

**The Integration of Community Health Workers into Health Care Teams
in North Carolina**

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Abstract

Community Health Workers (CHWs) bring the lived experience and understanding of the barriers many marginalized communities face in accessing and receiving equitable health care. Research has shown CHWs to play an essential role in addressing the social determinants of health and improving health outcomes in disadvantaged/underserved populations. Traditionally based in the community, recent efforts to advance the workforce have created more opportunities for inclusion as part of the health care team. However, the CHW role is unique, and the research shows that a lack of understanding and support amongst the health care team members can result in ineffectiveness, underutilization, and lack of outcomes.

Objectives: The purpose of the study was to understand, from the perspective of the CHW, to what level they are integrated into teams and the factors that affect integration. The study used a popular education lens and relational coordination theory to understand effective teams.

Methodology: The study used a non-experimental correlation design. The population of interest was a convenience sample of CHWs affiliated with the North Carolina Community Health Worker Association (NCCHWA). An online quantitative survey assessed demographics, relational coordination, and racial and ethnic discrimination. The survey enlisted NCCHWA champions and social media to recruit CHWs over the age of 18 who worked in North Carolina to participate in the study.

Results: The study sample included 38 CHWs. There was no correlation found between relational coordination and the number of CHWs employed or the length of employment. Additionally, there was no correlation found between understanding of a CHWs role and race/ethnic discrimination. A significant positive correlation was found between an

organization's understanding of the CHW role and relational coordination, and a significant negative correlation was found between relational coordination and race/ethnic discrimination.

Conclusions: The results suggest that understanding the CHW role leads to higher levels of relational coordination and that higher levels of relational coordination correlate to lower levels of race/ethnic discrimination. While the results offer insight into the integration of CHWs into health care teams, further research with a larger sample of CHWs and inclusion of all members of the health care team is advised.

Keywords: community health workers, equity, health care teams, relational coordination, racial/ethnic discrimination

Dedication

I could not have undertaken this journey without the tremendous support of my awesome family. My husband, Leroy, did not hesitate when I told him I wanted to leave my career and pursue a doctorate in order to fulfill my dream of teaching in higher education. He made me laugh when I wanted to cry and never doubted my ability to see this through to completion. To my three amazing children, two of whom are in college themselves, I admire you and appreciate all the love and advice. To my mom, who is also a lifelong learner and my biggest cheerleader; and my sister, whose global communication work on refugee issues inspires me to make a difference. I am forever grateful for your love and support.

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List of Abbreviations

ACIC.....	Assessment of Chronic Illness Care
ACO.....	Accountable Care Organizations
AHEC.....	Area Health Education Centers
AMH.....	Advanced Medical Home
APHA.....	American Public Health Association
ART.....	Antiretroviral Therapy
ASTHO.....	Association of State and Territorial Health Officials
CBO.....	Community Based Organization
CDC.....	Centers for Disease Control and Prevention
CHW.....	Community Health Worker
CMS.....	Centers for Medicaid and Medicare
CPSTF.....	Community Preventive Services Task Force
ELBW.....	Extremely Low Birth Weight
HbA1c.....	Hemoglobin A1c
HHS.....	U.S. Department of Health and Human Services
HIV.....	Human Immunodeficiency Viruses
HOP.....	Healthy Opportunities Pilots
IMPACT.....	Individualized Management for Patient-Centered Targets
IRB.....	Institutional Review Board
IOM.....	Institute of Medicine
LBW.....	Low Birth Weight
NACHW.....	National Association for Community Health Workers

NCCHWA..... North Carolina Community Health Worker Association
NCDHHS.....North Carolina Department of Health and Human Services
ODPHP..... Office of Disease Prevention and Health Promotion
PCHM..... Patient-Centered Medical Homes
QC4..... Queen City Community Connect Coalition
RCT.....Randomized Control Trial
SCCT.....Standardized Core Competency Training
SDoH.....Social Determinants of Health
SPSS.....Statistical Package for the Social Sciences
VLBW.....Very Low Birth Weight

Chapter I

Introduction

Community Health Workers (CHWs) have a long history of working with underserved communities. They are uniquely qualified to contribute to multidisciplinary health care teams by providing cost-effective solutions to address social determinants of health and reduce disparities (Ibe et al., 2021). Studies have demonstrated CHW's effectiveness as part of the health care team in chronic disease management, reducing disparities, improving the patient care experience, and advancing equity (Adams et al., 2021; Centers for Disease Control [CDC] 2014; Knowles et al., 2023; Sprague Martinez et al., 2021). According to the U.S. Bureau of Labor Statistics, 61,300 CHWs work in the United States, and 570 -1,580 CHWs work in North Carolina (U.S. Bureau of Labor Statistics, 2023). There are currently 922 CHWs certified through the North Carolina Community Health Worker Association (NCCHWA); however, the total number of CHWs is most likely closer to 1,580 (North Carolina Community Health Worker Association, 2023). This research study surveyed a convenience sample of North Carolina CHWs to understand the level at which CHWs felt valued as health care team members and whether race or ethnicity influenced integration. The study was guided by Popular Education and Relational Coordination theories and used relational coordination to measure the level of integration and a novel scale to understand the influence of race and ethnicity.

Statement of the Problem

It is well understood that in populations who have been historically marginalized, where you live, work, and play can contribute to widespread health disparities. Poor health outcomes and the social determinants of health, such as safe housing, transportation, discrimination, education, and access to healthy foods, play a more significant role in predicting health than

either health care or an individual's health behaviors (Hood et al., 2016; Office of Disease Prevention and Health Promotion [ODPHP], n.d.). To tackle these issues, health care, and non-profit organizations are investing in CHWs. While the transformation and the growth of the CHW workforce is encouraging, the literature on integration into health care teams shows that there can be barriers that lead to role confusion, conflict, turnover, and underutilization of CHWs in care teams (Allen et al., 2015; Findley, et al., 2014; Ibe et al., 2021; Ignoffo, et al., 2022; Jones et al., 2022; Malcarney et al., 2017; McCarville, 2022; Patel et al., 2023; Payne et al., 2017; Sprague Martinez, 2021; Washburn et al., 2021; Wennerstrom, 2022). Although CHWs have been recognized in North Carolina as valuable health care team members in addressing SDoH, a problem exists that there is no research on the current level of integration within health care teams.

Significance

As part of Medicaid transformation in North Carolina, NCDHHS is pursuing a Medicaid strategy for integrating CHWs to address the social determinants of health and health-related social needs (NCDHHS, 2013). In order to achieve these goals, CHWs must feel they are valuable and supported as part of health care teams. Effective multidisciplinary teams are essential in achieving the triple aim of health care and are vital to transforming health care (Hartzler et al., 2018; Pinto et al., 2020). CHWs often share the race, ethnicity, and culture of the patients they work with but not necessarily with health care team members. CHWs whose work and lived experience is with underserved, marginalized communities may experience institutional racism and classism as part of a health care team (APHA, 2022). This study could help inform North Carolina leaders involved in Medicaid transformation, health care organizations, and those working to advance CHWs in the state to understand factors that can

influence meaningful integration into teams. It can also help understand factors that might hinder true integration and promote the development of policies, strategies, and tools to support the workforce.

Purpose of the Research

The purpose of this research study was to understand the extent to which CHWs are integrated into multidisciplinary health care teams and whether culture, race, and ethnicity negatively influence integration. The study used a validated scale of relational coordination to measure team integration and a novel scale to measure racial/ethnic discrimination. The study population was CHWs who are 18 or older and work in North Carolina. For the purposes of this study, multidisciplinary health care team members included nurses, doctors, social workers, health educators, physician assistants, nurse practitioners, and pharmacists. Snowball sampling, a nonprobability sampling technique, was used to recruit study participants.

Research Question(s) and Hypotheses

Q1: Is there a correlation between relational coordination and the number of years employed as a Community Health Worker for an organization?

H1o: The number of years a Community Health Worker is employed by an organization will not be correlated with relational coordination.

H1a: The number of years a Community Health Worker is employed by an organization will be correlated with relational coordination.

Q2: Is there a correlation between relational coordination and the number of Community Health Workers employed in an organization?

H2o: The number of Community Health Workers employed in an organization will not correlate to greater relational coordination.

H2a: The number of Community Health Workers employed in an organization will correlate to greater relational coordination.

Q3: Does a Community Health Worker's perception that an organization understands their role relate to relational coordination?

H3o: A Community Health Worker's perception that an organization understands their role will not be associated with higher relational coordination

H3a: A Community Health Worker's perception that an organization understands their role will be associated with higher relational coordination

Q4: Does a Community Health Worker's perception that an organization understands their role relate to race/ethnic discrimination?

H4o: A Community Health Worker's perception that an organization understands their role will not be associated with racial discrimination.

H4a: A Community Health Worker's perception that an organization understands their role will be associated with racial discrimination.

Q5: Does a Community Health Worker's race/ethnic discrimination score relate to the level of relational coordination?

H5o: A Community Health Worker's race/ethnic discrimination score will not be related to relational coordination.

H5a: A Community Health Worker's race/ethnic discrimination score will be related to relational coordination.

Definition of Terms

Community Health Worker – a frontline public health worker who is a trusted member and 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 to facilitate access to services and improve the quality and cultural competence of service delivery (American Public Health Association [APHA], 2022)

Social Determinants of Health (SDoH) – the conditions where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks (Office of Disease Prevention and Health Promotion, n.d.).

Relational Coordination – “Relational coordination is a theory of performance, a theory of change, and a validated construct that can be measured using the Relational Coordination Survey tool”. (Brandeis, 2023, para. 4).

Summary

From an ethical and financial perspective, health care organizations have recognized the need to address the social determinants of health to reduce disparities and improve health outcomes. One way to achieve this is to hire CHWs. Many studies have shown that the CHW workforce effectively bridges the gap between vulnerable populations and health care (Adams et al., 2021; Centers for Disease Control [CDC] 2014; Knowles et al., 2023; Sprague Martinez et al., 2021) As the CHW workforce continues to grow and opportunities for CHWs in health care expand, it will be important to understand the level that CHWs feel they are integrated into multidisciplinary teams and if race and ethnicity are factors in integration.

Chapter II includes a review of the literature related to the study, including research on CHWs in the United States, competencies and roles, effectiveness in chronic disease management, reducing disparities, improving patient care experience, and health equity. The literature review also examined the integration into health care teams and CHW inclusion into Medicaid and Medicare systems. Finally, Popular Education and Relational Coordination

theories were reviewed as the theoretical frameworks for the study. Chapter III, Methodology, discussed the non-experimental correlational study design, the study population, instruments and measures, and data collection and analysis. The results of the study are presented in Chapter IV and Chapter V includes a discussion of the findings and recommendations for further studies.

Chapter II

Literature Review

Introduction

This chapter reviewed the current literature on Community Health Workers (CHWs), focusing on their role as part of multidisciplinary health care teams. The review included the background of CHWs in the United States (U.S.) and the changes in health care reform that enabled the workforce to become part of the health care team. Also included are studies showing effectiveness in managing chronic diseases, addressing the social determinants of health, and reducing disparities in marginalized communities. An examination of research on the integration of CHWs in the health care teams show barriers, opportunities, and a need for further research. Finally, literature on relational coordination, which emphasizes the importance of collaboration and communication in health care teams, is provided as a way to measure integration. Using the popular education framework as a guide for ensuring the voice of the Community Health Worker is central to the discussion about the workforce, articles that highlight work through this lens are included. Because this research focuses on integration into health care teams in North Carolina, articles focusing on the work of CHWs outside of the U.S. were omitted.

Different strategies were used between 2001- 2023 to find relevant literature for this review. Radford University McConnell Library Super Search was the leading search engine for the literature review. The advanced search on Super Search was used to find articles based on the keywords relevant to the paper's themes. Additionally, websites including the American Public Health Association (APHA), Association of State and Territorial Health Officials (ASTHO), Centers for Disease Control and Prevention (CDC), National Association for Community Health

Workers (NACHW), and the North Carolina Department of Health and Human Services (NCDHHS) were reviewed for literature on CHWs.

Community Health Workers in the U.S.

More than 61,000 CHWs are employed throughout the U.S. (U.S. Bureau of Labor Statistics, 2022). Because CHWs often have many different titles, such as outreach worker, navigator, and promoter, this number is estimated to be closer to 120,000 (APHA, 2014; U.S. Department of Health and Human Services (HHS), 2007). The projected average growth from 2022 to 2032 for CHWs is 14%, much faster than the 3% average for all U.S. occupations (U.S. Bureau of Labor Statistics, 2023).

CHWs often share lived experience, language, race/ethnicity, and cultural understanding of those they serve, allowing them to reach underserved populations and help them navigate the complexities of the health care and social services system. The only national workforce survey was done in 2007 and showed that 82% of CHWs were female (HHS, 2007). The respondents were diverse racially and ethnically, with the majority Hispanic or non-Hispanic White (35.2% and 38.5%, respectively) and African-Americans (15.5 %), Native Americans (5.0 %), and Asian and Pacific Islanders (4.6 %) made up the other groups (HHS, 2007).

CHWs have been working formally and informally in the U.S. since the 1960s, with the earliest work focused on social justice issues such as migrant health and poverty (HHS, 2007; Jones et al., 2021; Wennerstrom et al., 2021). In 1970, a group of 500 CHWs formed a new professional section of the APHA, and in 2000, this group became the Community Health Worker Special Primary Interest Group (SPIG) (APHA, 2022). CHWs are employed in community-based organizations, public housing authorities, and schools. They are also employed by health care organizations such as hospitals, federally qualified health center (FQHC) settings,

health departments, and managed care organizations (ASTHO, 2019; Rogers et al., 2018). CHWs can be integrated into health care teams in several ways, including as an employee of the health care organization, as community partners with a formal relationship with the health care organization, or as a resource or referral without any formal relationship (Malcarney et al., 2017).

The CHW workforce has become more visible and active in health care settings due to the 2010 classification as designated health professionals by the U.S. Department of Labor and recognition in the Patient Protection and Affordable Care Act (Sabo et al., 2017). These designations led the Centers for Medicaid and Medicare (CMS) to guide states on reimbursement for CHWs as part of the health care team (Malcarney et al., 2017; Sabo et al., 2021). Medicaid health plans in several states have included CHWs as key in health care reform and the adoption of population health strategies that address the social determinants of health (Sabo et al., 2021a; Wennerstrom et al., 2022). Accountable Care Organizations (ACO) and Patient-Centered Medical Homes (PCHM) have also included CHWs in multidisciplinary teams to meet the requirements of routine preventative care and education and coordination of care among disadvantaged populations (Allen et al., 2015; Shah et al., 2014).

Training and Certification

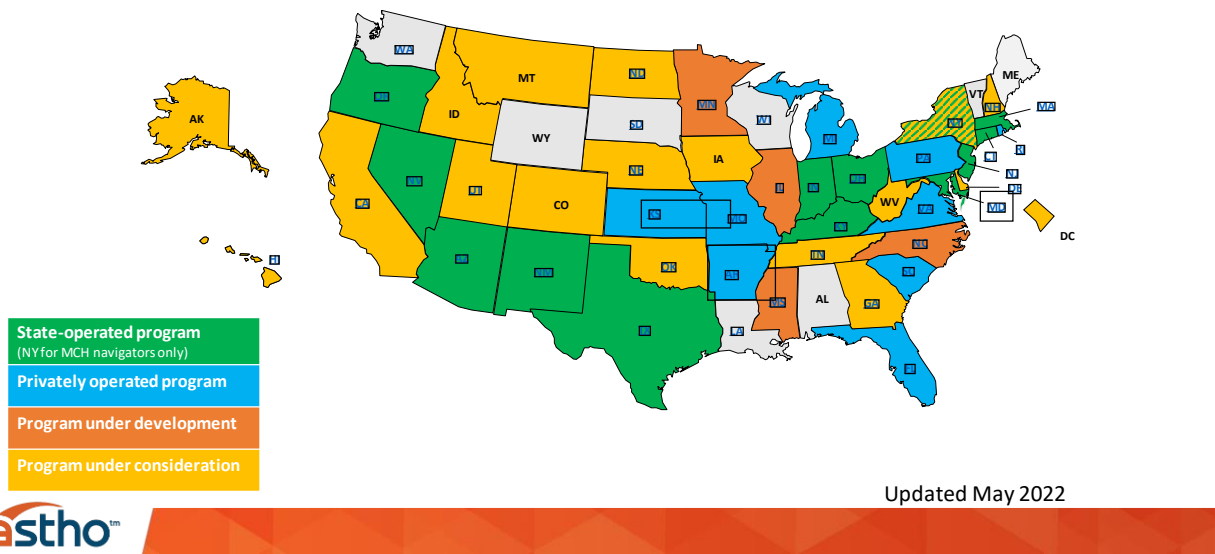
Unlike many health care professions, there is no accredited education process, licensure, or national certification for CHWs to ensure competency (Covert et al., 2019; Jones et al., 2021). In the absence of national certification, many states have developed their own certification standards. As of February 2020, 19 states had CHW certification programs. Of those, 12 were state-operated, and seven were privately operated. Two states had certification programs under

development, and 15 states had programs under consideration (Association of State and Territorial Health Officials, 2022) (Figure 1).

Figure 1

State Approaches to CHW Certification

Ever-Changing Picture: State Approaches to CHW Certification



Note. From the “State Approaches to Community Health Worker Certification” by the Association of State and Territorial Health Officials, 2022. In the public domain.

In most states, certification is voluntary, although it may be required for reimbursement under certain health plans, including state Medicaid plans (Jones et al., 2022). A CDC policy evidence assessment report showed certification, standard core curriculum, and certification development as components of CHW interventions that have improved health, equity, and efficiency outcomes (CDC, 2014). Furthermore, certification offers a way to formally recognize CHWs, demonstrate qualifications, define the scope of practice, and may assist health care organizations in hiring (ASTHO, 2022; Jones et al., 2021). While numerous articles mentioned the positives of

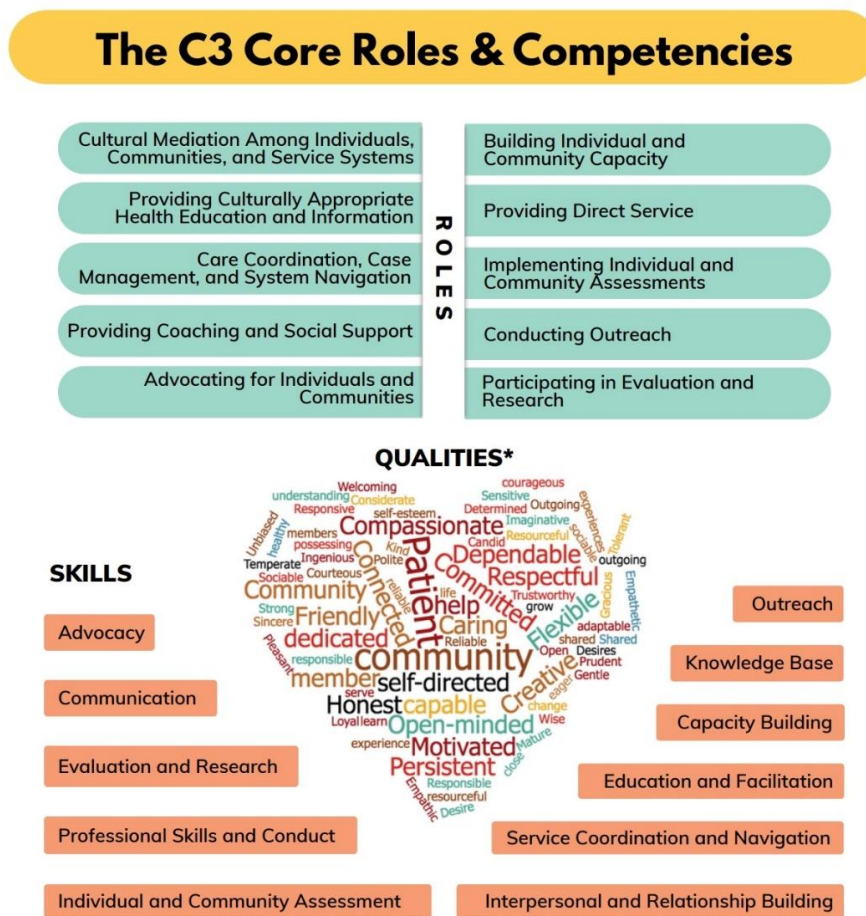
certification to ensure a standard skill set, many also cautioned against the professionalization of the workforce and the possibility that certification could create barriers for CHWs that would prevent them from entering the workforce (Barbero et al., 2021; Jones et al., 2021; Malcarney et al., 2017; Wennerstrom, 2021). A 2022 qualitative study of CHWs and CHW managers and allies (employers, policymakers, academic researchers) identified two positive themes related to certification, enhanced recognition and credibility, and upward mobility and growth; and two negative themes, threatened CHW identity and disparities between community-based and clinical CHWs and CHW exclusion (Kissinger et al., 2022). Solutions to this include ensuring that CHWs are key decision makers during the development of certification standards and the provision for recognition of work experience and lived experience as a path toward certification (Kissinger et al., 2022; Wennerstrom, 2021).

CHW Roles and Competencies

Two models identifying standardized core competencies for CHWs have been developed. Covert (2019) conducted a structured literature analysis measured by an expert panel and validated by CHWs and CHW supervisors to construct The Community Health Workforce Framework. The framework includes three categories and lays out specific guidelines for training, work setting, and scope of practice based on the level of specialization. Training for category 1 CHWs includes core competency training with health outreach and advocacy; category 2 adds training for chronic conditions, and category 3 adds disease-specific training. Category 1 training is more applicable to a community setting and categories 2 and 3 to health care settings (Covert et al., 2019). However, this model has been criticized by the National Association of Community Health Workers (NACHW) for being too medically oriented and not in alignment with best practices in evaluating the CHW workforce (George et al., 2021; Matos et

al., 2019). The Community Health Worker Core Consensus Project (C3 Project) also developed a framework for CHW roles and core competencies (Figure 2) that is endorsed by fifteen national public health organizations, including NACHW, and offers guidance to states developing curriculum and competency standards (Rosenthal et al., 2016). While diverse curriculums and training components exist, most states have adopted core competencies based on these models.

Figure 2



**The C3 Project did not develop a list of CHW qualities but rather endorsed existing research.*

Note. Rosenthal EL, Menking P, St. John J, Fox D, Holderby-Fox LR, Redondo F, Hirsch G, Lee L, Brownstein JN, Allen C, Haywood C, Ortiz Miller J, Ibarra J, Cole M, Huxley L, Palmer C, Masoud S, Uriarte J, Rush CH. The Community Health Worker Core Consensus (C3) Project

Reports and Website. Texas Tech University Health Sciences Center El Paso. 2014-2022. <https://www.c3project.org/>. In the public domain.

As of September 2020, 36 states had training programs developed, and 33 had adopted statewide core competencies (Barbero et al., 2021). Because of the variety of roles CHWs play, North Carolina has implemented standardized core competency training (SCCT) through NC community colleges and advanced specialty training through NC Area Health Education Centers (AHEC). CHWs who successfully complete the SCCT can apply for certification through the NC Community Health Worker Association (NCCHWA). A legacy track for CHWs with 2000 hours of documented experience is also a pathway for certification. To date, 922 CHWs have become certified in NC (H. Estrada, personal communication, November 7, 2023).

CHW Effectiveness

Kangovi (2015) emphasized the importance of quality research in determining the effectiveness of CHWs due to decades of inconsistent outcomes in the global research on CHW programs in the 1980s. Since the integration of CHWs as part of the Affordable Care Act and inclusion in Medicaid, recent evidence in the literature demonstrates the impact community health workers have in managing chronic disease, reducing health disparities, improving the patient care experience and advancing health equity (Adams et al., 2021; Centers for Disease Control [CDC] 2014; Knowles et al., 2023; Sprague Martinez et al., 2021).

Chronic Disease Management

Numerous studies demonstrate that CHWs can positively impact hypertension, diabetes self-management, asthma, HIV/AIDS prevention, and maternal and child health outcomes in vulnerable populations (Rajabiun et al., 2021; Sprague Martinez et al., 2021; Wilcock et al., 2015). The Community Preventive Services Task Force (CPSTF) recommends including CHWs

in diabetes management and prevention, heart disease, stroke prevention, and cancer screening interventions (The Community Guide, 2021).

Diabetes. A randomized control trial (RCT) of Latino adults with poorly controlled diabetes participating in the Miami Healthy Heart Initiative showed that a 12-month CHW intervention demonstrated a 0.51% reduction in hemoglobin A1c (HbA1c) levels (95% CI) and the proportion of patients whose diabetes was controlled was 37.8% versus 25% in the control group. Furthermore, the patients with the highest levels of HbA1c (9% or greater) had 1.36% lower levels than the control group at the completion of the study (Carrasquillo et al., 2017). The researchers did not find a statistically significant reduction in systolic blood pressure levels or low-density lipoprotein (LDL) cholesterol levels. Another RCT examined a CHW-nurse model in diabetes self-management with Samoan adults and also found statistically significant decreases in HbA1c (at least 0.5%) with 42.1% of CHW participants versus 31.8% of the control participants (DePue et al., 2013). In both studies, the greatest reduction was in patients with the highest HbA1c levels at the beginning of the intervention.

Asthma. A 2020 systematic review of fifteen studies on CHW asthma interventions for children showed improvement in health outcomes, including reduced emergency department/urgent care visits (n=10) and better symptom management (n=9) (Coutinho et al., 2020). A CHW home visit intervention to help improve and control asthma in children showed improvements in asthma-free days (2.10 more controlled days over two weeks), reduced urgent care utilization (1.3 fewer visits over 12 months), and showed a return on investment of \$1.90, with the intervention saving \$1340.92 for the \$707.04 invested (Campbell et al., 2015).

Hypertension. A RCT of a CHW coaching intervention with South Asian patients in a New York City primary care practice showed effectiveness in controlling hypertension. Results

at six months showed both systolic and diastolic blood pressure in control with 68.2% of participants compared to 41.6% of the control group, resulting in 3.7% (95% CI) higher odds of the CHW intervention participants controlling blood pressure than the control group (Islam et al., 2023).

HIV. In controlling HIV, adherence to antiretroviral therapy (ART) is critical, yet, like many chronic illnesses, inequities in care management and adherence to treatment exist (Drainoni et al., 2020). Several studies demonstrate the effectiveness of CHW interventions with vulnerable populations living with HIV. A RCT of a CHW intervention with at-risk African-American men with HIV showed improvements in viral load vs. the control group (log 0.9 copies/ μ L lower) (Kenya et al., 2013). Another study at ten Ryan White HIV/AIDS Program locations showed clinical improvements, with viral suppression doubling at 6 months from 22.4% to 43.7% for clients enrolled in a CHW program (Drainoni et al., 2020). Additionally, the researchers found that the CHW intervention increased provider visits (49.9-84.7%) and prescriptions for ART (22.4% - 43.7%).

Maternal Health. A retrospective study of 7,212 mothers who participated in a CHW home visiting program in Arizona compared to a matched synthetic control group showed improved birth outcomes in mothers who participated in the program. Statistically significant lower rates of low birth weight (LBW) were found among American Indian mothers (38% lower) and mothers with pre-existing health risks (25% lower) (Sabo et al., 2021). The researchers also found statistically significant reductions in both very low and extremely low birth weight (VLBW & ELBW) in Latina women (36% lower VLBW and 62% lower ELBW) and lower rates of pre-term birth in teen mothers (30%) (Sabo et al., 2021b). A second study of 291 women who participated in Safe Start, an evidence-based CHW program to improve health outcomes for

pregnant women with chronic conditions, had a lower adjusted odds ratio (AOR) of inadequate prenatal care (0.37) and antenatal inpatient admissions (0.58) in comparison to the control group. Although there was no difference in neonatal intensive care admissions, the Safe Start group had significantly shorter stays, with 15.9 days versus 18.3 days in the comparison group (Cunningham, 2020). A common theme throughout the studies on chronic disease management was that the populations at the highest risk of uncontrolled disease benefited the most from the CHW interventions (Campbell et al., 2015; Carrasquillo et al., 2017).

Reducing Disparities

It is estimated that \$93 billion in excess medical care costs are related to health disparities in the United States and that social factors are responsible for 25-60% of deaths (Cantor & Thorpe, 2018; Turner, 2018). Healthy People 2030 groups the social determinants of health (SDoH) into five domains, economic stability, education access and quality, neighborhood, health care access and quality, and built environment, and social and community context (Office of Disease Prevention and Health Promotion [ODPHP], n.d.) There is consensus in the literature regarding the importance of addressing patients' SDoH as part of holistic and quality patient care and improving population health (Cantor & Thorpe, 2018; DeVoe Jennifer, 2016; Giuse et al., 2017; Hood et al., 2016; Turner, 2018; Savitz et al., 2022). CHW interventions have shown a return on investment in health care expenditures and provide social determinants of health interventions to address food insecurity, housing, and transportation issues. CHWs can spend more time with patients than health care providers and, therefore, address social and cultural barriers affecting health and well-being (Cook & Keesecker, 2016; Malika et al., 2019; Washburn et al., 2021). National organizations such as the APHA and the Institute of Medicine (IOM) have recognized the importance of this workforce in reducing disparities and bridging the

gaps between health care and underserved communities (APHA, 2009; Institute of Medicine, 2003; Ruiz et al., 2012).

COVID-19

The COVID-19 pandemic magnified the inequities in our health care system as the communities most affected by poverty, racism, and language barriers struggled with reduced access to care, lack of internet, food insecurity, and basic needs (Peretz et al., 2020; Rumala et al., 2020; Valeriani et al., 2022). The need for CHWs increased to address the social determinants of health and connect health care providers with community members was critical; however, early on, the pandemic also presented challenges to CHWs who were not originally considered essential workers and the workforce experienced reduced hours and layoffs (Barbero et al., 2021; National Association of Community Health Workers, 2021). However, in March 2020, the U.S. Department of Homeland Security Cybersecurity and Infrastructure Security Agency classified CHWs as essential critical infrastructure workers. Furthermore, The American Rescue Plan Act of 2021 invested substantial funds to aid health departments and community organizations in hiring CHWs (Ibe et al., 2021; Peretz et al., 2020; Pinto et al., 2020). In North Carolina, CHWs linked 112,000 people to social support resources, provided education on COVID-19 vaccines to more than 420,000 people and scheduled more than 33,000 vaccine appointments (NCDHHS, 2021).

Valeriani (2022) provided a scoping review of CHW programs that were involved in tackling racial and ethnic disparities during the pandemic and, based on 23 articles, drew three main themes: action on socioeconomic inequities, linguistic and culturally tailored health information, and the ability to build trust in health providers. Although the researchers showed

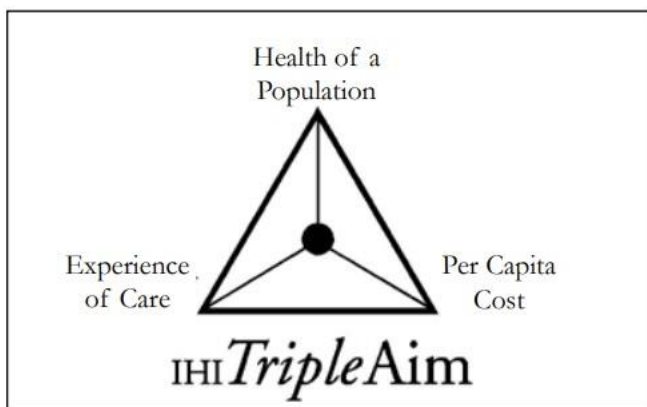
evidence of effectiveness in access and equity, they did not find literature examining the cost-effectiveness of CHW interventions during the COVID-19 pandemic.

Improving the Patient Care Experience

The Institute for Healthcare Improvement developed the triple-aim framework (Figure 3) as a way to optimize the performance of health care systems in the United States (Institute for Healthcare Improvement, 2023). The framework includes improving the patient care experience, improving the health of populations, and reducing the cost of health care.

Figure 3

Institute for Healthcare Improvement Triple Aim



Note. Stiefel M, Nolan K. A Guide to Measuring the Triple Aim: Population Health, Experience of Care, and Per Capita Cost. IHI Innovation Series white paper. Cambridge, Massachusetts: Institute for Healthcare Improvement; 2012. www.IHI.org. In the public domain.

Two systematic reviews of primary care patients showed improvements in cancer screenings and primary care access. Mistry (2021) shared that of 17 studies reviewed, 15 showed increases in cancer screening rates, and four out of five studies showed significant improvement in access to primary care services, although there was mixed evidence for patient satisfaction.

The second review showed that 70% of the CHW intervention studies (21/30) found

improvements in cancer screening behaviors, and of the five studies that examined cost-effectiveness, four out of five showed significant cost savings from incremental cost-effectiveness ratio (ICER) ranging from \$30,015 per quality-adjusted life year to an ICER of \$959 (Kim et al., 2016). Kangovi (2018) RCT of CHW interventions at three primary care clinics showed improvement in patient activation (difference in differences 1.9; 95% CI) and quality of care (OR, 1.8; 95% CI). In another RCT conducted by Kangovi and colleagues in 2017, participants under the care of CHWs improved mental health (2.3 vs -0.2; $P = .008$), reported higher quality care (49.2% vs 39.7%; $P = .010$) and higher disease self-management support (62.9% vs 38%; $P < .001$) (Kangovi et al., 2017).

Advancing Equity

Although the evidence in the literature is limited, opportunities for CHWs to assist with violence prevention and advancing equity are being examined (Barbero et al., 2022). On November 8, 2022, the APHA passed the policy statement - *A Strategy to Address Racism and Violence as Public Health Priorities: Community Health Workers Advancing Equity & Violence Prevention*. This statement identifies the CHW workforce as part of the solution to address violence, racism, and health inequity in community and health care settings (APHA, 2022).

Return on Investment

In examining the literature on Medicaid patients and reduced costs of care, three studies showed reduced health care costs, and one study found no net cost savings. Kangovi (2020) presented a well-cited return on investment analysis using a randomized controlled trial of Individualized Management for Patient-Centered Targets (IMPACT). The IMPACT intervention hired trained CHWs to support high-risk patients with at least two chronic diseases in high-poverty neighborhoods. The study concluded that every dollar invested in a standardized CHW

intervention that addressed the social determinants of health for low-income patients would return \$2.47 to an average Medicaid payer within the fiscal year. A pooled analysis of three randomized control trials in various clinical settings demonstrated that CHW interventions reduced hospital utilization in high-poverty Medicaid populations, 849 hospital days versus 1258 days, for an incidence rate ratio of 0.66, $p < .0001$ (Vasan et al., 2020).

A randomized quality improvement trial of 253 high-need and high-cost Medicaid patients showed that complex care management that included CHWs as part of a multidisciplinary team, demonstrated lower total medical expenditures (-\$7,732/member/year); fewer inpatient admissions (-0.32/member/year) and fewer specialists visits (-1.35/member/year) (Powers et al., 2020). The researchers did not find a significant impact on emergency or care center visits. Finally, a randomized program evaluation of a Medicaid CHW program found that while ED visits declined (0.96; $P < 0.1$), ambulatory care costs increased (1.15; $P < 0.1$), and the study found no difference in total patient costs (Heisler, 2020).

Integration into Health Care Teams

Twenty years ago, the Institute of Medicine (IOM) released its seminal report, *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Recommendations from the report included hiring CHWs and implementing multidisciplinary teams (Institute of Medicine, 2003). The CDC recommends that CHWs be included in health care teams to eliminate racial and ethnic disparities in health care, and The National Center for Chronic Disease Prevention and Health Promotion lists the inclusion of CHWs in the team-based care model as “best” in evidenced-based policies to improve chronic disease outcomes (CDC, 2014). Effective multidisciplinary teams are a key factor in health care transformation and the achievement of the quadruple aim framework, enhancing the patient experience, reducing costs,

improving population health, and improving the provider work-life satisfaction (Hartzler et al., 2018; Pinto et al., 2020).

The importance of CHW integration into health care teams is documented throughout the literature. Kangovi (2015) argues that CHWs are more valued and connected when services are delivered as part of the healthcare team and not through community-based organizations (CBOs) that are not integrated with the health care system. This is seen in a study where a CHW-led advanced care planning program for patients with advanced stages of cancer demonstrated the effectiveness of team-based care interventions led by CHWs (Patel et al., 2022). This qualitative study used the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework to evaluate the perceptions of health care professionals on the effectiveness of the CHW-led intervention, and while results revealed initial hesitancy in integration, over time, that changed due to positive experiences and data which led to trust and acceptance. The researchers also noted the importance of integrating CHWs as valued team members as necessary to achieve the goals of effectiveness (Patel et al., 2022). Findley (2014) conducted another qualitative study to examine CHW integration into a patient-centered medical home (PCMH) in New York. The authors discussed the value of CHWs in care coordination and the importance of CHW participation in care team meetings as participants and leaders in understanding patients' cultural and social perspectives (Findley et al., 2014).

Despite endorsements and evidence of effectiveness, CHWs can still struggle to be included in traditional health care teams and challenges with hiring and turnover have been documented in the literature. In 2021, turnover was estimated at 12% compared to 9.3% in other occupations (Jones et al., 2022). Payne (2018) used three years of qualitative evaluation data

from 13 sites and discovered four factors that drive CHW integration – an organization's capacity, transparency with health care roles, support for CHWs, and the clinical workflow.

Understanding the Role of the CHW

It is evident that a clear understanding of the role of CHWs as part of a health care team is essential for better integration and utilization of CHWs and that a lack of understanding can create confusion and conflict (Malcarney et al., 2017; Payne et al., 2017; Pinto et al., 2020; Sabo et al., 2017; Sprague Martinez, 2021; Washburn et al., 2021). The role of the CHW is unique in that they do not provide clinical health services (Wennerstrom, 2021). Furthermore, although CHW workforce development efforts involve certification and training, most CHWs do not hold professional licenses, degrees or have traditional health care training, which can create issues with reimbursement and acceptance by health care team members (Logan, 2021; McCarville et al., 2022). McCarville (2022) states CHWs may also have different care philosophies from clinicians, with CHWs being more environmentally oriented and relationship-driven versus treatment-oriented and transactional.

The importance of understanding, defining, and valuing the role of a CHW in the health care team was discussed in several qualitative studies. Results from a qualitative study of CHW integration into HIV clinics showed confusion in roles and the importance of defining and differentiating roles. Sprague Martinez (2021) conducted a process evaluation guided by RE-AIM to understand how the Ryan White HIV/AIDS program integrated CHWs into their care teams. Role ambiguity and the importance of clarifying the CHW role was the most common code derived from group interviews (n=10). In this study, the ambiguity between the roles of the HIV caseworkers and CHWs was an issue. In other studies, problems with understanding the scope of practice and the difference between CHWs and Social Workers led to CHWs not being

utilized fully (Payne et al., 2017; Washburn et al., 2021). Washburn (2021), in a qualitative study of 71 CHWs, shared that it is a multi-stage process to achieve interprofessional integration that involves three stages - role confusion, conflict and finally, a level of engagement and integration. According to the authors, this final level of integration takes time and maybe even years to develop as equal members of an interdisciplinary team. Finally, Ignoff (2022) shared lessons learned over 20 years of integrating CHWs into care teams at Sinai Urban Health Institute and emphasized the importance of supportive and knowledgeable supervision and an understanding of the uniqueness of the CHW role.

Support for CHWs

CHWs working in health care teams can experience full inclusion or isolation depending on the environment and support of the organization (Ibe et al., 2021). While many studies examined integration through the perspective of organizational leaders, Allen (2015) examined CHW integration through the lens of the CHW. Using Spearman rank-difference correlation, the researchers found a positive correlation between a CHW's feelings of organizational support and the number of CHWs employed ($\rho = 0.24$, $P = .02$, $n = 105$). The study also found that CHWs listed networking opportunities with other CHWs (77.9%), team meetings (73.7%), and training (81.6%) as supportive factors (Allen et al., 2015).

Providing sustainable funding for CHWs is also essential to ensure equity and effectiveness for the workforce (Ibe et al., 2021). Traditionally, community based CHW programs received grant funding from federal agencies such as the CDC and the Health Resources and Services Administration, state agencies, and private foundations (Malcarney et al., 2017). Employment estimates by sector show that local government has the highest level of

employment for CHWs and grantmaking and giving services with the highest concentration of CHWS (Figure 4).

Figure 4

Industries with the Highest Level of CHW Employment

Industries with the highest level of Community Health Workers:				
Industry	Employment	Percent of industry employment	Hourly mean wage	Annual mean wage
Local Government, excluding schools and hospitals (OEWS Designation)	9,910	0.18	\$24.66	\$51,290
Individual and Family Services	9,900	0.35	\$21.15	\$43,990
Outpatient Care Centers	5,820	0.57	\$21.71	\$45,150
General Medical and Surgical Hospitals	5,750	0.1	\$27.38	\$56,950
Insurance Carriers	3,150	0.26	\$29.38	\$61,110
Industries with the highest concentration of employment in Community Health Workers:				
Industry	Employment	Percent of industry employment	Hourly mean wage	Annual mean wage
Grantmaking and Giving Services	1,520	1.02	\$29.00	\$60,320
Community Food and Housing, and Emergency and Other Relief Services	1,910	0.96	\$20.27	\$42,170
Social Advocacy Organizations	2,140	0.9	\$23.12	\$48,090
Outpatient Care Centers	5,820	0.57	\$21.71	\$45,150
Individual and Family Services	9,900	0.35	\$21.15	\$43,990

Note. From “21-1094 Community Health Workers, Occupational Employment and Wages, May 2021” by U.S. Bureau of Labor Statistics, 2023. In the public domain.

Despite evidence of the growth of the workforce, mechanisms for funding the work of CHWs in health care settings are still being established (Allen et al., 2015; George et al., 2020; Lapidos et al., 2019; Wennerstrom et al., 2021). Studies have shown that unsustainable reimbursement systems created barriers to hiring CHWs and that short-term funding was one factor responsible for high workforce turnover (Jones et al., 2022; Rogers et al., 2018). As states enact legislation that includes financing for Medicaid through 1115 waivers, state Managed Care Contracts, and State Plan Amendments; opportunities for CHWs to be funded as part of Managed Medicaid Care will increase and will be a more sustainable source of funding for CHWs (ASTHO, 2019; Jones et al., 2021; Jones et al., 2022; Wennerstrom et al., 2022). Finally,

to be effective, state Medicaid and Medicare programs, health systems, and community-based organizations should work together to create workforce financing models (George et al., 2020).

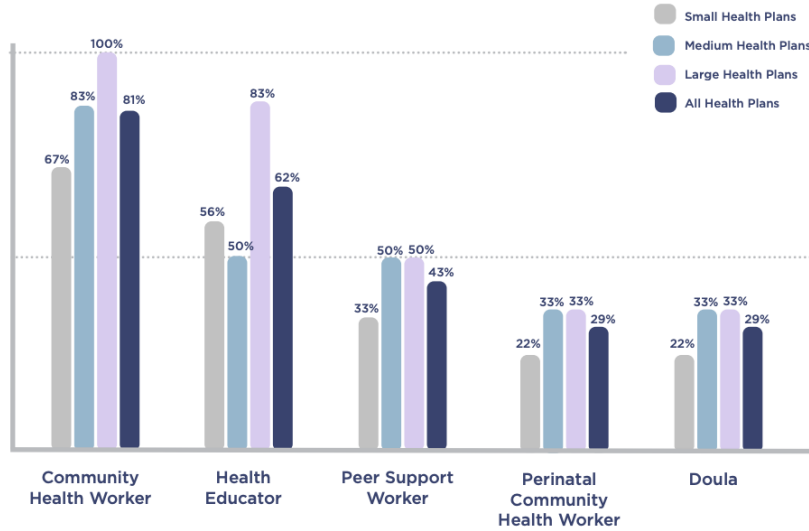
CHWs and Medicaid

Medicaid is an insurance program that provides coverage for low-income individuals. The Centers for Medicare & Medicaid Services (CMS) is the federal agency that oversees Medicare, Medicaid, the Children's Health Insurance Program (CHIP) and the Health Insurance Marketplace (Centers for Medicare & Medicaid Services (CMS), n.d.). More than 85 million people in the U.S., or 1 in 5, are covered under Medicaid, and it is jointly funded by the federal government and states (Rudowitz et al., 2019).

Nationally, 69% of Medicaid beneficiaries are enrolled in comprehensive Medicaid-managed care plans, and many states hope these arrangements will help reduce health care disparities and address social determinants of health (Hinton et al., 2022). One strategy to accomplish this goal is to hire CHWs (Wennerstrom, 2022). Twenty-nine states, including North Carolina, allow Medicaid payment for services provided by CHWs, often as part of a managed care organization, section 1115 waiver, or Health Home program (Halder & Hinton, 2023). A 2022 Institute for Medicaid Innovation survey showed that 81% of all Medicaid Health Plans and 100% of large plans employed CHWs in non-clinical high-risk care coordination (Institute for Medicaid Innovation, 2022) (Figure 5). While the roles of CHWs in community-based organizations, clinics, and hospitals have been well documented, how CHWs work in managed care organizations warrants further evaluation (Wennerstrom et al., 2022).

Figure 5

Medicaid Health Plan Non-Clinical High-Risk Care Coordination Workforce



Note. From “2022 Annual Medicaid Health Plan Survey” by Institute for Medicaid Innovation, 2022. In the public domain.

CHWS and Medicare

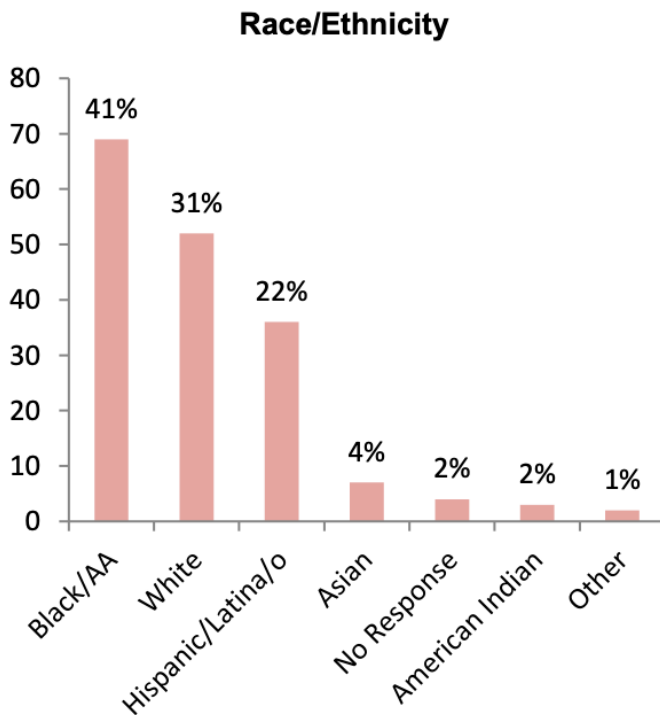
On August 7, 2023, The Centers for Medicare & Medicaid Services (CMS) announced a proposed rule regarding payment policies. Included in this proposal are new Medicare services that can be provided by CHWs and ordered by a Medicare billing practitioner, including community health integration services and principal illness navigation services (Centers for Medicare & Medicaid Services (CMS), 2023). At this stage, comments are being collected, but new payment policies show promise in creating sustainable reimbursement for the integration of CHWs within health care teams.

Community Health Workers in North Carolina

A 2017 survey of 168 CHWs in North Carolina also showed that the majority were female (90%) and diverse. The majority were Black/African American (41%), followed by Non-Hispanic White and Hispanic (31% and 22%, respectively). Asian, American Indian, other, and non-respondents made up the other 9% (NCDHHS, 2017) (Figure 6).

Figure 6

2017 NC CHW Survey



Note. From “The North Carolina Community Health Worker Survey” by the North Carolina Department of Health and Human Services, 2017. In the public domain.

The North Carolina Community Health Worker Initiative was established to coordinate efforts to address population health and create an integrated CHW workforce (NCDHHS, n.d.). In 2018, stakeholders released the “Community Health Workers in North Carolina: Creating an Infrastructure for Sustainability, Final Report and Stakeholder Recommendations of the North

Carolina Community Health Worker Initiative (CHW Stakeholder Report)” based on their findings (NCDHHS, 2018). This report included guidance on roles and responsibilities, core competencies, curriculum, training, and certification. Recognizing the importance of social justice and equity in training, the report recommends adult learning and popular education styles of teaching to value the lived experiences of learners.

Additionally, the report included four recommendations for future pathways. The first was to create a board for certification and accreditation. This recommendation led to the development of the North Carolina Community Health Worker Association as the professional home for CHWs in the state (NCDHHS, 2018). Other suggestions from the CHW Stakeholder Report included implementing standardized core competency training (SCCT) through community colleges and Area Health Education Centers (AHEC) and creating a professional network led by CHWs. Finally, the report emphasized the importance of integrating CHWs into Medicaid Managed Care and team-based care as critical to linking patients and community resources to address the social determinants of health (NCDHHS, 2018).

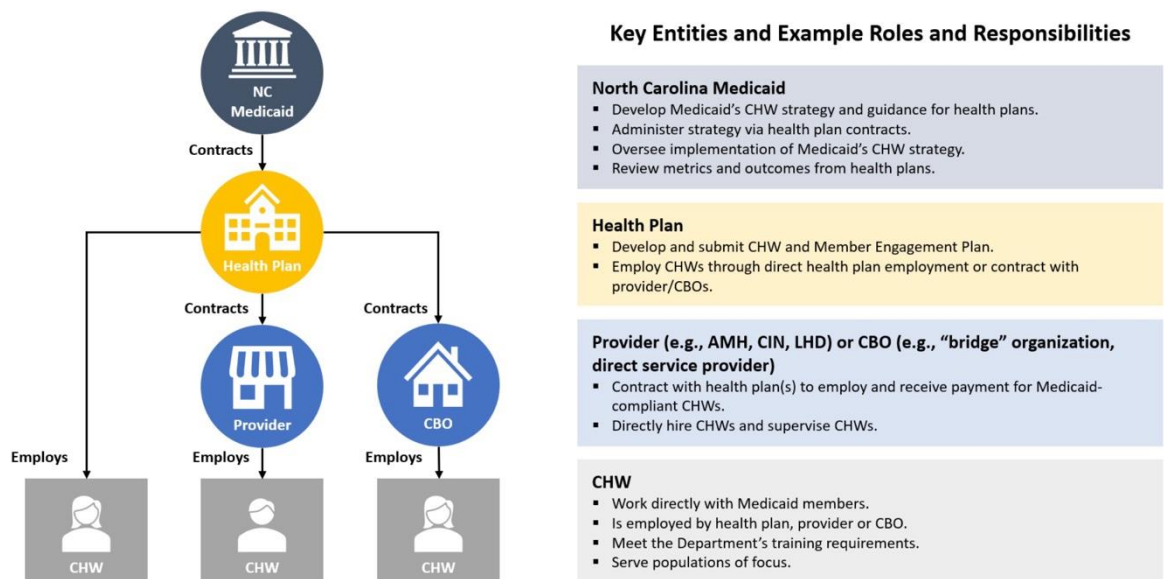
Medicaid Transformation in North Carolina

In 2015, the North Carolina General Assembly passed legislation to transform the fee-for-service Medicaid model into a managed care model. In 2021, Managed Medicaid began in the state for enrollees in standard plans. The vision of the Medicaid transformation is “To improve the health of North Carolinians through an innovative, whole-person centered, and well-coordinated system of care that addresses both the medical and non-medical drivers of health.” (NCDHHS, 2023a, pg. 4). To deliver local care management through the new Medicaid Managed Care model, the NCDHHS developed the Advanced Medical Home program (AMH) as the primary care management vehicle (NCDHHS, 2023a.).

NCDHHS has published guidance on how CHWs can support Medicaid members and the roles CHWs can play as part of health plans, community-based organizations (CBOs), or health care providers (NCDHSS, 2023a). Figure 7 highlights the key entities involved in NC Managed Medicaid and examples of the various roles and responsibilities CHWs can play in each entity.

Figure 7

Community Health Worker Roles and Responsibilities in NC Medicaid



Note. From “North Carolina Medicaid’s Community Health Worker Strategy” by NCDHHS, February 17, 2023. In the public domain.

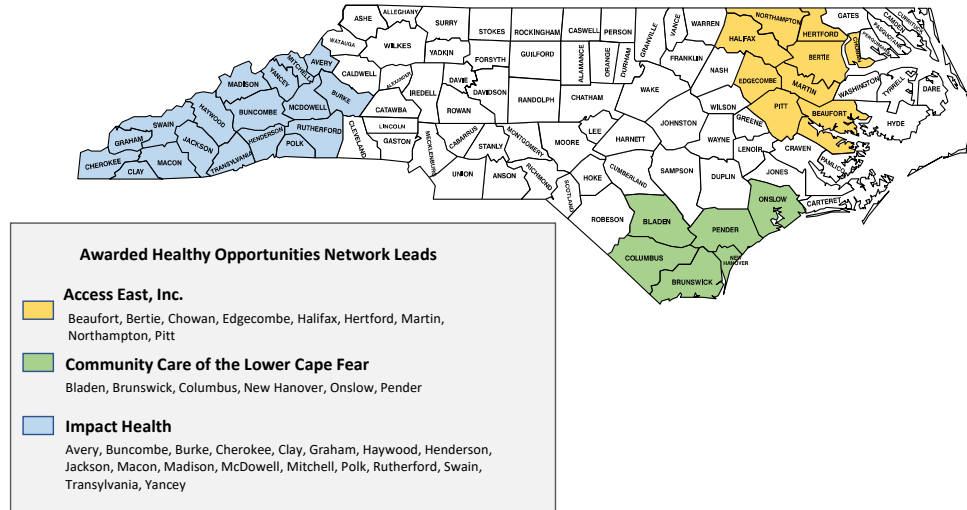
Under the proposed strategy, certification through the North Carolina Community Health Worker Association (NCCHWA) is required for CHWs working with Medicaid members. Pathways for certification include successful completion of the NC SCCT with a score of at least 80% or the NC CHWA Legacy Track for CHWs with 2000 hours of documented experience within the past five years (NCDHHS, 2023a).

Additionally, to test the delivery of non-traditional services to address the social determinants of health, North Carolina established the Healthy Opportunities Pilots (HOP). The federal government has authorized \$650 in state and federal Medicaid funding to provide non-medical services to Medicaid enrollees to evaluate the impact of these services on health outcomes, costs, and utilization. Four approved services were authorized, including housing, food, transportation, and interpersonal violence, through the Centers for Medicare & Medicaid Services (CMS) as part of North Carolina's Section 1115 Medicaid Demonstration Waiver. To qualify for services, a Medicaid participant must live in one of the pilot regions and have at least one physical or behavioral issue and at least one social risk factor (NCDHHS,2023b).

The HOP sites are located in three geographic regions— Region 1 in the western part of the state, Region 6 in the northeast, and Region 5 in the southeast (Figure 8). The western region encompasses 18 counties, and the lead agency is Impact Health. The northeast region has nine counties, and the network lead is Access East, Inc. All three regions include metropolitan areas with state universities, Asheville (population 94,067) in the western region, Greenville, NC (88,728) in the northeastern region, and the largest, Wilmington NC (117,643) in the southeast region. Four entities play critical roles in the HOP – Prepaid Health Plans, Care Managers, Lead Pilot Entities, and Human Services Organizations. The HOP lead pilot entities connect prepaid health plans and human services organizations (NCDHHS, 2023b).

Figure 8

Healthy Opportunities Network Leads and Regions



Note. From “Healthy Opportunities Pilots” by NCDHHS, 2023. In the public domain.

This innovative pilot program provides an opportunity to increase the number of CHWs working with teams to address the social determinants of health with Medicaid participants. As of September 30, 2023, 13,612 participants have enrolled in the pilot, and 146,485 services have been delivered (NCDHHS, 2023c).

Theoretical Frameworks and Guidance

Allen (2019) provided a scoping review to understand if the use of implementation science, a subset of health theories that guide researchers on the development, implementation and evaluation of interventions, guided the integration of CHWs into health care settings. The results of the review found that the use of implementation theories was limited. Out of 50 studies, only six used implementation theory, which represents an opportunity for further research on integrating CHWs into health care teams. Without solid research practices and

standardized measures, the evaluation of programs leads to issues with aggregating data across populations and settings. Although the C3 Project core competencies (Figure 2) include participating in evaluation and research as one of the ten core CHW roles, CHWs have often been overlooked as full partners in all stages of the research process (Rodela et al., 2023; Wiggins et al., 2022). A scoping review of CHWs involvement in health intervention research teams included a primary analysis of 130 articles and a secondary analysis of 23 that included the participation of CHWs in research between 2008-2018. Sixty percent of the studies were community based participatory research studies and 43.1% were RCTs. The analysis concluded that CHW involvement was valuable in both CBPR and non-CBPR studies with recruitment and inclusion of hard-to-reach populations (6 studies), participant retention (6 studies), a community perspective (4 studies), participant benefit (7 studies), and advocacy (9 studies) (Coulter et al., 2020).

Popular Education

Popular education theory is incorporated throughout CHW literature. The theory recognizes the importance of lived experiences and empowerment of CHWs and shares similar key principles, such as experiential knowledge being more important than the knowledge gained through formal education (Wiggins et al., 2020). The theory is also known as people's education, empowerment education, or Freirean education in reference to Paul Freire, a Brazilian educator and philosopher who popularized the theory with his work in social justice in Latin America (Wiggins, 2011; Friere, 1970).

“Popular education, a philosophy and methodology that creates settings in which people most affected by inequities can identify problems and underlying causes and develop

solutions, has been a cornerstone of social movements around the world for decades.”

(Wiggins & Perez, 2017, p. 661).

Popular education principles have been incorporated into core competency, standard-based clinical, and specialty training for CHWs (Bridgeman-Bunyoli et al., 2015; George et al., 2021; Rajabiun et al., 2021; Ruiz et al., 2012). These principles include the recognition that the distribution of the world’s resources is unjust and that change is needed, the importance of trust, shared life experiences and knowledge, active participation in one’s learning process, inclusiveness and equality between educators and students, critical consciousness in organized action to change the world and learning with our heads, hearts and bodies (Wiggins, 2007). The Common Indicator Project (CI project) also uses popular education as its theoretical framework for developing evaluation indicators for CHW practice (Rodela et al., 2021).

Community Health Worker Common Indicators Project (CI Project).

The CI project leadership team is made up of 50% CHWs. The goal of the project is to “contribute to the integrity, sustainability, and viability of CHW programs through the collaborative development and adoption of a set of common process and outcome constructs and indicators for CHW practice” (Rodela et al., 2022, pg. 2; Figure 9). One of the twelve priority indicators of the CI project is the extent to which CHWs are integrated into teams, which uses relational coordination theory and examines integration from the perspective of the CHW (Rodela et al., 2022). To develop this indicator, the project team examined models that identified “teamness” and concluded that the evidence-based relational coordination scale was relevant to understanding the integration of CHWs within health care teams and was supported in the literature (CHW Center for Research & Evaluation, 2023).

The National Academy of Medicine issued a call to action to members on inclusion, diversity, equity, and anti-racism in health and science professions (Fuentes-Afflick et al., 2022). Most community health workers are women of color who represent the communities they serve but are often the minority in the health care teams they work with. To measure whether race, ethnicity, and/or culture influence the level of integration into a health care team, a novel scale was included in the Common Indicators Project's recommended measures for team integration (Rodela et al., 2022).

Figure 9

CI Project Priority Indicators

Process Indicators	Outcome Indicators
CHW compensation, benefits, and advancement	Participant self-reported health status
CHW enactment of the 10 core roles	Participant health and social needs
CHW-facilitated referrals	Participant social support
CHW involvement in decision- and policy-making	Participant empowerment
CHW integration into teams	Policy and systems change (program level)
Supportive and reflective supervision	Policy and systems change (state level)

Note. From “CHW Common Indicators Piloting Manual” March 30, 2022. In the public domain.

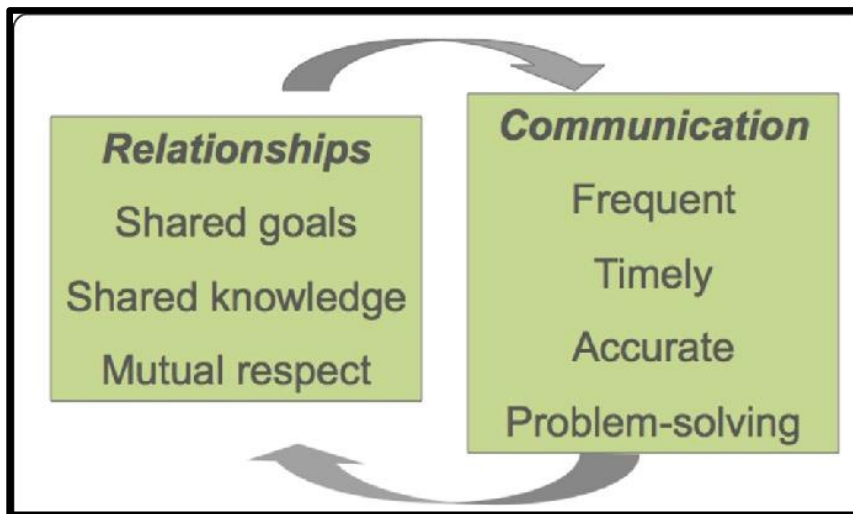
Relational Coordination

Relational Coordination is the theory of “communicating and relating for the purpose of task integration” (Gittel, 2008, p.25). The theory emphasizes that high-quality relationships are most effective when work is based on shared goals, shared knowledge, and mutual respect and

when communication is frequent, timely, accurate, and problem-solving (Figure 10) (Brandeis, 2023; Brazil et al., 2019; Havens et al., 2018).

Figure 10

Relational Coordination



Note. From Brazil et al., 2019. Improving the relational aspects of trauma care through translational simulation. In the public domain.

Relational coordination seeks to understand performance in interdisciplinary teams in health care settings and has been associated with increased patient satisfaction, improved quality of care, and integrated care delivery (Bolton et al., 2021; Gittel et al., 2015; Lee, 2020). A study of 283 primary care team members and the correlation between relational coordination and the assessment of chronic illness care (ACIC) surveys showed relational coordination scores were significantly and positively associated with the ACIC scores (.26) (Noel et al., 2013). A systematic review of relational coordination studies found positive associations with patient quality outcomes such as quality of life and care, satisfaction, trust and confidence, and patient well-being (Bolton et al., 2021). Furthermore, high relational coordination was also shown to

improve quality of care for total hip and knee arthroplasty patients (1.068, $P < 0.001$) and reduce costs by reducing length of hospital stays with a 1-point increase in relational coordination associated with a 53.77 % decrease in stay length (95% CI 44.41% - 61%) (Bolton et al., 2021; Gittel et al., 2000; Gittel et al., 2008). Finally, relational coordination has been associated with high job satisfaction, low turnover, and reduced burnout in health care providers (Bolton et al., 2021; Gittel et al., 2020; House et al., 2022). A study of nurses in 5 rural community hospitals used the 7-item Relational Coordination Survey for Patient Care to measure experiences working with other nurses, physicians, support staff, and therapists and correlated the results with job satisfaction, work engagement, and burnout survey questions. Significant positive bi-variate correlations were found between job satisfaction (.27) and work engagement (.25) and negative correlations with emotional exhaustion (-.27) (Havens et al., 2018).

The relational coordination survey is a fully validated tool that has been used in health care settings to measure teamwork (Gittel et al., 2015). The studies reviewed have included providers, nurses, medical technologists, social workers, therapists, home care staff, pharmacists, and administrators. However, the lack of studies that include CHWs as part of multidisciplinary health care teams indicates a gap in the literature. For the purposes of this study, health care team members include nurses, doctors, social workers, health educators, physician assistants, nurse practitioners, and pharmacists.

Summary

Reducing health disparities in vulnerable communities will require health care teams to reevaluate how they address the non-medical factors that affect their patient population. There is evidence in the literature that integrating CHWs into health care teams can help organizations do so and achieve the triple aim of health care - improving population health, the experience of care

and the cost of care (Adams et al., 2021; Centers for Disease Control [CDC] 2014; Knowles et al., 2023; Sprague Martinez et al., 2021). While several studies focused on the inclusion of CHWs in health care, only one study used quantitative data to examine integration from a CHW perspective. Furthermore, CHWs provide a unique voice and lived experience and share culture, race, and ethnicity closely aligned with the population that they serve, but may be different from other members of the health care team.

Chapter III

Methodology

A review of the literature included studies on the effectiveness of CHWs working with high-risk populations to improve health equity, reduce disparities, and achieve the triple aim of health care. Furthermore, the literature on relational coordination demonstrated the importance of a well-functioning team to improve patient satisfaction and quality of care. As the CHW workforce grows and more CHWs begin to work as part of health care teams, it is vital to understand if CHWs feel they are fully integrated into health care teams in a meaningful way (Rodela et al., 2021). The literature review also revealed a gap in understanding integration from a community health worker perspective. This study aimed to understand the extent CHWs felt they were part of a team and the factors that correlated with higher levels of integration. Specifically, whether the CHWs felt their role was understood and whether race, culture, or ethnicity influenced how CHWs felt they were treated as part of a healthcare team.

Study Design

This study used a non-experimental, correlational study design. An online quantitative survey was used to collect the data at a single point in time. CHWs who were associated with the North Carolina Community Health Worker Association (NCCHWA) were surveyed to make statistical inferences about their level of integration and the role of culture, race, and ethnicity. A seven-item validated tool was used to measure relational coordination, and a four-question novel scale measured the extent to which CHWs felt that their race/ethnicity or culture negatively influenced how they were viewed or treated by health care team members.

Study Population

The target population for the study was individuals who identified as CHWs and worked in North Carolina. The study utilized a convenience sample of CHWs who were part of the NCCHWA. As of November 1, 2023, North Carolina had 922 certified CHWs (H. Estrada, personal communication, November 7, 2023).

Inclusion

For the purposes of this study, participants were 18 years of age and older, identified as a CHW, and worked in North Carolina. Because certification is a choice and not mandatory to work in North Carolina or be a part of the NCCHWA, all CHWs were included regardless of certification. The definition most widely used to describe CHWs is from the American Public Health Association (APHA):

A community health worker is 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 to facilitate access to services and improve the quality and cultural competence of service delivery (American Public Health Association [APHA], 2022).

Exclusion

CHWs under 18 years of age and who did not work in North Carolina were excluded from the study. Members of the NCCHWA who identified as allies, such as health care providers, public health professionals, educators, advocates, researchers, and others who support the workforce but did not identify as CHWs, were also excluded.

Sampling Method

This study used a non-experimental approach to understand the variables that affect CHW integration into health care teams. The study examined if there was a correlation between relational coordination, the organization's understanding of the CHW's role, and race/ethnic discrimination. This data was collected from a convenience sample of CHWs who are connected to the NCCHWA. The NCCHWA posted information about the study on their social media sites Facebook and LinkedIn. Additionally, NCCHWA board members, CHW ambassadors and CHW SCCT instructors were contacted and asked to share the survey with their CHW connections. Finally, the survey information was shared by email with the Queen City Community Connect Coalition (QC4), a group of CHWs in Mecklenburg County, NC.

Sampling Size

Sample size calculations were provided by G*Power to determine the sample size needed for the study (Faul et al., 2007). To determine the correlation between the study's independent and dependent variables, a bivariate normal model two-tailed test with 80% power, 0.3 effect size, showed that a sample size of 84 participants was needed.

Instruments and Measures

A bilingual (English/Spanish) 22-item survey included eight demographic questions that measured gender, race, ethnicity, age, county, certification status and employment setting. In addition to demographic data, a seven-question validated relational coordination survey was used to measure the extent to which CHWs are fully integrated into healthcare teams (Appendix A). The scale is an adapted relational coordination scale that replaced the phrase “others on your team” with “the other healthcare, social service, and/or education providers with whom you work, and replaced the term “patients” with the term “program participants” to better align with

the CHW role (CHW Center for Research and Education, 2023, p. 7). Question four of the survey was reverse scored, and then the mean of the seven questions was calculated to represent a relational coordination score with a scale from 1-5. A four-question novel scale measured race/ethnicity factors and how CHWs are treated as part of a health care team (Appendix B). The mean of these four questions was calculated to determine a race/ethnic discrimination score. A final question, “To what extent do the other healthcare, social service, and/or education providers with whom you work understand your roles and what you do as a CHW?” examined to what extent health care team members understood the CHWs' role. The survey instruments are included in the CHW Common Indicators Project Priority: Indicators for Priority Constructs, version 8-24-2023, and available in English and Spanish (CHW Center for Research and Evaluation, 2023). These measures are designed to support the CHW workforce by adopting standard processes, outcome constructs, and indicators for practice (Rodela et al., 2022). A final open-ended question asked participants to share comments. Fiorella Horna, a CHW SCCT Instructor at Durham Technical Community College, who teaches the training in Spanish, provided translation for the open-ended question at the end of the survey. She also translated the survey consent and directions into Spanish.

Data Collection

NCCHWA posted information through their social media channels. Additionally, the association has six CHW ambassadors representing every North Carolina region. The CHW ambassadors were sent the survey link to forward to CHWs working in their region. NCCHWA's seven board members who are CHWs or CHW supervisors were also asked to share the survey with CHWs in their organizations. Finally, there are currently eleven community colleges that teach the NC CHW SCCT, and the instructors shared the survey with CHWs in their area. A

follow-up with the CHW ambassadors, CHW board members and CHW SCCT instructors occurred two weeks after the first request. Finally, the Queen City Community Connect Initiative (QC4), a group of approximately 40 CHWs in Mecklenburg County, NC, who meet quarterly for education and networking, were sent an initial email with a link to the survey and a follow-up after two weeks.

The participant consent forms and survey questions were entered into Qualtrics, an online survey tool, and a web link and QR code were created (Appendix C). Survey responses were anonymous, and the participants' IP Address, location data, and contact information was not collected in the survey. The Spanish survey was added into Qualtrics using a combination of manual entry and Google translation.

Using an incentive for online surveys has been shown to increase survey response, and a small number of large incentives was shown to be more effective than a larger number of small incentives (Sauermaann & Roach, 2013). To encourage participation, four \$50 Amazon gift cards were offered to those who completed the survey and chose to enter the raffle. The anonymized raffle was created in Qualtrics as a separate survey. At the end of the survey, participants could enter the raffle or opt out and were informed that their survey responses would still remain anonymous if they chose to enter the raffle. Participants who chose to enter the raffle were directed to a separate survey that collected email addresses for the raffle. This protected anonymity, and the participant's email was not be associated with the main survey data. The raffle winners were selected randomly using an online random number generator and the four winners were emailed a \$50 Amazon gift card. When the survey closed, the data was transferred into SPSS (Statistical Package for the Social Sciences) for analysis.

Data Analysis

Both descriptive and inferential data analyses were utilized to assess study data. Data from the Qualtrics survey was exported to SPSS and coded according to the data analysis table (Appendix D). Descriptive statistics were calculated, including the mean, range, percentages, and total count for the demographic questions, age, gender, race and ethnicity, employment length, and setting. Inferential data analysis was used to understand CHW integration into health care teams using relational coordination and racial discrimination measures.

For the first research question, which examined the correlation between the independent variable, the number of years a CHW has worked in an organization (RQ1), and the dependent variable, relational coordination, Spearman rank-difference correlation (Spearman's rho) was used to calculate a correlation coefficient. Spearman's rho was used for this question because the dependent variable, the number of years employed, was ordinal and not an interval variable. Research questions 2 – 5 examined the relationship between two variables and used Pearson Correlation, a quantitative formula developed by Karl Pearson that also calculates a correlation coefficient (Terrell, 2012, p. 322). For Research Questions 2 and 3 (RQ 2 - 3), Pearson Correlation was used to determine the degree of linear correlation between the number of CHWs employed (RQ2); and the understanding of a CHW role (RQ3), and the dependent variable, relational coordination. Additionally, Pearson Correlation was used for Research Question 4 (RQ4) to determine if there was is a correlation between the independent variable understanding a CHW's role and racial/ethnic discrimination and again for Research Question 5 (RQ5) to understand if there was a correlation between the independent variable racial/ethnic discrimination and dependent variable relational coordination.

Question eight, which asks, "When an error has been made about program participants, do the other healthcare, social service, and/or education providers with whom you work blame

others rather than sharing responsibility?” is part of the seven relational coordination questions and was reverse-scored to align with the scoring direction of the other six questions. The average of the seven-question relational coordination questions determined the mean relational coordination score (RC). Racial/ethnic discrimination was determined by an average of the four novel questions on the influence of racism/discrimination on integration into health care teams (Appendix C). Statistical significance was set at $p < .05$ for all analyses.

Institutional Review Board

Since this study involved human subjects, approval by the Institutional Review Board (IRB) was required. The researcher requested approval from the Radford University IRB on January 16, 2024 for expedited review and the study was approved on February 8, 2024.

Study Considerations

Limitations

The study used a convenience sample of CHWs; therefore, the results cannot be applied to the general CHW population, only suggested. Furthermore, the study was non-experimental and examined relationships but not causation.

Delimitations

This study only included CHWs affiliated with the North Carolina Community Health Worker Association. It may have excluded CHWs who do not receive electronic communication and social media posts from the NCCHWA and are not connected to NCCHWA or QC4. The study population included only CHWs who work in North Carolina, and the results may not apply to other states.

Chapter IV

Results

This study examined the level at which community health workers believe they are integrated into health care teams in North Carolina and the factors that influence integration. The Radford University IRB approved the study on February 8, 2024, and a link and information to the online Qualtrics survey was sent to the NCCHWA and QC4 leaders for dissemination that same day. The survey closed on March 6, 2024. The data from Qualtrics was exported to SPSS for descriptive and inferential data analyses. The codebook describing each variable in the dataset for the SPSS analysis is included in Appendix C. This chapter will review the recruitment strategies, sample, descriptive statistics, the recoding of dependent variables relational coordination and race/ethnic discrimination, and inferential statistics used to test the hypotheses.

Recruitment Strategies

Participants were recruited through the NCCHWA and QC4. The NCCHWA staff members posted information about the survey on LinkedIn and Facebook to share the survey information with NCCHWA members. Honey Estrada, Executive Director, also shared the survey information through an email to NCCHWA stakeholders, including board members, CHW ambassadors, and SCCT instructors. The QC4 group received an email with the recruitment information from Brittany Weatherhall with the Mecklenburg County Community Health Worker Initiative. A snowball methodology was employed, and stakeholders were asked to forward the information to CHWs in their network.

Sample

The survey remained open for four weeks and was completed by 147 participants. However, 86 of those participants were suspected to be fraudulent and thus removed from the

data set used for analyses as described in Appendix E. Of the remaining surveys submitted, 60 participants completed the consent form, 10 were excluded because they did not identify as a CHW, eight were excluded because they did not work in North Carolina. Of those who completed the consent and screening questions, 38 completed the survey. One participant did not answer survey question six, which is part of the seven questions that determine relational coordination (questions 5 – 11). Therefore, these participant's responses to the relational coordination questions were excluded, making the total number of participants for determining relational coordination (RC) 37. Table 1 shows the breakdown of the participants and the final sample used for the data analysis. The goal of 84 participants to determine the correlation between the independent and dependent variables within a bivariate normal model for a two-tailed test in power analysis was not achieved; therefore, the following analyses are underpowered.

Table 1

Survey Completion

Survey	Participants
Completed	147
Completed not fraudulent	61
Completed the Consent Form	60
Identified as a CHW (Screening Question)	50
Worked as a CHW in NC (Screening Question)	42
Over 18 (Screening Question)	42
Completed Survey Questions	38
Completed Survey Questions Including All Relational Coordination (RC) Questions (5-11)	37

Demographics

Of the 38 participants, the majority were female ($n=30$, 79%), followed by male ($n=7$, 18%) and one participant identified as non-binary/third gender ($n=1$, 3%). The majority of the participants were between 45 and 55 years old ($n=13$, 34%), followed by 35-44 years old ($n=11$,

30%), 25-34 years old ($n=2$, 5%), 55-64 years old ($n=2$, 5%), and 18-24 years old ($n=2$, 5%). Most participants reported their race as White or Caucasian ($n=17$, 45%) and Black or African American ($n=15$, 40%). The other participants reported more than one race ($n=3$, 8%) or chose Other race ($n=2$, 5%). One participant preferred not to say ($n=1$, 3%), and none identified as American Indian/Native American or Alaska Native, Asian or Native Hawaiian or Pacific Islander. Additionally, 10 participants reported being of Hispanic, Latino, or Spanish origin ($n=10$, 26%); see Table 2. Two participants answered the survey in Spanish.

Sociodemographic Characteristics of the Participants

Table 2
Sociodemographic Characteristics of the Participants

Sample Characteristics	<i>n</i>	%
Gender		
Male	7	18.4
Female	30	78.9
Non-binary/third gender	1	2.6
Age		
18-24	2	5.3
25-34	10	26.3
35-44	11	28.9
45-54	13	34.2
55-64	2	5.3
Race		
White	17	44.7
Black	15	39.5
More than one race	3	7.9
Other	2	5.3
Prefer not to say	1	2.6
Spanish, Hispanic, or Latino		
Yes	10	26.3
No	28	73.7

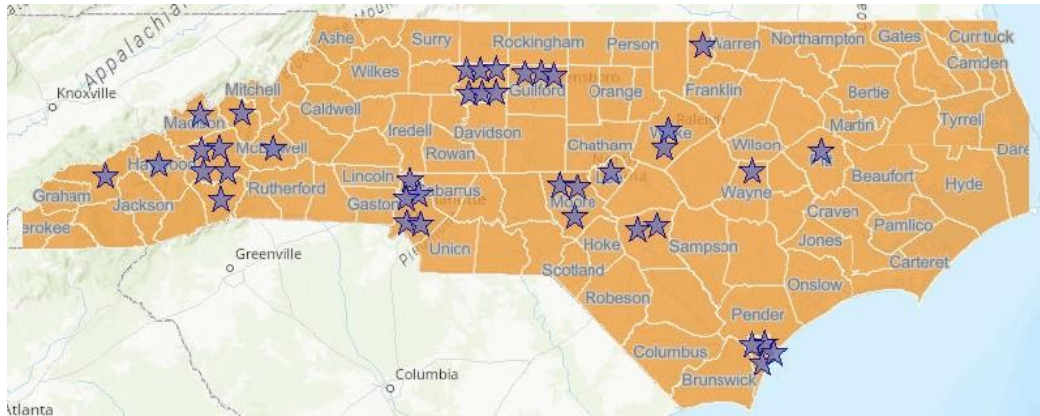
Note: N=38

Employment

Participants in the survey worked in 18 counties across North Carolina. The distribution of participation per county is depicted in Figure 11.

Figure 11

Survey respondents by County



Note. North Carolina Counties adapted from “NC DOT County Boundaries” by the North Carolina Department of Transportation, updated October 30, 2023.

Most participants worked for a health clinic/hospital or community-based organization (Table 3).

Table 3
Employment Categories

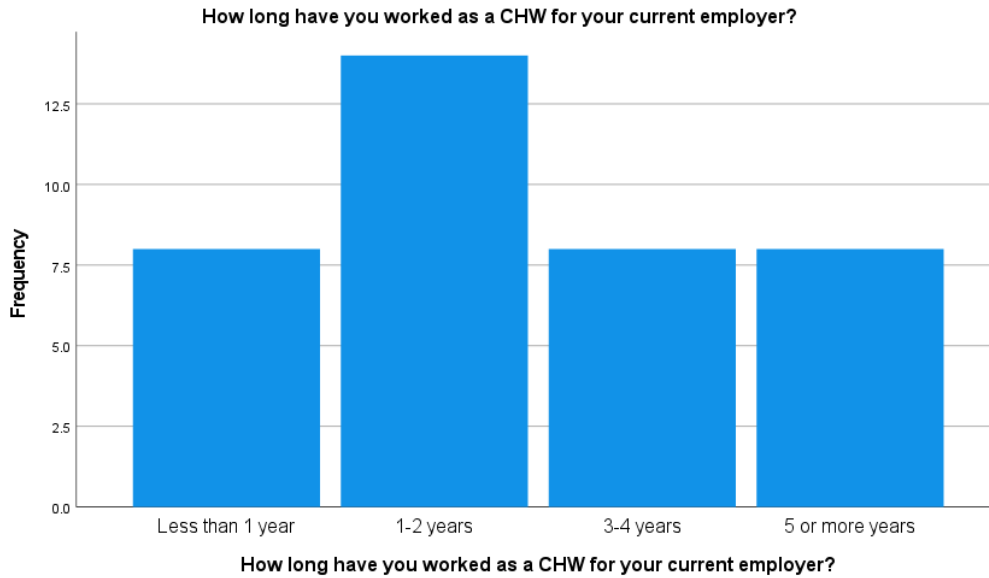
Employer	Frequency	Percent
Health Clinic/Hospital	13	34.2
Community Based Organization	13	34.2
Private Medical Practice	5	13.2
Federally Qualified Health Center (FQHC)	2	5.3
Government Based Organization	2	5.3
Health Department	1	2.6
Health Plan	1	2.6
Other	1	2.6

Note: N=38

CHWs reported having worked for their current employer for one to two years (n=14, 37%). The

rest of the responses were equally divided: less than a year ($n=8$, 21%), three to four years, ($n=8$, 21%), and 5 or more years ($n=8$, 21%), as shown in Figure 12.

Figure 12
CHW Length of Employment



Note: $N=38$

When asked how many CHWs worked at their organization, the majority reported one ($n=8$, 21%). The results ranged from one to 70, with a mean of 8.6 and a median of 7. Although 70 appeared to be an outlier and unlikely, it was not removed from the data set (Figure 13).

Figure 13
Number of CHWs Employed

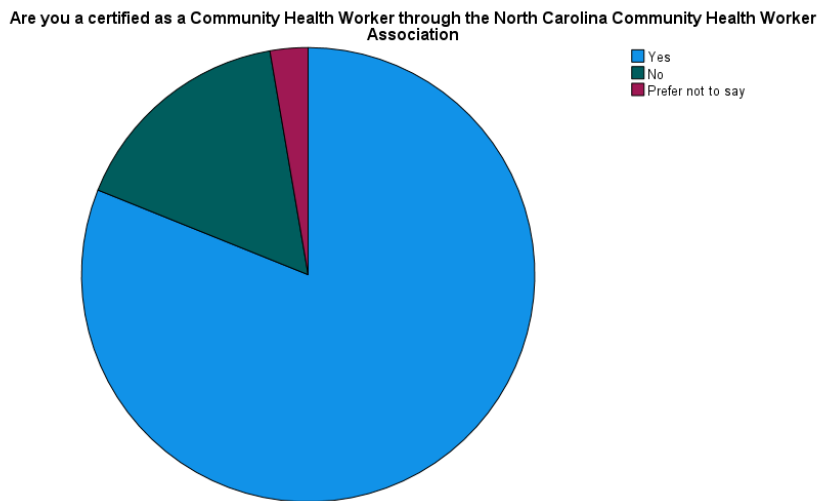
How many CHWs work at your organization? (Including yourself)

	Frequency	Percent
1.00	8	21.1
2.00	2	5.3
3.00	4	10.5
4.00	2	5.3
6.00	2	5.3
7.00	4	10.5
8.00	3	7.9
10.00	5	13.2
12.00	2	5.3
13.00	1	2.6
14.00	1	2.6
15.00	1	2.6
20.00	1	2.6
25.00	1	2.6
70.00	1	2.6
Total	38	100.0

Certification

The survey showed that 80% of participants were certified as CHWs through the NCCHWA, 16% were not certified, and 3% preferred not to say whether they were certified (Figure 14).

Figure 14
Certification



Note: N=38

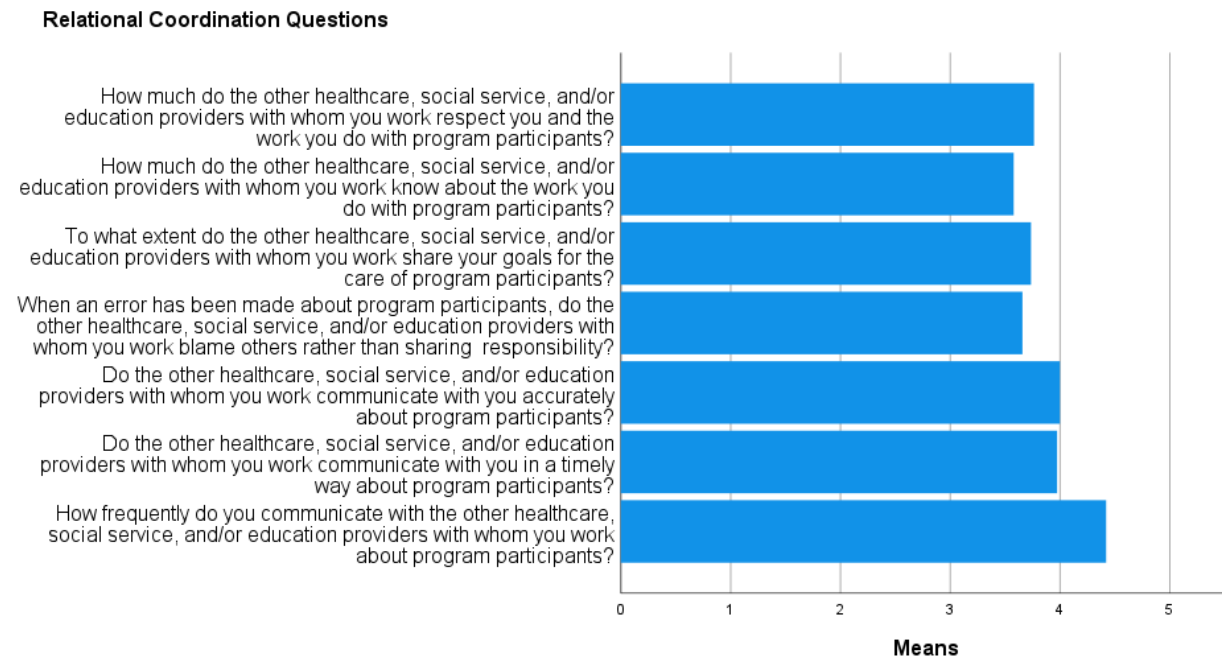
Relational Coordination Analyses

CHW integration into teams is one of the twelve priority indicators of the CHW Common Indicator Project. It examines integration from the perspective of the CHW and uses the evidence-based relational coordination scale developed by Gittel and colleagues (Gittel et al., 2015). Figure 15 shows the means of the answers to the relational coordination survey questions five through 11. The results showed that the highest mean score was for frequent communication between team members (4.42), followed by accurate communication (4.00), timely communication (3.97), respect (3.76), shared goals (3.74), shared responsibility (3.66), and knowledge about role (3.58).

Rescoring and Recoding Relational Coordination

In examining the seven relational coordination questions, it was determined that question eight needed to be reverse-scored because the Likert scale was negative, whereas the others were all positive. The researcher confirmed rescoring with Noelle Wiggins, CHW Center for Research and Evaluation (N. Wiggins, personal communication, March 16, 2024). To determine a relational coordination score (RC), the mean of questions five through 11 was calculated and recoded to variable RC (CHW Center for Research and Evaluation, 2023).

Figure 15
Relational Coordination



Note: N=37

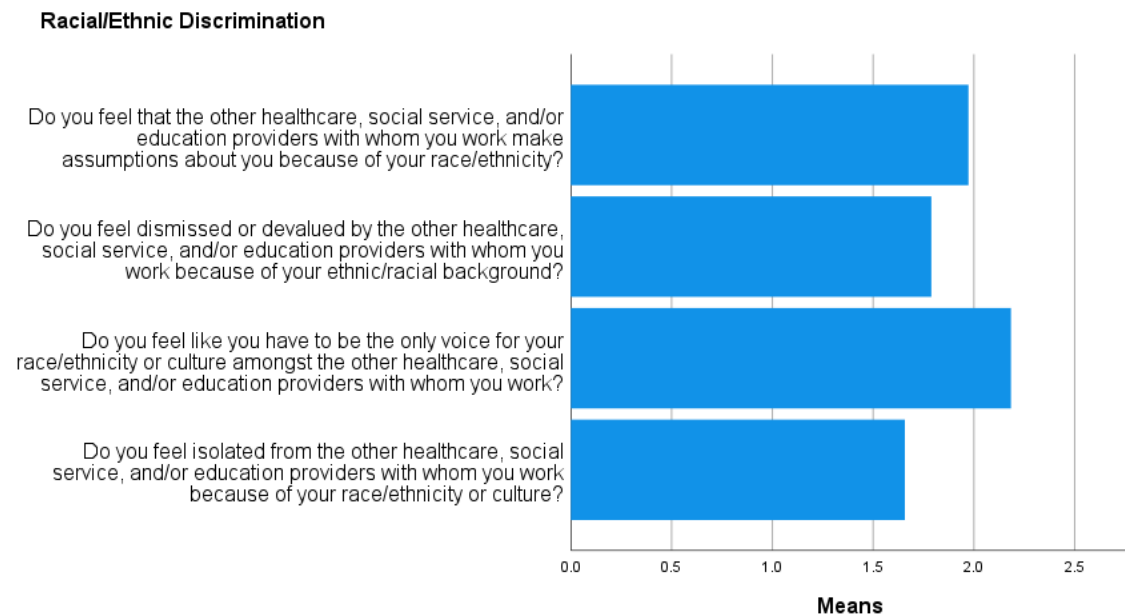
Recoding Racial/Ethnic Discrimination

The means of the four racial/ethnic discrimination questions, which also used a five-point Likert scale, were analyzed. The results in Figure 16 showed that being the only voice for your race/ethnicity and culture had the highest mean score (2.18), followed by assumptions about race/ethnicity and culture had the highest mean score (2.18), followed by assumptions about race/ethnicity (1.97), feeling dismissed or devalued (1.79), and feeling isolated (1.66).

Racial/ethnic discrimination was determined by calculating the mean of survey questions 12- 15 and recoded to RACETH.

Figure 16

Racial/Ethnic Discrimination Questions



Note. N=38

Open-Ended Question

The final question in the survey was an open-ended question asking CHWs for any other thoughts or comments, and 32% of the participants responded (n=12). The qualitative answers were divided into four themes: organizational support, integration, CHW role, and other.

Appendix F details the responses and whether CHWs viewed organizational support, integration, and the CHW role positively (+1), negatively (-1), or neutrally (1). All direct identifiers were removed from the data.

Inferential data analysis was used to understand CHW integration into health care teams using relational coordination and racial discrimination measures and to test the research hypotheses. All of the research questions examined the relationship between two variables. Research question one used Spearman's rank correlation (Spearman's rho) and research questions two through five used Pearson Correlation to determine whether a significant relationship existed.

Research Questions and Hypotheses

Research Question 1: Is there a correlation between relational coordination and the number of years employed as a Community Health Worker for an organization?

H1o: The number of years a Community Health Worker is employed by an organization will not be correlated with relational coordination.

H1a: The number of years a Community Health Worker is employed by an organization will be correlated with relational coordination.

For RQ1, the recoded variable RC represents the mean of survey questions 5 – 11. Spearman's rho was used to assess the relationship between the dependent variable (RC) and the mean of the independent variable (question 23), which is the number of years a CHW has worked for an organization. The results indicated the relationship was not significant between the two variables, $r(35) = .01$, $p = .958$. Therefore, the null hypothesis was accepted.

Research Question 2: Is there a correlation between relational coordination and the number of Community Health Workers employed in an organization?

H2o: The number of Community Health Workers employed in an organization will not correlate to greater relational coordination.

H2a: The number of Community Health Workers employed in an organization will correlate to greater relational coordination.

For RQ2, a Pearson correlation coefficient was used to assess the relationship between the dependent variable (RC) and the mean of the independent variable (question 24), which is the number of CHWs who worked at the organization. The results indicated the relationship was not significant between the two variables, $r(35) = -.24$, $p = .16$ and the null hypothesis was accepted.

Research Question 3: Does a Community Health Worker's perception that an organization understands their role relate to relational coordination?

H3o: A Community Health Worker's perception that an organization understands their role will not be associated with higher relational coordination

H3a: A Community Health Worker's perception that an organization understands their role will be associated with higher relational coordination

For RQ3, a Pearson correlation coefficient was used to assess the relationship between the dependent variable (RC) and the mean of the independent variable (question 16) which is the organization's understanding of the CHW role. There was a significant moderate positive relationship between relational coordination and the organization's understanding of the CHW role. $r(35) = .42$, $p = .009$. The null hypothesis was rejected.

Research Question 4: Does a Community Health Worker's perception that an organization understands their role relate to race/ethnic discrimination?

H4o: A Community Health Worker's perception that an organization understands their role will not be associated with racial discrimination.

H4a: A Community Health Worker's perception that an organization understands their role will be associated with racial discrimination.

For RQ4, the recoded variable RACETH represents the mean of survey questions 12-16. A Pearson correlation coefficient was used to assess the relationship between the dependent variable RACETH and the organization's understanding of the CHW role. The results indicate the relationship was not significant between the two variables, $r(36) = -.18$, $p = .27$. The null hypothesis was accepted.

Research Question 5: Does a Community Health Worker's race/ethnic discrimination score relate to the level of relational coordination?

H5o: A Community Health Worker's race/ethnic discrimination score will not be related to relational coordination.

H5a: A Community Health Worker's race/ethnic discrimination score will be related to relational coordination.

For RQ 5, A Pearson correlation coefficient was used to assess the relationship between dependent variables RACETH, the mean of recoded questions 12-16, which provided a race/ethnic discrimination score, and RC, the mean of recoded questions 5 -11. There was a significant moderate negative correlation $r(35) = -.48$, $p = .003$. The null hypothesis was rejected.

Summary of Results

The study's results suggest a positive relationship between an organization's understanding of the role of the CHW and the level of relational coordination. The study also showed that the level of relational coordination was negatively correlated to the race/ethnic discrimination score, suggesting that the higher the level of relational coordination, the less

racial/ethnic discrimination amongst the team. The organization's understanding of the CHW's role was not associated with the level of racial/ethnic discrimination. Finally, the study did not find a correlation between relational coordination and the number of CHWs in the organization nor the length of time a CHW worked for an organization. In Chapter V, these results will be discussed along with implications for further research and practice.

Chapter V

Discussion

This study aimed to understand at what level CHWs are being integrated into health care teams and whether race, culture, or ethnicity negatively affects integration. A seven-question relational coordination tool was used to measure the level of integration, and a novel scale was used to understand the level of racial/ethnic discrimination. The survey results identified relationships between the level of relational coordination and an understanding of a CHWs role and level of racial and ethnic discrimination.

The plan was for the survey to be open for four weeks to allow CHWs time to participate. Unfortunately, the day before the survey was to be closed, suspected fraudulent data was entered into the survey, and the survey was closed about 10 hours earlier than anticipated. Appendix F provides information on the issue with the fraudulent data and what was done to remove those surveys.

Discussion of the Results

The first research question, “Is there a correlation between relational coordination and the number of years employed as a Community Health Worker for an organization?”

aimed to examine whether a correlation existed between relational coordination and years employed as a CHW for an organization. The study asked CHWs how long they had worked for their current employer, and the possible answers were grouped into categories of less than one year, one to two years, three to four years, and five or more years. The highest percentage of CHWs had worked in an organization for 1-2 years (37%), and the rest were divided equally at 21%. This study did not find a significant correlation between the years a CHW worked for their current organization and relational coordination, $r(35) = .01, p = .958$. Although no other study

in the literature examined the correlation between these two variables, a qualitative study by Washburn (2023) shared that integration into teams evolves and may take years to develop. This study also described a multi-stage process to achieve interprofessional integration involving three stages: role confusion, conflict, and a level of engagement and integration (Washburn, 2023), which could be interpreted to indicate that to evolve through the process of integration, more years employed as a CHW would lead to stronger integration and greater relational coordination. The literature indicated that turnover is higher in the CHW workforce as compared to other professions. In this study, 58% of CHWs had worked for an organization for two years or less. With most CHWs in this study being relatively new to organizations, there may not have been enough CHWs who reached the level of engagement and integration to be able to determine a relationship between years employed as a CHW and the level of relational coordination. It would be interesting to re-examine this in the future to understand, as the workforce grows and more career pathways exist for sustainability and job longevity, whether the length of employment will show a significant positive correlation to the level of relational coordination.

The second research question, “Is there a correlation between relational coordination and the number of Community Health Workers employed in an organization?” examined whether a relationship existed between relational coordination and the number of CHWs employed in an organization. The study found that the mean number of CHWs in the organization was 8.6, the median was 7.0, and mode was 1 CHW. A significant correlation was not found between the number of CHWs and the level of relational coordination ($r(35) = -.24, p = .16$). This contradicts what Allen (2015) reported, in which the number of CHWs positively correlated with organizational satisfaction ($\rho = 0.24, P = .02, n = 105$). However, the Allen (2015) study of 265 CHWs used a 5-point Likert scale of six organizational satisfaction questions versus the seven-

question relational coordination measure. The researchers in this study also used Spearman's rho to analyze the relationship between organizational satisfaction and the number of CHWs employed. Using organizational satisfaction is a different way to measure integration versus relational coordination. While both seek to understand integration, they include different questions and data analysis methods. Additionally, in the Allen (2015) study, the average number of CHWs in the organization was greater, the sample size was considerably larger, and the study was conducted ten years ago, all of which could also explain the differences in the results.

The third research question, "Does a Community Health Worker's perception that an organization understands their role relate to relational coordination?" examined whether understanding the CHW role correlated to relational coordination. The survey results suggested a significant positive relationship between relational coordination and a CHWs perception that an organization understands their role ($r(35) = .42, p = .009$). This implies that if a CHW perceives that the organization understands the uniqueness of the CHW role, the relationship and communication level among team members will be higher. The importance of understanding the unique role of a CHW as a critical factor in integration is well documented in the literature (Ignoff et al., 2022; Payne et al., 2018; Sprague Martinez et al., 2021; Washburn et al., 2021). This study aligns with previous research on understanding the CHW's role in effective teams. In a qualitative study by Sprague Martinez (2021), role ambiguity and clarity were the top concerns shared by CHWs in interviews. This was expressed by a CHW in the current study who shared, "I don't feel the organization as a whole truly understand the benefits of community health workers. I don't feel the organization knows how to incorporate CHW's in the healthcare system properly. The CHW's are limited to certain departments but they should be utilized more within the organization."

Research question four, “Does a Community Health Worker’s perception that an organization understands their role relate to race/ethnic discrimination?” examined the CHW role and whether understanding the role correlated with racial/ethnic discrimination score. Unlike the findings in research question three, where a significant correlation between role and relational coordination was found, there was not a significant association between race/ethnic discrimination and understanding the CHW role ($r(36) = -.18, p = .27$). This may indicate that an understanding of the CHW role by itself does not influence race/ethnic discrimination amongst team members. On the other hand, the study did not examine this question based on the race and ethnicity of the CHW. Greater insight into whether the relationship between role and race/ethnicity based on a CHW’s race/ethnicity could be examined in future studies.

Finally, the last research question, “Does a Community Health Worker’s race/ethnic discrimination score relate to the level of relational coordination?” examined whether a CHW’s race/ethnic discrimination score was related to the level of relational coordination. A significant correlation was found between the level of relational coordination and race/ethnic discrimination score ($r(35) = -.48, p = .003$). It was a negative correlation, meaning the higher the relational coordination level, the lower the race/ethnic discrimination score. Numerous national organizations, such as the APHA and the National Academy of Medicine (NAM), have recognized the importance of the CHW workforce as part of the solution to address racism and health inequities in health care. These results suggest that health care organizations which employ CHWs with high levels of relational coordination among team members have lower levels of discrimination. The reverse is also true, as mentioned by one CHW in this study who stated, “I think community health workers are essential to community health & advocacy, but I don’t think healthcare & social service providers don’t respect or completely understand what

CHW's do for their clients and how that benefits what they do. I think sometimes those systems feel a way about ppl of color or other with challenging backgrounds having access to the healthcare field." The literature has shown that relational coordination leads to high job satisfaction, low turnover, and reduced burnout in health care providers (Bolton et al., 2021; Gittel et al., 2020; House et al., 2022). This study adds to this research and suggests a relationship between relational coordination and lower race/ethnic discrimination.

In summary, this study contributed to understanding factors that contribute to integrating CHWs into healthcare teams. As stated throughout the literature, understanding the role of the CHW is important and correlated to the level of relational coordination amongst teams. CHWs bring a unique contribution to health care teams in helping to reduce disparities, and CHWs reported that teams with higher relational coordination correlated to less racial/ethnic discrimination. These factors are important for the health care organizations and stakeholders to understand as the CHW workforce grows and more CHWs become part of interdisciplinary health care teams.

Recommendations for Future Practice, Research, and Policy

As of this writing, this is the first study to examine the integration of CHWs into health care teams in North Carolina. It used relational coordination as a theoretical framework and examined race/ethnic discrimination as a factor in integration.

Relying on snowball sampling and the risks of having a study using social media recruitment opened the study to receiving fraudulent surveys. Due to the inclusion of these fraudulent surveys, the study was closed earlier than anticipated, which could have led to missing some CHWs who would have participated (Appendix E). Future investigators using Qualtrics should check to see if fraudulent detection tools are part of your institution's license. These tools

can be used to detect bots and multiple submissions. While the Radford University Qualtrics license included expert review and preventing multiple submissions, it did not include fraud detection. This researcher also suggests being cautious when sharing incentives for completing the survey on social media, as this can increase the chance of fraudulent surveys. Using fraudulent detection tools and sending a unique survey link to participants rather than an open link is recommended if participant emails are available to the researcher.

To further explore the relationship between relational coordination and race/ethnic discrimination and the role of the CHW, I recommend conducting studies at the organizational level with hospitals and medical offices. In addition to the perspective of the CHW, understanding how all members of the health care team and patients perceive the level of relational coordination and racial/ethnic discrimination would be valuable. Findings could be used to understand strategies for improving relationships and communication amongst the team and be measured over time.

Additionally, the most recent study of CHWs in North Carolina was conducted in 2017. An updated statewide study of CHWs that includes measurements of team integration and race/ethnic discrimination along with other measures included in the CHW Common Indicators, such as CHW involvement in policy and decision making, is recommended. A larger study would provide the opportunity to further analyze race/ethnic discrimination questions by race to better understand the experience of CHWs and advance equity amongst health care teams. To align with the Popular Education theory and CHW Center for Evaluation and Research principles, future researchers should include CHWs in all research project phases, including the design, collection, and analysis of study information. Coulter (2020) found that CHW involvement was valuable in both CBPR and non-CBPR studies with recruitment and inclusion

of hard-to-reach populations, participant retention, a community perspective, participant benefit, and advocacy. This could further elevate the role of CHWs and help guide the NCCHWA, NCDHHS, and other NC Stakeholders in understanding the unique needs and characteristics of the workforce.

The North Carolina AHEC offers several training opportunities for Advanced Medical Homes on best practices for integrating community health workers. This study can benefit AHEC facilitators by providing an understanding of the relationship between relational coordination and racial/ethnic discrimination and the importance of understanding the unique role of the CHW in sharing with healthcare leaders.

Limitations

This study used a convenience sample of CHWs; therefore, the results cannot be generalized to all CHWs. Furthermore, the study was non-experimental and examined relationships but not causation, and the sample size did not meet the criteria for power analysis. Therefore, any correlations that suggest a relationship exists would need to be confirmed with a study that obtained a larger sample.

Delimitations

The use of snowball sampling helped recruit a population that was difficult to reach but was only representative of the CHWs affiliated with the NCCHWA and QC4 and may not represent the larger population of CHWs in North Carolina. The study may have also excluded CHWS who do not use social media and electronic means of communicating.

There were challenges in reaching the necessary sample size to determine correlation. In part, this was due to the nature of the CHW workforce, which is spread across the state in diverse settings and is called by many different titles. Also, efforts to support the workforce through the

creation of the NCCHWA are recent, and the organization has only been in existence since the spring of 2021. While the organization sent the study information to key stakeholders and posted it on social media sites, recruiting CHWs who were members of the NCCHWA directly through an email with a personal survey link was not possible due to constraints beyond this researcher's control.

Conclusion

The CHW workforce has existed under the radar for decades and is finally being recognized nationally and within North Carolina. CHWs have traditionally worked in community-based organizations; however, this is changing as more health care organizations hire CHWs. In this study, more than half of the CHWs worked for hospitals, private medical practices, or federally qualified health centers. Proposed changes in Medicaid reimbursement for CHWs will further provide sustainable opportunities for CHWs within health care teams.

Studies of health care teams have shown the importance of relationally centered work and that multidisciplinary teams' performance is improved by shared goals, knowledge, and mutual respect and supported by strong communication skills. This research highlighted the importance of an organization's understanding of the role of a CHW and relational coordination amongst the health care team. The study also suggested a relationship between relational coordination and racial and ethnic discrimination and showed that when a CHW feels respected and shares patient care goals with the team, they feel less discriminated. To this researcher's knowledge, there were no prior studies that examined levels of relational coordination and race/ethnic discrimination among CHWs in North Carolina.

Organizations that seeking to hire CHWs should be aware of the importance of understanding the profession's unique role to the health care workforce. Community health work

is based on having the trust of the community. Health care teams should seek to build trust with CHWs through effective communication and relationships based on shared goals, knowledge, and respect, the key elements of relational coordination.

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Appendix A

Relational Coordination

	Never	Rarely	Occasionally	Often	Constantly
1) How <i>frequently</i> do you communicate with the other healthcare, social service, and/or education providers with whom you work about program participants?					
2) Do the other healthcare, social service, and/or education providers with whom you work communicate with you <i>in a timely way</i> about program participants?					
3) Do the other healthcare, social service, and/or education providers with whom you work communicate with you <i>accurately</i> about program participants?					
4) When an error has been made about program participants, do the other healthcare, social service, and/or education providers with whom you work blame others rather than sharing responsibility?					
	Not at all	A little	Some	A lot	Completely
5) To what extent do the other healthcare, social service, and/or education providers with whom you work share your goals for the care of program participants?					
	Nothing	Little	Some	A lot	Everything
6) How much do the other healthcare, social service, and/or education providers with whom you work know about the work you do with program participants?					

	Not at all	A little	Some	A lot	Completely
7) How much do the other healthcare, social service, and/or education providers with whom you work respect you and the work you do with program participants?					

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Appendix B

Racial/Ethnic Discrimination

	Not at all	A little	Some	A lot	Completely
8) Do you feel isolated from the other healthcare, social service, and/or education providers with whom you work because of your culture or race/ethnicity?					
9) Do you feel like you have to be the only voice for your race/ethnicity or culture amongst the other healthcare, social service, and/or education providers with whom you work?					
10) Do you feel dismissed or devalued by the other healthcare, social service, and/or education providers with whom you work because of your ethnic/racial background?					
11) Do you feel that the other healthcare, social service, and/or education providers with whom you work make assumptions about you because of your race/ethnicity?					
	Never	Rarely	Occasionally	Often	Always
12) How much do the other healthcare, social service, and/or education providers with whom you work know about the work you do with program participants?					

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Appendix C

Codebook

Question #	Question	Variable Name	Values	Data Type
* Any question or issue that is left blank will be coded in SPSS as "System Missing"				
Screening Questions				
1.	Consent Form	CONSENT	1 = Yes 2 = No	
2.	Are you a Community Health Worker?	CHW	1 = Yes 2 = No	
3.	Do you work as a Community Health Worker in North Carolina?	NCCHW	1= Yes 2 = No	
4.	Are you 18 years of age or older?	OVER18	1=Yes 2= No	
CHW opinions on integration and communication with team members				
Please respond to the following items				
5.	How <i>frequently</i> do you communicate with the other healthcare, social service, and/or education providers with whom you work about program participants?	TEAMS1	1 = Never 2 = Rarely 3 = Occasionally 4 = Often 5 = Constantly	Continuous
6.	Do the other healthcare, social service, and/or education providers with whom you work communicate with you <i>in a timely way</i> about program participants?	TEAMS2	1 = Never 2 = Rarely 3 = Occasionally 4 = Often 5 = Always	Continuous
7.	Do the other healthcare, social service, and/or education providers with whom you work communicate with you <i>accurately</i> about program participants?	TEAMS3	1 = Never 2 = Rarely 3 = Occasionally 4 = Often 5 = Always	Continuous
8.	When an error has been made about program	TEAMS4	1 = Never 2 = Rarely	Continuous

	participants, do the other healthcare, social service, and/or education providers with whom you work blame others rather than sharing responsibility?		3 = Occasionally 4 = Often 5 = Always	
9.	To what extent do the other healthcare, social service, and/or education providers with whom you work share your goals for the care of program participants?	TEAMS5	1 = Not at all 2 = A little 3 = Some 4 = A lot 5 = Completely	Continuous
10.	How much do the other healthcare, social service, and/or education providers with whom you work know about the work you do with program participants?	TEAMS6	1 = Nothing 2 = Little 3 = Some 4 = A lot 5 = Everything	Continuous
11.	How much do the other healthcare, social service, and/or education providers with whom you work respect you and the work you do with program participants?	TEAMS7	1 = Not at all 2 = A little 3 = Some 4 = A lot 5 = Completely	Continuous
CHW opinions regarding the influence of race, ethnicity, or culture as part of a health care team				
12.	Do you feel isolated from the other healthcare, social service, and/or education providers with whom you work because of your culture or race/ethnicity?	RACETH1	1 = Not at all 2 = A little 3 = Some 4 = A lot 5 = Completely	Continuous
13.	Do you feel like you have to be the only voice for your race/ethnicity or culture amongst the other healthcare, social service, and/or education providers with whom you work?	RACETH2	1 = Not at all 2 = A little 3 = Some 4 = A lot 5 = Completely	Continuous

14.	Do you feel dismissed or devalued by the other healthcare, social service, and/or education providers with whom you work because of your ethnic/racial background?	RACETH3	1 = Not at all 2 = A little 3 = Some 4 = A lot 5 = Completely	Continuous
15.	Do you feel that the other healthcare, social service, and/or education providers with whom you work make assumptions about you because of your race/ethnicity?	RACETH4	1= Never 2 =Rarely 3 =Occasionally 4 = Often 5 = Always	Continuous
CHW opinions on how their role is understood within the health care team				
16.	To what extent do the other healthcare, social service, and/or education providers with whom you work understand your roles and what you do as a CHW?	ROLE	1 = Not at all 2 = A little 3 = Some 4 = A lot 5 = Completely	Continuous
Participant Demographics				
17.	How old are you?	AGE	1 = Under 18 2 = 18 – 24 3 = 25 – 34 4 = 35 – 44 5 = 45 – 54 6 = 55 – 64 7 = 65+	Categorical (Ordinal)
18.	Are you Hispanic or Latino?	ETHNICITY	1 = Yes 2= No	Categorical (Nominal)
19.	Choose one or more races that you consider yourself to be	RACE	1 = White or Caucasian 2= Black or African American 3= American Indian/Native American or Alaska Native 4= Asian 5=Native Hawaiian or Pacific Islander 777= Other	Categorical

			888 = Prefer not to say	
20.	How do you describe yourself?	GENDER	1 = Male 2 = Female 3 = Non-binary/third gender 777= Prefer to self describe 888 = Prefer not to say	Categorical
21.	Are you certified as a Community Health Worker through the Community Health Worker Association?	CERTIFIED	1= Yes 2 = No 888= Prefer not to say	Categorical
22.	I work for a _____? Choose the option that best describes your employer	EMPLOY1	1 = Health Department 2 = Health clinic/hospital 3 = Federally qualified health center 4 = Private practice 5 = Pharmacy 6 = Educational institution 7 = Community-based organization 8 = Faith-based organization 9 = Government organization 10 =Other 11 = Prefer not to reply	Categorical (Nominal)
22a.	If you selected "other" please identify your employer	OTHEMP		STRING
23.	How long have you worked as a CHW for your current employer?	EMPLOY2	1= Less than 1 year 2= 1 - 2 years 3= 3 - 4 years 4 = 5 or more years	Categorical (Ordinal)
24.	How many CHWs including you work at this organization? (Including yourself)	EMPLOY3	0 - N	Continuous
25.	What County do you work in?	COUNTY	Drop down of all NC counties	Categorical (Nominal)
Open-ended Question				
26.	Please share any other thoughts or feelings	COMM		STRING

	about working as part of a health care team.			
RECODED Variables				
Relational Coordination (RC)	TEAMS 6 reverse-scored and then the mean of questions 5-11 (TEAMS 1-7)	Relational Coordination	Number 1-5	Continuous
Race/Ethnicity (RD)	Average of questions 12-15 (RACETH 1-4)	Race/Ethnicity Score	Number from 1 - 4	Continuous

Appendix D

Data Analysis Table

RQ1: Is there a correlation between relational coordination and the number of years employed as a Community Health Worker for an organization?					
Hypotheses	IV	IV Data	DV	DV Data	Statistical Test
H3a: The number of years a Community Health Worker is employed by an organization will be correlated with relational coordination.	EMPLOY2	Categorical	RC	Continuous	Spearman's rank-difference correlation
RQ2: Is there a correlation between relational coordination and the number of Community Health Workers who are part of the healthcare team for an organization?					
Hypotheses	IV	IV Data	DV	DV Data	Statistical Test
H4a: The number of Community Health Workers employed in an organization will correlate to greater relational coordination.	CHWNUM	Continuous	RC	Continuous	Pearson correlation
RQ3: Does a Community Health Worker's perception that an organization understands their role relate to relational coordination?					
Hypotheses	IV	IV Data	DV	DV Data	Statistical Test
H5a: A Community Health Worker's perception that an organization understands their role will be associated with higher relational coordination	ROLE	Continuous	RD	Continuous	Pearson correlation
RQ4: Does a Community Health Worker's perception that an organization understands their role relate to race/ethnic discrimination?					
Hypotheses	IV	IV Data	DV	DV Data	Statistical Test
H6a: A Community Health Worker's perception that an organization understands their role will be associated with racial discrimination.	ROLE	Continuous	RD	Continuous	Pearson correlation

RQ5: Does a Community Health Worker’s race/ethnic discrimination score relate to the level of relational coordination?					
Alternate Hypotheses	IV	IV Data	DV	DV Data	Statistical Test
H7a: A Community Health Worker’s race/ethnic discrimination score will be related to relational coordination.	RD	Continuous	RC	Continuous	Pearson correlation

Appendix E

Fraudulent Data

The morning of March 6, 2024, the researcher observed that there was a significant influx of surveys completed on the evening of March 5 and early morning hours of March 6. Upon further investigation, examining both the survey and the raffle survey, it was deemed that 86 surveys were suspicious and most likely fraudulent. The unusual activity included email addresses in the raffle survey that all contained four-digit numbers, location coordinates outside of NC, and survey completion outside of normal business hours, which was inconsistent with previous submissions. Upon realization of this issue, the researcher closed the study. With agreement from committee members, all responses between the evening of 3/5/24 – 3/6/24 were eliminated from the data set.

Appendix F

Qualitative Survey Data

Qualitative Survey Data	Theme 1	Theme 2	Theme 3	Theme 4
Question 26: Any other thoughts or comments would be greatly appreciated.	Org. Support	Inte-gration	CHW Role	Other
I don't feel the organization as a whole truly understand the benefits of community health workers. I don't feel the organization knows how to incorporate CHW's in the healthcare system properly. The CHW's are limited to certain departments but they should be utilized more within the organization.	-1	-1		
Working with my program and having the full support of our Leadership team, has allowed us to be fully integrated as team members. It has also opened more opportunities for upward mobility.	(+)1	(+) 1		
Would be great to have many more lovecaring community health workers	1			
We work closely with my team and I feel we have a great working relationship.	(+) 1			
The company I work for has other clinics with other CHW staff. I am the only CHW at my clinic, but have support from other clinic CHWs.	(+) 1			
Translated from Spanish - The main job as health promoters is to create awareness in the population of the importance of choosing healthy life options and all part of health education, creating trust and personal responsibility, providing them with support and guidance, which are fundamental pieces to promote a positive change in behavior.			1	
What about including Community Based Organizations into the survey? Social Services may be seen to refer to Department of Social Services, not necessarily Community Based Organizations				1
Our CHW's are a part of the patients care team. We work alongside the providers, pharmacist, social workers, ambulatory care nurses etc. It works well for us.		(+) 1		
I don't feel that CHW's are effectively integrated into our healthcare system. Patients in the healthcare system aren't made aware of CHW's.		-1		
I think community health workers are essential to community health & advocacy but I don't think healthcare & social service providers don't respect or completely understand what CHW's do for their clients and how that benefits what they do. I think sometimes those systems feel a way about ppl of color or other with challenging backgrounds having access to the healthcare field. I also think that many healthcare / social program providers resent that out relationship and rapport with our clients and don't like our attempts to advocate for our clients as they see it as criticizing their work which In actuality we are just doing our job just like they claim to be doing theirs.	-1			
There are 20 CHW'S on my team but there are more depts with CHWs				1
I am currently taking courses to become a certified CHW. I am the first CHW in my program but feel that there is no guidance for me in what is expected of me. It has been a confusing transition for me from my previous job as a case manager which had clear expectations, code of ethics and goals within my role.			-1	