1371/journal.pone.0178153>
- Jain, P., & Sengar, S. (2024). Unraveling the Role of IBM SPSS: A Comprehensive Examination of Usage Patterns, Perceived Benefits, and Challenges in Research Practice. *Educational Administration: Theory and Practice*, 30(5), 9523–9530.  
<https://doi.org/10.53555/kuey.v30i5.4609>
- Jenks, J. D., Nipp, E., Tadikonda, A., Karumuri, N., Morales-Lagunes, K., Carrico, S., Mortiboy, M., & Zitta, J. P. (2023). Relationship between sexually transmitted infections and social determinants of health in Durham County, North Carolina, United States. *Open Forum Infectious Diseases*, 10(7), 1–6. <https://doi.org/10.1093/ofid/ofad368>
- Jih, J., Nguyen, A., Cenzer, I., & Morrish, J. (2023). Burden of unmet health-related social needs in an academic adult primary care practice in San Francisco California. *BMC Primary Care*, 24(166). <https://doi.org/10.1186/s12875-023-02125-2>
- Jordanova, K. E., Suresh, A., Canavan, C. R., D’Cruze, T., Dev, A., Boardman, M., & Kennedy, M. A. (2024). Addressing food insecurity in rural primary care: A mixed-methods evaluation of barriers and facilitators. *BMC Primary Care*, 25, 163.  
<https://doi.org/10.1186/s12875-024-02409-1>

Kabir, R., Syed, H. Z., Hayhoe, R., Parsa, A. D., Sivasubramanian, M., Mohammadnezhad, M., & Dwivedi, P. (2024). Meta-analysis using SPSS: A simple guide for clinicians, public health, and allied health specialists. *Evidence*, 2(1), 1–25.

<https://doi.org/10.61505/evidence.2024.2.1.25>

Kaiser Family Foundation (KFF). (2023). Medicaid expansion under the ACA: Evidence from recent studies. <https://www.kff.org>

Kamitaki, B. K., Maniar, S., Rambhatla, R., Gao, K., Cantor, J. C., Choi, H., & Bover Manderski, M. T. (2024). Health insurance and transportation barriers impact access to epilepsy care in the United States. *Epilepsy Research*, 205, Article 107424.

<https://doi.org/10.1016/j.eplepsyres.2024.107424>

Kandi, V., & Vadakedath, S. (2022). Ethical considerations in clinical research: A comprehensive review. *American Journal of Public Health Research*, 10(2), 42–52.

<https://doi.org/10.12691/ajphr-10-2-2>

Kang, H. (2021). Sample size determination and power analysis using the GPower software. *Journal of Educational Evaluation for Health Professions*, 18, 17.

<https://doi.org/10.3352/jeehp.2021.18.17>

Kangovi, S., Mitra, N., Norton, L., Harte, R., Zhao, X., Carter, T., Grande, D. & Long, J. A. (2018). Effect of community health worker support on clinical outcomes of low-income patients across primary care facilities: A randomized clinical trial. *JAMA Internal Medicine*, 178(12), 1635–1643.

<https://doi.org/10.1001/jamainternmed.2018.4630>

Karaca-Mandic, P., Nikpay, S., Gibbons, S., Haynes, D. II, Koranne, R., & Thakor, R. (2023). Policy insight: Proposing an innovative bond to increase investments in social

- determinants of health interventions in Medicaid managed care. *Health Affairs*, 42(3), 383–391. <https://doi.org/10.1377/hlthaff.2022.00821>
- Kim, G., Qua, K., Clark, M., & Furman, L. (2024). Childhood homelessness and housing instability: A curriculum for pediatric residents. *Academic Pediatrics*, 24(1), 176–178. <https://doi.org/10.1016/j.acap.2023.09.011>
- Kirby, J. B., Bernard, D., & Liang, L. (2021). The prevalence of food insecurity is highest among Americans for whom diet is most critical to health. *Diabetes Care*, 44(6), e131-e132. <https://doi.org/10.2337/dc20-3116>
- Knief, U., & Forstmeier, W. (2021). Violating the normality assumption may be the lesser of two evils. *Behavior Research Methods*, 53, 2576–2590. <https://doi.org/10.3758/s13428-021-01587-5>
- Kolak, M., Bhatt, J., Park, Y. H., Padron, N. A., & Molefe, A. (2020). Quantification of neighborhood-level social determinants of health in the continental United States. *JAMA Network Open*, 3(1), e19928. <https://doi.org/10.1001/jamanetworkopen.2019.19928>
- Larson, E. K., Ingram, M., Dougherty, E., Velasco, M., Guzman, V., Jackson, A., Patel, K., Carvajal, S. C., & Wilkinson-Lee, A. M. (2024). Centering the role of community health workers in social risk screening, referral, and follow-up within the primary care setting. *BMC Primary Care*, 25, 338. <https://doi.org/10.1186/s12875-024-02590-3>
- Levy, P. S., & Lemeshow, S. (2013). *Sampling of populations: Methods and applications* (4th ed.). Wiley.
- Liang, H., Tao, L., & Shi, L. (2023). The effect of Medicaid eligibility on utilization of services and access to care among health center patients: A regression discontinuity design.

*Health & Social Care in the Community*, 2023, Article ID 9102639.

<https://doi.org/10.1155/2023/9102639>

Liese, A. D. (2022). Shining a light on marginal food insecurity in an understudied population.

*Public Health Nutrition*, 25(8), 2337–2338. <https://doi.org/10.1017/S1368980022001094>

Ma, H., Wang, X., Li, X., Zhang, Y., Chen, Y., & Zhao, L. (2024). Food insecurity and

premature mortality and life expectancy in the US. *JAMA Internal Medicine*, 184(3),

301–310. <https://doi.org/10.1001/jamainternmed.2023.7968>

Mayfield, C. A., Robinson-Taylor, T., Rifkin, D., & Harris, M. E. (2024). A clinical-community

partnership to address food insecurity and reduce emergency department utilization

among Medicaid-insured patients in North Carolina.

<https://doi.org/10.1097/PHH.0000000000001821>

McGraw, D., Dempsey, J. X., Harris, L., & Goldman, J. (2009). Privacy as an enabler, not an

impediment: Building trust into health information exchange. *Health Affairs*, 28(2), 416–

427. <https://doi.org/10.1377/hlthaff.28.2.416>

Mello, M. M., Goodman, S. N., & Faden, R. R. (2012). Ethical considerations in studying drug

safety — The institute of medicine report. *New England Journal of Medicine*, 367, 959–

964. <https://doi.org/10.1056/NEJMhle1207160>

Michels, C., Hallgren, K. A., Cole, A., Chwastiak, L., & Cheng, S. C. (2022). The relationship

among social support, food insecurity and mental health for adults with severe mental

illness and type 2 diabetes: A survey study. *Psychiatric Rehabilitation Journal*, 45(3),

212–218. <https://doi.org/10.1037/prj0000525>

- Moses, K., & Benyo, A. (2021). Building successful managed care programs with community health workers' expertise. Center for Health Care Strategies Brief.  
<https://www.chcs.org/resource/building-successful-managed-care-programs-with-community-health-workers-expertise/>
- Nakphong, M. K., Bright, D. J., Koreitem, A., Mocello, A. R., Lisha, N. E., Leslie, H. H., Estrada, I., Libby, M. K., Lippman, S. A., & Lightfoot, M. A. (2024). Housing instability patterns among low-income, urban Black young adults in California and associations with mental health outcomes: Baseline data from a randomized waitlist-controlled trial. *BMC Public Health*, 24, 2492. <https://doi.org/10.1186/s12889-024-19948-y>
- Namburi, N., & Tadi, P. (2023). Managed care economics. *StatPearls*.  
<https://ncbi.nlm.nih.gov/books/NBK556053>
- National Transitions of Care Coalition. (n.d.). Definitions of transitional care.  
<https://www.nacns.org/wp-content/uploads/2016/11/TC-definitions.pdf>
- Nichols, L. M., Waidman, T. A., Clemans-Cope, L., Garrett, B., & Taylor, K. (2024). Tracing value from social determinant solutions. *Health Affairs Scholar*, 3(1).  
<https://doi.org/10.1093/haschl/qxae173>
- Novilla, L. K., Barnes, M. D., Deavenport-Saman, A., Williams, P. N., & Richards, R. (2023). Integrating social determinants of health into primary care: Barriers, facilitators, and best practices. *International Journal of Environmental Research and Public Health*, 20(19), 6873. <https://doi.org/10.3390/ijerph20196873>
- Nuako, A., Liu, J., Pham, G., Smock, N., James, A., Baker, T., & Chen, L.-S. (2022). Quantifying rural disparity in healthcare utilization in the United States: Analysis of a

large Midwestern healthcare system. *PLOS ONE*, 17(2), e0263718.

<https://doi.org/10.1371/journal.pone.0263718>

Office of Disease Prevention and Health Promotion (ODPHP). (n.d.a). Economic stability [Social determinants of health domain]. *Healthy People 2030*.

<https://health.gov/healthypeople/objectives-and-data/browse-objectives/economic-stability>

Office of Disease Prevention and Health Promotion (ODPHP). (n.d.b). Food insecurity—literature summary. *Healthy People 2030*.

<https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/food-insecurity>

Office of Disease Prevention and Health Promotion (ODPHP). (n.d.c). Housing instability—literature summary. *Healthy People 2030*.

<https://odphp.health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/housing-instability>

Office of Disease Prevention and Health Promotion (ODPHP). (n.d.d). Social determinants of health. *Healthy People 2030*. U.S. Department of Health and Human Services.

<https://health.gov/healthypeople/objectives-and-data/social-determinants-health>

Office of Statewide Initiatives, University of Nevada, Reno School of Medicine. (2023). Health and health care in Clark County – 2023. <https://nvnaco.org/wp-content/uploads/CHRR-Clark%20County-2023%20Final.pdf>

- Olier, I., Zhan, Y., Liang, X., & Volovici, V. (2023). Causal inference and observational data. *BMC Medical Research Methodology*, 23, Article 227. <https://doi.org/10.1186/s12874-023-02058-5>
- Olivas, E., & Marcus, H. (2021). Community health workers: The state of the evidence, 2021. *CHW Central*. <https://chwcentral.org/wp-content/uploads/State-of-the-Evidence-2021-1.pdf>
- Olsen, R. B., Orr, L. L., Bell, S. H., & Stuart, E. A. (2013). External Validity in Policy Evaluations that Choose Sites Purposively. *Journal of the Association for Public Policy Analysis and Management*, 32(1), 107–121. <https://doi.org/10.1002/pam.21660>
- Ostrer, I. R., & Seligman, H. K. (2025). Food insecurity, health, and health care in the US. *JAMA*, 333(15), 1352–1353. <https://doi.org/10.1001/jama.2024.26784>
- Owen, R., Crabb, C., Stober, K., Mitchell, D., Tamaki, K., & Heller, T. (2020). Utilization of and relationships with primary care providers during the transition to Medicaid managed care. *Journal of Disability Policy Studies*, 31(2), 67–76. <https://doi.org/10.1177/1044207319880278>
- O’Shea, A. M. J., Mulligan, K., Carlson, P., Haraldsson, B., Augustine, M. R., Kaboli, P. J., & Shimada, S. L. (2024). Healthcare utilization differences among primary care patients using telemedicine in the Veterans Health Administration: A retrospective cohort study. *Journal of General Internal Medicine*, 39(Suppl 1), 109–117. <https://doi.org/10.1007/s11606-023-08472-1>

- Park, S., Hamadi, H. Y., Abdul, S., Spaulding, A., Xu, J., & Zhao, M. (2025). Exploring the routine recording of health-related social needs in U.S. acute care hospitals. *Health Services Insights*, 18, 1–9. <https://doi.org/10.1177/11786329251342849>
- Park, S., Chen, J., & Bustamante, A. V. (2024). Adverse consequences of food insecurity among U.S. adults beyond health outcomes. *American Journal of Preventive Medicine*, 66(1), 146–153. <https://doi.org/10.1016/j.amepre.2023.09.003>
- PeaceHealth. (2025). *Outpatient services*. <https://www.peacehealth.org/medical-topics/id/ty7319>
- Pinnock, C., Rothen, J., Carlough, T., & Shah, N. R. (2023). Improving value for underserved populations with a community-based intervention: A retrospective cohort study. *Archives of Public Health*, 81, 96. <https://doi.org/10.1186/s13690-023-01117-z>
- Porter, S. R. (2020). Generalizability: Linking evidence to practice. *Journal of Orthopaedic & Sports Physical Therapy*, 50(1), 45–46. <https://doi.org/10.2519/jospt.2020.0701>
- Raphael, J. L., Rueda, A., Lion, K. C., & Giordano, T. P. (2013). The role of lay health workers in pediatric chronic disease: A systematic review. *Academic Pediatrics*, 13(5), 408–420. <https://doi.org/10.1016/j.acap.2013.04.015>
- Rollings, K. A., Kunnath, N., Ryus, C. R., Janke, A. T., & Ibrahim, A. M. (2022). Association of coded housing instability and hospitalization in the US. *JAMA Network Open*, 5(11), e2241951. <https://doi.org/10.1001/jamanetworkopen.2022.41951>
- Rothstein, M. A. (2015). Ethical issues in big data health research. *Journal of Law, Medicine & Ethics*, 43(2), 425–429. <https://doi.org/10.1111/jlme.12258>
- Routhier, G., Mijanovich, T., Schretzman, M., Sell, J., Gelberg, L., & Doran, K. M. (2023). Associations between different types of housing instability and future emergency

department use among a cohort of emergency department patients. *Journal of Health Care for the Poor and Underserved*, 34(3), 910–930.

<https://doi.org/10.1353/hpu.2023.a903054>

Ruiz Escobar, C., Pathak, S., & Blanchard, T. (2021). Screening and referral care delivery services and unmet health-related social needs: A systematic review. *Preventing Chronic Disease*, 18(E78). <https://doi.org/10.5888/pcd18.200569>

Sanderson, D., Braganza, S., Philips, K., Chodon, T., Whiskey, R., Bernard, P., Rich, A., & Fiori, K. (2021). Increasing warm handoffs: Optimizing community-based referrals in primary care using QI methodology. *Journal of Primary Care & Community Health*, 1–7. <https://doi.org/10.1177/21501327211023883>

Santoro, C. (2025). ACA Impact on Medicare Beneficiaries Linked to Reduced Costs, Improved Health. JAMA Health Forum. <https://www.ajmc.com/view/aca-impact-on-medicare-beneficiaries-linked-to-reduced-costs-improved-health>

Savitz, S., Harper, S., Glasgow, A., Sosso, J., & Westfall, E. (2025).

The relationship between transportation risk and missed primary care appointments.

*Annals of Family Medicine*, 23(Suppl 1), 7706. <https://doi.org/10.1370/afm.23.s1.7706>

Schechter, S. B., Lakhane, D., Peretz, P. J., & Matiz, L. A. (2021). Community health worker intervention to address social determinants of health for children hospitalized with asthma. *Hospital Pediatrics*, 11(12), 1370–1376. <https://doi.org/10.1542/hpeds.2021-005903>

- Schriger, S. H., Knowles, M., Daglieri, T., Kangovi, S., & Beidas, R. S. (2024). Barriers and facilitators to implementing an evidence-based community health worker model. *JAMA Health Forum*, 5(3), e240034. <https://doi.org/10.1001/jamahealthforum.2024.0034>
- Shadowen, H., Marks, S. J., Bachiredy, C., Obembe, O., Hines, A., Mitchell, A., Sabo, R., Cunningham, P., Krist, A., & Barnes, A. (2023). The relationship between food and housing insecurity and healthcare use among Virginia Medicaid expansion members: Considering the neighborhood context. *Health Services Research*. <https://doi.org/10.1111/1475-6773.14416>
- Sherwin, R. P. (1983). What is an adverse health effect? *Environmental Health Perspectives*, 52, 1–4. <https://pubmed.ncbi.nlm.nih.gov/6653520/>
- Shi, X., Prins, C., Van Pottelbergh, G., Mamouris, P., Vaes, B., & De Moor, B. (2021). An automated data cleaning method for electronic health records by incorporating clinical knowledge. *BMC Medical Informatics and Decision Making*, 21(267). <https://doi.org/10.1186/s12911-021-01630-7>
- Shin, P., Sharac, J., Morris, R., Handley, M., Casoni, M., Somodevilla, A., Rosenbaum, S. (2021). Opportunities and challenges for Medicaid managed care organizations, community health centers and their partners in addressing social determinants of health in five states. *Milken Institute School of Public Health. The George Washington University*. <https://geigergibson.publichealth.gwu.edu/sites/g/files/zaxdzs4421/files/2023-08/rwjf-mmc-sdoh-final-report.pdf>
- Social Interventions Research & Evaluation Network (SIREN). (2021). Guide to implementing social risk screening and referral-making: Steps 1–5. *University of California, San*

Francisco. <https://sirenetwork.ucsf.edu/guide-implementing-social-risk-screening-and-referral-making>

Solar, O., & Irwin, A. (2010). *A conceptual framework for action on the social determinants of health: Social determinants of health discussion paper 2 (Policy and practice)*. World Health Organization. <https://www.who.int/publications/i/item/WHO-IER-CSDH-08.1>

Sommers, B. D., Smith, R. B., & Figueroa, J. F. (2025). Closing gaps or holding steady? The Affordable Care Act, Medicaid expansion, and racial disparities in coverage, 2010–2021. *Journal of Health Politics, Policy and Law*, 50(2), 253–281.

<https://doi.org/10.1215/03616878-11567660>

State of Missouri Department of Health & Senior Services. (n.d.). Community health workers. <https://www.health.mo.gov/professionals/community-health-workers>

Stiles, S., Thomas, R., Beck, A. F., Parsons, A., Buzek, N., Mansour, M., & Anderson, K. (2020). Deploying community health workers to support medically and socially at-risk patients in a pediatric primary care population. *Academic Pediatrics*, 20(8), 1213–1216.

<https://doi.org/10.1016/j.acap.2020.04.003>

Stratton, S. J. (2021). Population research: Convenience sampling strategies. *Prehospital and Disaster Medicine*, 36(4), 373–374. <https://doi.org/10.1017/S1049023X21000649>

Syed, S. T., Gerber, B. S., & Sharp, L. K. (2013). Traveling towards disease: Transportation barriers to health care access. *Journal of Community Health*, 38(5), 976–993.

<https://doi.org/10.1007/s10900-013-9681-1>

Talikan, A. I., Salapuddin, R., Aksan, J. A., Rahimulla, R. J., Ismael, A., Jimlah, R., Idris, N., Dammang, R. B., Jamar, D. A., Sarahadil, E., & Ajan, R. A. (2024). On paired samples

t-test: Applications, examples and limitations. *Zenodo*.

<https://doi.org/10.5281/zenodo.10987546>

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <https://doi.org/10.5116/ijme.4dfb.8dfd>

The 3-D Commission. (2021). *Data, social determinants, and better decision-making for health: The report of the 3-D Commission*. The Rockefeller Foundation & Boston University School of Public Health. <https://3dcommission.health/report>

Theofanidis, D., & Fountouki, A. (2018). Limitations and delimitations in the research process. *Perioperative Nursing*, 7(3), 155–163. <https://doi.org/10.5281/zenodo.2552022>

Thorndike, A. N., McCurley, J. L., Chang, Y., Levy, D. E., & Gelsomin, E. (2025). Food and housing insecurity, stress, and health care use after Medicaid expanded services program. *JAMA Network Open*, 8(7), e2519507.

<https://doi.org/10.1001/jamanetworkopen.2025.19507>

Topp, S. M., Schaaf, M., Sriram, V., Scott, K., Dalglish, S. L., Nelson, E. M., Sr, R., Mishra, A., Asthana, S., Parashar, R., Marten, R., Costa, J. G. Q., Sacks, E., Br, R., Reyes, K. A. V., & Singh, S. (2021). Power analysis in health policy and systems research: a guide to research conceptualisation. *BMJ global health*, 6(11), e007268.

<https://doi.org/10.1136/bmjgh-2021-007268>

Tuohy, C. A., Liziewski, K. E., White, P. A., & Wright, W. L. (2024). Evaluating adherence to American Diabetes Association standards of care in diabetes and impacts of social determinants of health on patients at two nurse practitioner-owned clinics. *Journal of the*

*American Association of Nurse Practitioners*, 36(7), 399–408.

<https://doi.org/10.1097/JXX.0000000000001026>

U.S. Department of Health and Human Services. (2022). *About the Affordable Care Act*.

<https://www.hhs.gov/healthcare/about-the-aca/index.html>

University of California. (2023). Outlier detection and handling in health data. In *Health Data Analytics Guide* (pp. 45–58). UC Press.

Xu, Jing. (2025). Construct validity in cross-cultural, developmental research: Challenges and strategies for improvement. *Evolutionary Human Sciences*, 5, e34.

<https://doi.org/10.1017/EHS.2025.3>

Vera, L., Reed, K. K., DeYampert, L., Thompson, A. N., Williams, K. N., Blount, Q., Castater, C., Schenker, M., Smith, R. N., Rose, E., Woodward, J., Cortes, J., & Henry, A. (2022). Prevalence of housing instability in survivors of traumatic injury. *American Surgeon*, 88(9), 2274–2279. <https://doi.org/10.1177/00031348221101575>

Welsch, D., & Neuhäuser, M. (2025). Wilcoxon-signed-rank test. In M. Lovric (Ed.), *International encyclopedia of statistical science* (pp. 2898–2900). Springer.

[https://doi.org/10.1007/978-3-662-69359-9\\_722](https://doi.org/10.1007/978-3-662-69359-9_722)

Wennerstrom, A. (2022). The evolving role of community health workers in Medicaid managed care organizations. *Population Health Management*, 25(6), 647–654.

<https://doi.org/10.1089/pop.2022.0191>

Wennerstrom, A., Haywood, C. G., Smith, D. O., Jindal, D., Rush, C., & Wilkinson, G. W.

(2023). Community health worker team integration in Medicaid managed care: Insights

from a national study. *Frontiers in Public Health*, 10, 1042750.

<https://doi.org/10.3389/fpubh.2022.1042750>

Wennerstrom, A., Haywood, C. G., Smith, D. O., Jindal, D., Rush, C., & Wilkinson, G. W.

(2022). What are the roles of community health workers in Medicaid managed care?

Results from a national study. *Population Health Management*.

<https://doi.org/10.1089/pop.2022.0191>

Wennerstrom, A., Springgate, B., & Haywood, C. (2023). Integration of community health

workers in Medicaid managed care: Findings from a national survey. *Frontiers in Public*

*Health*, 10, 1042750. <https://doi.org/10.3389/fpubh.2022.1042750>

Whitman, A. J., Hampton, D. A., & Buikema, A. R. (2022). Addressing social determinants of

health: Evidence of the relationship between social risks and health outcomes. *Office of*

*the Assistant Secretary for Planning and Evaluation (HHS)*.

<https://aspe.hhs.gov/sites/default/files/documents/e2b650cd64cf84aae8ff0fae7474af82/S>

[DOH-Evidence-Review.pdf](#)

World Health Organization. (2017). Social determinants of health. [https://www.who.int/health-](https://www.who.int/health-topics/social-determinants-of-health)

[topics/social-determinants-of-health](https://www.who.int/health-topics/social-determinants-of-health)

Zhu, J. M., Rumalla, K. C., & Polsky, D. (2023). New opportunities to strengthen Medicaid

managed care network adequacy standards. *JAMA Health Forum*, 4(10), e233194.

<https://doi.org/10.1001/jamahealthforum.2023.3194>