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EMERGENCY DEPARTMENT USE AMONG PROBATIONERS ENROLLED IN THE RIVERSIDE UNIVERSITY HEALTH SYSTEM, WHOLE-PERSON CARE PILOT PROGRAM

Nirshila Chand
Claremont Graduate University

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By

Nirshila Chand, MPH

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Approval of the Dissertation Committee

This dissertation has been duly read, reviewed, and critiqued by the Committee listed below, which hereby approves the manuscript of Nirshila Chand as fulfilling the scope and quality requirements for meriting the degree of Doctor of Public Health.

Dr. Paula H. Palmer (Co-chair)

Claremont Graduate University

Associate Professor

Dr. Bin Xie (Co-chair)

Claremont Graduate University

Professor

Dr. Debbie Freund

Claremont Graduate University

Professor

Dr. Judi Nightingale

Riverside University Health Systems

Director of Population Health

Abstract

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Formerly incarcerated individuals suffer from poor health outcomes and often overuse emergency department (ED) services because of a lack of access to care and insurance coverage upon reentry to their community. The Riverside County Whole Person Care (WPC) pilot program implemented by Riverside University Health System (RUHS) was designed as a reentry program developed to address these challenges and ensure that releasees successfully transition back into the community.

The primary aim of this project was to assess whether participating in the RUHS WPC program reduced emergency department (ED) use among recent releasees. This was a cross-sectional retrospective study of formerly incarcerated individuals who participated in the RUHS WPC pilot program during 2017, 2018, and 2019. The study hypothesized that those who complied to their referrals and gained active Medi-Cal benefits, and encountered services for outpatient visits, substance use treatment, and mental health treatment services, and who were not homeless would reduce the likelihood of ED use among releasees during the 12-month period after initial screening for the RUHS WPC pilot program.

Several logistic regression analyses were utilized, and the study showed mixed findings. For instance, having active Medi-Cal benefits and mental health treatment services were not

significantly related to ED use. Homeless status and outpatient visits had greater odds of using the ED. Interestingly, substance use disorder treatment services were not significantly associated with ED use in either model but were significant when all different encounters were controlled in the model. Despite this study's findings, the RUHS WPC program stakeholders and staff have been instrumental in supporting the health outcomes of releasees and have impacted health equity. Future studies are needed to continue to assess the relationship between reentry services and ED use among releasees.

Dedication

To many second chances.

I am grateful for the heartfelt support from my parents, Nirbhay and Sushila Kumari Chand. My sister, Dr. Sushini Chand as we both set out to accomplish our Doctorates in our commitments to service in Public Health and Education. Thank you to my grandparents Chandrawati, and Sita, and Hari Chand. As well as my beautiful family, friends, all my mentors, and guidance received throughout my journey for all the support.

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This dissertation would not have been accomplished without the support of my strong team of mentors and colleagues.

I want to begin by thanking my entire committee—Dr. Paula Palmer for her unwavering support over the past decade. Your passion for community health and advocating for unseen populations in public health research has ignited my commitment towards this purpose. Dr. Bin Xie, for your brilliant statistical guidance, encouragement, and patience along the way. Dr. Debbie Fruend, for her commitment to Medicaid policies and equity. This has encouraged me to think broadly about the health care safety net systems and has deepened my commitment towards this path in public health service. Finally, I would like to thank Dr. Judi Nightingale, who was instrumental in bringing together stakeholders and designing an integrated and coordinated care service for reentry community members. Being a part of this project has expanded my knowledge of the effects of incarceration in our communities and the need to recognize and support returning community members in improving their health outcomes. Thank you for allowing me to be a part of this project. Finally, I sincerely thank my colleague Dr. Endy Etim for explaining and simplifying the data and supporting me on this journey. Working with this dynamic committee has taught me the importance of being a part of a strong and dynamic team.

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safety projects in New Delhi, India. Finally, I would like to thank all my classmates at SCGH and the Claremont Colleges who have become my longtime colleagues as we share our commitment to supporting public health services. Our teamwork across public health services could never be needed as much as today.

Abbreviations

ED- Emergency Departments

WPC- Whole Person Care pilot program

SSA - Social Security Act

CMS- Centers for Medicare and Medicaid Services

RUHS- Riverside University Health System

RN- Registered Nurse

HbA1c- Glycohemoglobin

HIV- Human Immunodeficiency Virus

DPSS- Department of Social Services

DBH- Department of Behavioral Health

FQHC- Federally Qualified Health Centers

IE- Inland Empire

IRB- Institutional Review Board

EMTALA- Emergency Medical Treatment and Active Labor Act

MH- Mental Health

SUD- Substance Use Disorder

ACA- Affordable Care Act

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CHAPTER 1- INTRODUCTION

INCARCERATION IN THE UNITED STATES

The United States (U.S.) accounts for almost 25% of the world's incarcerated men and women, more than any other country.[1-12] In 2018, roughly 6,410,000 individuals were incarcerated in U.S. jails or prisons or on parole or probation.[13] According to the California Department of Corrections and Rehabilitation (CDCR), there are nearly 160,000 individuals in state prisons or county jails in California (CA).[14] Significant changes in law and policy explain most of this increase.[15,16] The "War on Drugs," beginning in the 1980s, resulted in a substantial increase in the number of people incarcerated for drug offenses in the U.S. from 40,900 in 1980 to 452,964 in 2017.[15,16] In addition, the three-strikes law mandates life imprisonment for three felony offenses and continues to keep people incarcerated for extended periods.[6] According to the Prison Policy Initiative (PPI), these are harshly discriminating "get tough on crime" laws.[16] These laws continue to pack prisons and jails with primarily poor, medically underserved, low-educated people of color, who suffer from adverse physical health issues, mental health illnesses, substance use disorders, and unmet social needs.[16]

Since 2009, efforts towards reducing the incarcerated population have been supported by a general decrease in crime throughout the country, reassessment of tough-on-crime policies, overcrowded and inhumane prison conditions, and impossible costs of running an ever-burgeoning prison system.[17] The Sentencing Project, a policy think tank, has indicated that while federal and policymakers have made reducing mass incarceration a priority, it will take an estimated 75 years to cut the prison population by 50%.[18,19]

PROJECT OVERVIEW

Statement of the problem

Formerly incarcerated individuals suffer from poor health outcomes and overuse of emergency department (ED) services because of a lack of access to care and insurance coverage upon reentry to their community.[20,21] In addition to the high cost of ED services, probationers without proper reentry planning and accessible care support are at an increased risk for recidivism, mortality, and low-life expectancy.[4,6,22]

Significance of the study

This study focused on The Riverside County Whole Person Care (WPC) pilot program implemented under California's Section 1115(a) Medicaid Waiver called "Medi-Cal 2020." This waiver allows for the coordination and integration of medical, behavioral, substance use, and social services to improve the health outcomes and well-being of high utilizing Medi-Cal beneficiaries with complex needs.[23,24] The overall goal of this study was to assess ED use patterns among formerly incarcerated individuals, many of whom suffer from poor health outcomes due to unmet social needs and systematic discrimination.[4-6,8]

Purpose of the study

The purpose of this study was to determine whether participating in the RUHS WPC pilot program services reduced ED use. This was a cross-sectional retrospective study of formerly incarcerated individuals who participated in the RUHS WPC pilot program during 2017, 2018, and 2019. The findings of state-funded demonstration projects, such as the RUHS WPC can inform policy and continue to support innovation for improving access to health care services

and outcomes for high utilizing, complex populations such as reentering community members after incarceration.

Research questions and hypothesis

1. What is the status of ED use among formerly incarcerated individuals during the 12-month period after release from incarceration and screening by Registered Nurses (RN's) in the Whole Person Care (WPC) pilot program implemented by Riverside University Health Systems (RUHS)?
2. Does compliance with upstream services (Active Medi-Cal benefits, outpatient services, substance use treatment, mental health treatment, and homeless status) affect ED use among formerly incarcerated individuals during the 12-month period after screening by the Registered Nurses (RN's) in the (WPC) pilot program implemented by Riverside University Health Systems (RUHS)?

   The null hypothesis for question 2: For this research question, we hypothesize that there will be a significant reduction of ED use resulting from compliance with upstream services for Active Medi-Cal benefits, outpatient services, substance use treatment, mental health treatment, and those who indicated they were homeless or not among formerly incarcerated individuals during the 12-month period after screening by the Registered Nurses (RN's) in the (WPC) pilot program implemented by Riverside University Health Systems (RUHS).

Conclusion

The U.S. has the largest incarcerated population of any country.[1-12] Incarcerated individuals suffer disproportionately from poor health before, during, and after incarceration.

Upon release, they lack access to health care and social support services, resulting in higher acute and costly ED services utilization. This study provides insights into which services may reduce ED use among formerly incarcerated individuals after participating in the WPC pilot program implemented by RUHS.[25]

CHAPTER 2- LITERATURE REVIEW

REENTRY IN THE UNITED STATES AND CALIFORNIA

For this study, reentry refers to offenders transitioning from prisons or jails back to their communities.[26-28] Over 600,000 individuals are released from prison and seven million from jail annually in the United States (U.S.).[26,27] In California, about 36,000 formally incarcerated men and women were released from prisons annually over the past decade.[29] Upon reentry, releasees have several obstacles, which include: navigating health care systems and benefits, enrolling in a health insurance program, not having valid identification cards, acquiring permanent housing, finding reliable transportation, coping with food insecurity, lacking access to a cellphone, computer, broadband internet, or general understanding of how to use digital devices, and facing systemic discrimination and poverty.[21,30-34] These are all notable risk factors contributing to high rates and repeated use of acute and costly care services such as EDs.[35] These obstacles necessitate the importance of providing linkages to county and community services immediately upon release.

HEALTH OUTCOMES OF CURRENTLY INCARCERATED INDIVIDUALS

Incarcerated individuals are disproportionately affected by poor health compared to the general population. Imprisonment is a stressful life event and is associated with long term poor health outcomes. Incarcerated individuals endure acute and chronic stressors from confinement, dangers of the carceral environment, and isolation all of which have severe long term mental health consequences.[36,37] In addition, high rates of chronic conditions including asthma, arthritis, cancer, cardiovascular disease, cirrhosis, diabetes, hypertension, and kidney disease are prevalent among incarcerated individuals.[6,22,38-41] They also suffer disproportionately from infectious diseases, including tuberculosis, hepatitis B and C, HIV, and other sexually transmitted diseases

(STDs).[6,38-40] These health conditions can worsen during incarceration because of inadequate access to health services and poor quality treatment.

Incarcerated individuals in the U.S. are entitled to health care services. According to Estelle vs. Gamble, a 1976 United States Supreme Court ruling, correctional facilities are required to provide adequate health care services to individuals in custody.[6,40] The denial or failure to provide basic health care services for incarcerated individuals constitutes cruel and unusual punishment and violates the Eighth Amendment.[6,40] However, these enacted legislations do not clearly define what constitutes reasonable, adequate healthcare standards in correctional facilities.[6,40,42]

The National Commission on Correctional Health Care (NCCHC) is an independent, not-for-profit 501(c)(3) organization dedicated to improving the quality of health care across correctional institutions.[43] NCCHC establishes standards for health services in correctional facilities and operates a voluntary accreditation program for institutions that meet those standards.[43] Many correctional institutions provide onsite primary care and specialized treatments for acute or chronic illness such as kidney dialysis or recuperative care after hospital stays.[44,45] However, correctional institutions rely on hospitals for diagnostic tests, specialist consultations, surgery, and other treatment services.[44,45] There are specific care protocols used to address security, transportation, privacy, and staff as incarcerated patients are transported and checked into public community health care facilities.[46] These care procedures are costly and delivered as needed.[46]

As correctional facility health care costs per inmate continue to rise, state officials and policymakers continually seek strategies to manage the burgeoning older inmate population and overcrowding.[47] In addition, they are consistently finding methods of paying the lowest rates for

health services without discouraging health care facilities from providing care to incarcerated individuals.[47] As a result, many correctional institutions outsource their onsite health care services.[47] This is often referred to as a "privatized" model, whereby a correctional institution contracts with private sector entities, such as health care vendors, to render services directly provided by the government.[48] Centurion, Corizon, and Wexford are three prominent prison health vendors in the U.S. that adhere to policies supporting national correctional health care standards.[49-51] These health vendors are often responsible for coordination and care management of onsite and off-site care.[52,53] The health vendors negotiate contracts with correctional facilities to capitate payments "per inmate."[52,53] Due to incurring substantial and unpredictable expenses, health vendors may not want to assume any financial responsibility for patient hospitalizations.[45,47] In this case, they may exclude critical health care services for inmates, which can cause the systematic quality of care problems and drive up costs.[45,47,53] These disruptions in health care services can lead to a lack of mental health screenings and counseling, improper implementation of physician orders, and lack of timely referrals to specialists and care.[53] Consequently, these disruptions can have severe implications for an inmate's health. Therefore, providing adequate health care services to incarcerated individuals per their constitutional rights is essential to improve their wellbeing, health care utilization, and outcomes after serving their sentences.

HEALTH OUTCOMES OF FORMERLY INCARCERATED INDIVIDUALS

As formerly incarcerated individuals reenter their communities, many are under the supervision of a probation or parole officer.[13] Reentry is stressful for these individuals, their families, and the community.[54] Crucial to reentry is preparing individuals for life after incarceration, including connecting them with essential safety net community agencies to access food, clothing, transportation, personal identification, health insurance and services, medication,

and housing. Navigating the health care system and community support services is complex, especially for an individual who has had little to no contact with the outside world for an extended period and lacks social support.[21,55] Also, reentry obstacles increase the risk of developing severe, life-threatening health conditions that newly released individuals may not know how to seek treatment.[56] Meeting the health care needs of formally incarcerated individuals is essential to their wellbeing but is often inaccessible or inadequate during reentry.[21,57]

Multiple stressors and unmanaged physical and mental health issues can lead to higher hospitalization rates among the reentry population compared with the general population. Wang and colleagues (2014) conducted a national retrospective cohort study utilizing Medicare administrative claims data. [58] This study assessed the risk for hospitalizations among former inmates released from 2002 to 2010 by comparing them with a matched control group of Medicare beneficiaries who were never incarcerated.[58] Each participant group consisted of 110,419 individuals.[58] Both groups' characteristics were majority older, male, and White. [58] Also, former inmates qualified for Medicare by receiving disability income through the Social Security Administration.[58] The primary study outcomes were hospitalization rates within 7, 30, and 90 days of release.[58] The independent variables were mortality rate outcomes within 30 and 90 days after release.[58] This study utilized logistic regression modeling techniques.[58] The overall findings demonstrated 1559 (1.4%) individuals were hospitalized within seven days after release, 4285 (3.9%) individuals within 30 days, and 9196 (8.3%) within 90 days for acute conditions such as diabetes, hypertension, and asthma.[58] These rates were much higher than the matched control group.[58] The high hospitalization rates for chronic medical issues underscore the importance of providing linkages to healthcare services to support successful reentry.

Unmet social needs and systematic discrimination contribute to a high risk of recidivism, defined as relapsing into criminal behavior with the possibility of rearrest.[59] A nationally representative Bureau of Justice Statistics study found that among 404,638 state prisoners released in 2005 across 30 states, 67.8% were re-arrested within three years of release and 76.6% within five years.[59] Furthermore, a national PEW Research study conducted in 2011 found more than four in ten offenders nationwide returned to state prison within three years of release.[60]

The many barriers and stressors involved in navigating and accessing services make the post-release period dangerous for releasees.[61,62] Previously incarcerated people have higher mortality rates and lower life expectancy than the general population.[61] Binswanger and colleagues (2007) conducted a retrospective cohort study of 30,237 released inmates, mostly 18 to 64 years old, male, and White using data from the Washington State Department of Corrections and National Death Index from July 1999 to December 2003.[61] This study found that during the first two weeks after release, the risk of death among former inmates was 12.7 times higher than among Washington State residents of the same age, race, and sex.[61] The leading causes of death were from drug overdose followed by cardiovascular disease, and homicide.[61] Another retrospective cohort study by Patterson (2013) utilized New York State parole data from the Bureau of Justice Statistics from 1989-2003 to assess the length of incarceration on post-prison mortality among parolees, mostly non-Hispanic Black males 34 years or younger.[63] This study demonstrated each additional year in prison produced a 15.6% increase in the odds of death for parolees and a two-year decline in life expectancy for each year served in prison.[63] These studies underscore the critical need for preparing individuals to reenter the community and linking them to support services that may prevent the high rates and risk of hospitalization, recidivism, and potentially even death immediately after release.

SUCCESSFUL REENTRY MODELS IN THE UNITED STATES

Reentry programs assist incarcerated individuals in successfully transitioning back to their communities. Several sustainable reentry models include collaborations between government agencies, healthcare providers, community organizations, case managers, and many other safety-net entities along with the correctional institution to ensure formerly incarcerated individuals have linkages to services upon reentry. For example, the Transitions Clinic (TC), based in San Francisco, California, was launched in 2006 to provide primary care, transitional, and case management for previously incarcerated individuals.[64] Wang and colleagues (2010) conducted a descriptive analysis study among 185 formerly incarcerated patients who had chronic medical conditions during TC's first pilot year, from January 2006 to October 2007.[64] Most of the patients were economically and socially disenfranchised, 86% were ethnic minorities, 38% were homeless, and 89% of patients did not have a primary care provider before incarceration.[64] This study demonstrated that health care interventions need to be available to all individuals within two weeks of release since this is a high-risk period for poor health outcomes, including death.[64] In addition, incorporating community health workers (CHW), who share lived experiences, and are proficient in the cultural, environmental, and social factors that shape the patients' lives assures optimal utilization, mitigates mistrust, creates empathy, and can improve long term health outcomes.[64]

Another reentry program is the Bronx Transitions Clinic (BTC), founded in 2009 in New York, New York.[65] BTC fosters collaboration with federally qualified health centers (FQHCs) to provide previously incarcerated individuals with comprehensive primary care services.[65] Fox and colleagues (2014) conducted a retrospective cohort study to assess the medical care delivery and health outcomes for patients participating in BTC between July 2009 and January 2013.[65]

There were two primary outcomes for this study: 1) the time between release from correctional facilities and initial medical visit at the BTC, and 2) the proportion of patients retained in medical care at six months.[65] The secondary outcomes were the disease-specific health outcomes and retention in care.[65] This study utilized logistic regression techniques.[65] The overall study included 135 patients, who were primarily male (97%), Hispanic or African American (92%), and had Medicaid (65%).[65] The median time from reentry to their initial BTC visit was ten days, and 54% were seen within two weeks.[65] Additionally, this study revealed CHWs were integral to alleviating stigma and building trust with patients. [65] Hence, participants were more likely to continue with care, ultimately leading to improved health outcomes.[65]

Collectively, these reentry service models underscore the importance of addressing health disparities among formerly incarcerated individuals. These services also demonstrated the importance of integrated and coordinated safety net care systems. In addition, these reentry models include trained staff with lived experiences which was integral to alleviating stigma by establishing trust and empathy. This can lead to better efficacy for continuing long-term care and improving health outcomes. Therefore, reentry services can mitigate high utilization rates of acute and costly healthcare services such as emergency departments (EDs).

EMERGENCY DEPARTMENT USE AMONG FORMERLY INCARCERATED POPULATIONS

Formerly incarcerated individuals have a challenging time navigating health care systems upon release. EDs are often the first place newly released inmates turn to and have their point of contact with the health care system.[54] In 1986, congress passed The Emergency Medical Treatment and Labor Act (EMTALA), allowing any person to access emergency services regardless of their ability to pay.[66] As a result of this law, EDs have become a regular source of repeated care for formerly incarcerated individuals. This is because navigating community

resources is overwhelming and inhibits releasees from accessing critical healthcare services and resources. [67,68] Consequently, this may lead to an increase in acute and costly care utilization like EDs.[69]

Previous studies have indicated that formerly incarcerated individuals use EDs more frequently than patients with no criminal justice contact.[69] For instance, a retrospective cross-sectional study conducted by McConville and colleagues (2017) utilized state-level data from the California (CA) Office of State-Wide Health Planning and Development (OSHPD) on all ED visits made in 2014.[69] The outcome variable was frequent ED use categorized as one visit, 2-3 visits, 4-6 visits, 7-10 visits, and more than ten visits.[69] This study utilized a descriptive statistical analysis to compare patient demographics, ED use, health conditions, primary diagnoses, and frequency of visits among patients with and without a criminal justice record during any ED visit in 2014.[69] Of the 3,757,870 patients (18-64 years old) in the sample, 27.2% of ED patients had criminal justice contact versus 9.4% who did not.[69] Among those with a criminal record, 48% were a younger sample between 18-34 years, male, and more likely to be non-Hispanic Black.[69] The overall findings demonstrated that patients with criminal justice contact were only 0.9% of all ED patients in CA.[69] However, they accounted for 2.6% of all frequent ED users (four or more annual ED visits) and 5.6% of all heavy ED users (more than ten annual ED visits) in the state.[69] At least 41.3% of patients who visited EDs lacked health insurance coverage who had a criminal record versus 14.1% who never had a criminal record.[69] Furthermore, McConville and colleagues (2017) also reported behavioral health issues accounted for most ED visits, including 12.4% for schizophrenia and 33.7% for substance use disorders among those with a criminal record.[69] ED users with a criminal record also had 12.6% higher inpatient hospitalization rates than 8.3% without a criminal record. Therefore, McConville and

colleagues (2017) advocated for the critical need for coordinated care services integrated within CA's Medicaid public health insurance which can mitigate frequent ED use among formerly incarcerated individuals.[69]

Another cross-sectional study by Frank et al. (2014) utilized the National Survey On Drug Use and Health across all 50 states from 2008-2011 to examine ED utilization among 5.7 million adults who reported they were either on parole or probation and an additional 3.9 million adults who reported an arrest in the past year.[20] The final sample consisted of 154,356 individuals who were mostly younger than 35 years, male, Black or Hispanic, publicly insured or uninsured, and less educated and poor than the general population.[20] The independent variable for this study was self-reported criminal justice involvement within the past year, grouped into three categories: 1. individuals with recent parole or probation; 2. individuals with a recent arrest without parole or probation; 3. individuals without recent criminal justice involvement.[20] The outcome variables were past year hospitalization and ED utilization.[20] Logistic regression models were used to characterize the independent association between criminal justice involvement and hospital and ED utilization by adjusting for covariates.[20] The findings from this study demonstrated higher rates of ED utilization among adults with recent parole and probation (39.3%), recent arrest (47.2%) compared to the general population (26.9%).[20] Overall, this study found adults with current criminal justice involvement made up 4.2% of the United States adult population and accounted for 8.5% of ED use.[20]

In summary, these studies demonstrate that formerly incarcerated individuals face tremendous barriers and stressors accessing and navigating critical healthcare services post-release.[20] These obstacles lead to an increase in repeated acute and costly ED services. Therefore, these challenges underscore the importance of providing linkages to comprehensive,

coordinated care services immediately following release from incarceration to improve health care use patterns, reduce systematic discrimination, and mitigate high ED utilization rates.

OVERVIEW OF THE WHOLE PERSON CARE PILOT PROGRAM

The Whole Person Care (WPC) pilot program is part of California's Section 1115(a) Medicaid Waiver called "Medi-Cal 2020" implemented by the California Department of Health Care Services (DHCS) from January 1, 2016, to December 31, 2021 (extended by 12 months due to COVID).[23] Medi-Cal is CA's Medicaid public health insurance program for low-income populations. Section 1115(a) is part of the Social Security Act (SSA), which approves experimental, pilot, and demonstration projects that are likely to support and promote objectives of the Medicaid program.[70] The total program budget was $3 billion, including a $1.5 billion investment to implement WPC and $1.5 billion in matching funds from the Centers for Medicare and Medicaid Services (CMS).[70]

Twenty-five WPC pilots were selected to provide coordinated and integrated medical care, social services, and behavioral and substance use treatments to high-utilizing Medi-Cal beneficiaries.[70] High utilizing Medi-Cal beneficiaries repeatedly use multiple acute and costly care services and yet have poor health outcomes.[70] Considering these factors, the WPC pilots provided counties the flexibility to design and improve their health programs and evaluate state-specific policy approaches to serve Medi-Cal populations better.[70] Imperative to the effectiveness of the WPC pilots was the ability to strengthen partnerships with safety net providers, such as managed care organizations, behavioral health departments, community-based organizations, housing authorities, social service agencies, and hospitals.[70] Together, these partnerships identified their target populations and focus area, shared data, coordinated care, and evaluate improvements in their target populations' health.[70] WPC pilots were expected to

improve service delivery and health outcomes, enhance the sustainability of infrastructure improvements and program interventions, address systematic discrimination, and reduce costs through reductions in avoidable utilization.[70] Evidence from these demonstration projects will continue to inform future public health program innovations and policies for high utilizing Medi-Cal populations in California.

OVERVIEW OF THE RIVERSIDE UNIVERSITY HEALTH SYSTEM, WHOLE PERSON CARE PILOT PROGRAM

The Riverside County WPC pilot program was implemented by The Riverside University Health System (RUHS).[25] WPC provided reentry support to formerly incarcerated individuals on probation or parole to reduce recidivism and unnecessary emergency department (ED) utilization.[25] The program provides coordinated and integrated care management, support services for Medi-Cal insurance enrollment, behavioral health and substance use disorder treatment, physical health, and housing assistance to individuals as close to release from incarceration as possible.[25]

BACKGROUND OF RIVERSIDE COUNTY

Riverside County is the fourth largest County in California, with more than 2.3 million residents.[25] Within the last decade, Riverside has experienced a 44% increase in population, placing the county in fifth place for population growth in the United States (U.S. Census Bureau, 2011).[25] The county's majority ethnic populations are Hispanics and Whites.[25] Approximately 25% of the population is under 18, and 15% is over 65.[25] Also, fewer residents between the ages of 18-44 (4.4%) have a bachelor's degree or higher, compared to those in California (7.8%) and the United States (9.2%).[25] Between 2000 and 2010, rates of unemployment in Riverside County exceeded the rates for California and the United States.[25] In September 2013, the United

States Census Bureau ranked the Inland Empire, which includes Riverside County, first in poverty rates among the nation's 25 largest metropolitan areas.[25]

REALIGNMENT AND PROBATIONERS' NEEDS IN RIVERSIDE COUNTY

In 2014, 12,348 individuals comprised the Riverside County Probation Department caseload.[25] Over the years, the number of probationers in Riverside County has risen due to the passage of several realignment laws in California.[25] The State of California passed these realignment laws due to severe prisoner overcrowding and lawsuits alleging inadequate mental health and medical care in carceral institutions.[71] For instance, Plata vs. Brown, known as Assembly Bill 109 enacted in 2011, was a historic reform that shifted incarceration and supervision responsibility for many lower-level felons from the state prison systems to the county's sheriffs and probation department.[71] In 2012, California passed Proposition 36, revising the state's three-strikes law to impose a life sentence on a third felony conviction only in cases of severe or violent crimes.[71] A few years later, in 2014, California voters passed Proposition 47, which reduced penalties for many drug and property offenses.65 According to The Prison Policy Initiative (PPI), the realignment laws (AB 109) and propositions 36 and 47 have significantly lowered incarceration rates in California.[71]

These realignment laws have collectively placed more urgent demands on Riverside County to provide supportive linkages to safety-net services. These services can help probationers reduce probation failures that can result in rearrest.[25] The WPC pilot program has been essential to creating services meeting the social needs of probationers immediately following reentry who often suffer from systematic and structural discrimination.

RIVERSIDE UNIVERSITY HEALTH SYSTEMS WHOLE PERSON CARE PILOT PROGRAM PARTNERSHIPS

RUHS convened a group of stakeholders represented as partners in the WPC pilot program plan and implementation.[25] These partners included: The County Probation Department, Sheriff's Department, California Department of Corrections, Federally Qualified Health Centers (FQHCs), Department of Behavioral Health (DBH), Department of Social Services (DPSS), Managed Care Organizations (MCOs ex: Inland Empire Health Plan and Molina Healthcare), hospital case management personnel, housing providers, substance use treatment providers, and community-based organizations (CBOs).[25] The collaboration among these entities aimed to increase integration among stakeholders by developing a solid infrastructure over the long term, increasing coordination and appropriate access to care for probationers, and improving data collection and sharing among partners to support ongoing case management, monitoring, and strategic program improvements.[25] The overall goal for this collaboration was to reduce reincarceration and unnecessary ED usage among probationers.[25]

Collectively, these stakeholders recognized there was room to improve upstream screening and preventive care provision upon exit from incarceration.[25] Upon reentry, individuals had high rates of undiagnosed chronic medical conditions and undiagnosed behavioral health issues, including severe mental illness (SMI). [25] They also used the ED for primary health care needs, were at risk of being homeless or experiencing homelessness and needed assistance to obtain social services such as Medi-Cal and food programs.[25] In addition, stakeholders recognized gaps in services provided to new probationers. [25] For example, there was a need for improving the efficiency of infrastructure to share data between systems and assessment tools to evaluate physical health, behavioral health, trauma experience, housing, and the supportive needs of new probationers.[25] Overall, the collaboration between these entities

recognized there would be substantial cost-savings and improvement in the quality of life for Riverside County residents by investing in a comprehensive program that identifies needs and coordinates the care of new probationers.[25]

INDEPENDENT VARIABLES AND THEIR EFFECTS ON ED USE

MEDI-CAL AND EMERGENCY DEPARTMENT USE

I. The Patient Protection and Affordable Care Act overview and relevance to ED use

In March 2010, the United States Congress passed the Patient Protection and Affordable Care Act (ACA).[72,73] By 2014, the major provisions under the ACA began implementation across states.[72,73] Some of the significant provisions are: prohibiting insurers from charging higher premiums or denying coverage for preexisting conditions, requiring that insurance policies provide a minimum amount of preventative services without any cost-sharing; allowing family insurance plans to keep young adults as dependents on their parent's coverage until the age of 26; improving the affordability of prescription medications; expanding the health insurance exchange marketplace to provide subsidies for individuals whose incomes fall below 400% of the poverty line and who are not eligible for Medicaid and Medicare.[74-76] An integral provision of the ACA was Medicaid expansion, which increased coverage eligibility to all qualifying legal residents with incomes below 138% of the federal poverty line (FPL).[75] However, the Supreme Court ruled in 2012 that Medicaid expansion was optional for states.[75] As of 2021, 39 states have expanded Medicaid.[77]

About 20 million Americans have gained health insurance coverage since the ACA was enacted.[78] Previous studies have utilized large national survey data sources and methodologies and found the ACA's coverage expansion has led to an increase in insurance coverage and benefits, improvements in access to primary care, affordability in care, reduced care costs,

increased use of prescription medication adherence, and reduced racial and ethnic disparities in coverage.[78-85] These improvements are more notable in Medicaid expansion states than non-expansion states.[78-83] For instance, a cross-sectional study of 7,500 nonelderly adults conducted by Shartzer et al. (2016) utilized national data from the Health Reform Monitoring Survey between September 2013, before the first open enrollment period in the ACA Marketplace to March 2015, after the end of the second open enrollment period.[86] This study utilized multivariate regression modeling to compare access to and affordability of health insurance from March 2015 to September 2013.[86] The findings from this study demonstrated improvements in access to care and affordability for all nonelderly adults across income and Medicaid expansion states.[86]

Similarly, Collins et al. (2016) conducted a cross-sectional study utilizing the national Commonwealth Fund Affordable Care Act Tracking Survey from February to April 2016.[87] The study consisted of a nationally representative sample of 4,802 nonelderly adults ages 19 to 64, 13% Black, 17% Latino, and 61% Non-Hispanic White.[87] This study found the uninsured rate among nonelderly adults decreased between February to April 2016 and was 12.7%, compared to July to September 2013, which was 19.9%.[87] This study also demonstrated significant gains in insurance as 72% of individuals were enrolled in an ACA Marketplace plan or Medicaid.[87]

Another retrospective cohort study by Sommers and Colleagues (2015) utilized the 2012-2015 national Gallup Heathway's Well Being Index to compare changes in health outcomes among 48,905 low-income nonelderly adults in Medicaid expansion states versus 37,283 in non-Medicaid expansion states.[83] The primary outcomes for this study were six self-reported measures: 1. being uninsured, 2. not having a personal physician, 3. medication access, 4. affordability of medical care for an individual or family member, 5. overall health status, and 6.

percentage of days in the past month in which activities were limited by poor health.[83] The models adjusted for age, sex, race/ethnicity, marital status, employment, income, urban vs. rural residence, state year specific unemployment rate, calendar month, and state of residence.[83] This study utilized statistical analysis techniques such as linear regression models and differences in differences to assess the differences in health outcomes among low-income individuals in Medicaid expansion versus non-Medicaid expansion states.[83] The overall findings demonstrated that low-income adults in states that expanded Medicaid reported increased coverage, access to primary care and medications, affordability, and health compared with adults in states that did not expand Medicaid.[83] Specifically, this study found that changes in insurance coverage and access to medications varied significantly by race/ethnicity, with more significant changes among minorities.[83] For instance, there was a greater reduction in the uninsured rate among Latino adults than among White adults.[83] Also, there were more significant improvements in access to medicine for urban residents than rural residents.[83] In addition, the affordability of care improved significantly for men compared with women.[83] Together, these studies underscore the value and importance of the ACA as it has increased insurance availability, expanded health coverage, and improved a wide range of health outcomes overall.

II. The Affordable Care Act-Medicaid Expansion and ED use

Success of the Affordable Care Act (ACA) has been notable. However, previous studies showed mixed findings on the relationships between the ACA and the potential increase in ED use. For example, the Oregon Health Insurance Experiment, a widely cited randomized control trial study conducted between 2008 to 2010, found Medicaid coverage was linked to a 40% rise in urgent and non-urgent ED visits. This increase persisted two years after that.[80,88,89] Interestingly, ED rates increased simultaneously as newly insured adult outpatient services use

increased because individuals often do not have an existing relationship with a provider because they are not aware of where to seek services.[80,88,89] Furthermore, a longitudinal study by Nikpay and colleagues (2017) utilized the National Agency for Healthcare Research and Quality's Fast Stats program that compared changes in ED visits by payers after 2014 in 14 expansion states and 11 non-expansion states.[90] The findings from this study suggested ED visits increased more in Medicaid expansion states than in non-expansion states.[90] The authors argued that coverage often reduces the out-of-pocket costs for going to the ED, driving more frequent visits.[90]

Under some circumstances, Medicaid coverage expansion has mixed associations with ED utilization. These associations may have a lower or no effect on ED utilization. For example, Sommers and Simon (2017) utilized a cross-sectional design among 8,676 non-elderly patients ages 19 to 64 years with incomes below 138% of the federal poverty level among three different types of coverage states: Kentucky (Medicaid expansion state), Arkansas (private option state), and Texas (non-expansion state) between 2013-2015.[81] The primary outcomes and measures for this study were: 1. self-reported access to primary care, specialty care, and medications; 2. affordability of care; 3. outpatient, inpatient, and emergency services utilization; 4. receiving glucose and cholesterol testing, an annual checkup, and care for chronic conditions; 5. quality of care, depression score, and overall health.[81] The statistical analysis technique utilized for this study was a difference in difference analysis.[81] This study found reductions in ED use in Kentucky and Arkansas.[81] In addition, these states also had significant increases in outpatient utilization, prevention care, and improved health care quality. [81] Sommers and Simon (2017) mentioned that although studies showed a reduction in ED use, no evidence suggests overall costs of care decline when coverage expands.[89] The variations in ED use may depend on

population characteristics (age, income, health status), insurance plans (cost-sharing, generosity of provider payments), and the types of outpatient providers seen by patients and their ED referral patterns.[89] Whereas, for Texas, Sommers and Simon (2017) mentioned considering Medicaid expansion can produce substantial benefits for low-income people.[89]

III. Medicaid/Medi-Cal and emergency department use among formerly incarcerated people

Under the ACA, formerly incarcerated individuals meet the eligibility for Medicaid coverage since a large portion are poor and low-income.[8,21,91] For instance, Looney and Turner (2018) reported the year after incarceration, only 55% of working-age men reported a minimum annual income of $10,090, suggesting that most would qualify for Medicaid after release.[92] However, lack of access to health insurance and benefits remains a significant barrier.[8] Historically formerly incarcerated individuals have been left without health coverage upon release due to the Inmate Exclusion Policy (IEP) that terminates or suspends Medicaid health insurance coverage during incarceration. [93] This policy creates discontinuities in care and makes it difficult to enroll in health insurance as 90% lack health insurance upon release.[21,94,95]

Medi-Cal is California's state Medicaid health insurance program.[93] It takes about 45 days to process Medi-Cal application claims.[93] Expedited Medi-Cal is the "fast track" application process to support specific individuals seeking a community-based services waiver or state plan services immediately rather than waiting until the application is fully processed.[93] It takes about 17 days to process Expedite Medi-Cal.[93] When an individual obtains a Benefits Identification Card (BIC), their Medi-Cal is active, and they have full-scope services (medical, dental, mental health, and vision care).[93] They are assigned a Managed Care Plan and can

choose a network provider.[93] Full-scope Medi-Cal also provides eligibility for other essential services such as food via nutrition assistance programs.[93]

The process of applying for and understanding health care benefits provided under Medi-Cal is overwhelming because it entails several steps and a long wait time. Many individuals reentering their community post-incarceration are often left without guidance and lack support navigating and enrolling in Medicaid public health insurance. For instance, Malik-Kane and Visher (2008) conducted a longitudinal study of reentry experiences among 838 men and 262 women returning from Ohio and Texas state prisons during 2004 and 2005.[96] This study reported 78% of men and 66% of women were uninsured two to three months after release.[96] This study also found 68% of men and 58% of women were still uninsured eight to 10 months later.[96] An individual's length of incarceration coupled with a lack of reentry planning and coordination between corrections and community providers hinders access to health services, medications, and treatments individuals may have received before reentry.[97] Therefore, disruptions in health services can exacerbate mental and physical health conditions, impeding Medi-Cal enrollment.[97] These are notable reasons contributing to high rates and repeated use of acute and costly care ED services.[35]

THE EFFECTS OF MENTAL HEALTH AND SUBSTANCE USE DISORDER ON EMERGENCY DEPARTMENT USE AMONG FORMERLY INCARCERATED

Formerly incarcerated individuals with mental illness (MI) and substance use disorders (SUD) face pervasive challenges upon release from incarceration due to the lack of reentry planning and resulting inability to access critical treatment services. Previous research shows that approximately 65% of incarcerated populations in the U.S. have an active SUD. [98] Also, an estimated 25% of prison inmates and 10-20% of jail inmates have a serious MI condition.[99] If

individuals were receiving treatments to manage these conditions while incarcerated, upon reentry, treatments usually stop.[57,100] In the first few months of post-release, individuals diagnosed with MI and SUD have a high risk of relapse, fatal and non-fatal overdose, and recidivism.[57,100] Depending on the severity of their MI condition, they can be prone to self-harm, public destructive behaviors, and aggressive or violent behavior.[100] These circumstances make them particularly vulnerable to stigma, harsh policing, recidivism, and ED use.[100]

Under the provisions of the ACA, Medicaid is the largest payer of MI and SUD treatment services for low-income people.[101] The ACA and the Mental Health Parity and Addictions Equity Act of 2008 require all Medicaid-managed care plans to cover MH disorders and SUD treatment services as essential health benefits.[101] It is important to enroll individuals and expedite their Medicaid coverage to access treatment and rehabilitation services immediately following reentry. For example, Gertner and colleagues (2019) conducted a retrospective study linking administrative data from the Department of Social and Health Services and the Department of Corrections in Washington State containing all people released from state prisons from 2002 to 2010.[102] This study examined the effect of referral to expedited Medicaid for SUD treatment among 3,086 individuals diagnosed with serious mental illness (SMI) who were released from prison from January 2006 to December 2007 in Washington state.[102] The primary outcome for this study was utilizing SUD treatment services within three, six, and twelve months of release. [102] This study used several statistical analysis techniques, including logistic regression models and doubly robust IPW models.[102] These models predicted the effect of referral to expedited Medicaid for the use of any SUD treatment services.[102] The findings demonstrated that 871 individuals received referrals for expedited Medicaid and 2,215 did not.[102] Those who received expedited Medicaid enrollment with SMI increased utilization of SUD

treatment within three months (90 days) of reentry versus those who did not receive referrals.[102] Also, individuals continued to access SUD services at six and 12-month follow-up.[102]

Similarly, Cuddeback and colleagues (2016) conducted a retrospective cohort study that linked administrative data from state prisons, county jails, and psychiatric hospitals in Washington state during 2006.[103] The objective of this study was to identify individual's with SMI who were referred for expeditated Medicaid enrollment from state prisons (n=252), county jails (n=489), and psychiatric hospitals (n=507) across gender, race/ethnicity, and age.[103] This study also examined Medicaid enrollment status and outpatient mental health service utilization at 30, 60, 90 days of release.[103] This study utilized bivariate and multivariate analyses statistical analysis techniques.[103] The findings demonstrated that referral for expedited Medicaid upon release from incarceration was statistically significant with increased Medicaid enrollment and use of community mental health and medical services within 90 days after release.[103] Together, these studies describe how expedited Medicaid can be a promising pathway for formerly incarcerated individuals to comply with MH and SUD treatment services which may prevent recidivism, mortality, and repeated ED use and improve long-term health outcomes.[93,94,104]

ENGAGING IN HEALTH CARE SERVICES INTERVENTIONS AND EMERGENCY DEPARTMENT USE AMONG FORMERLY INCARCERATED

Formerly incarcerated individuals often have pervasive health issues following reentry making it vital they receive prompt and continuous physical health services. However, they face significant obstacles engaging with the health care system, such as finding a primary care physician, making health care appointments, accessing transportation, and refilling expensive prescriptions. [57,105] These are also notable risk factors contributing to repeated use of ED

services due to ease of access, the immediacy of attention, and lack of knowledge regarding outpatient resources.[57,105]

Previous studies have shown that engaging formerly incarcerated individuals with services to help them access and navigate the health care system shows greater efficacy in remaining in primary care. For instance, Wang and colleagues (2012) conducted a randomized control trial in California among 200 formerly incarcerated participants, over 50, between 2007-2009.[68] This study compared two interventions designed to improve primary care engagement and reduce acute care utilization.[68] The first is the Transitions Clinic (TC), a primary care-based, complex care management (PC-CCM) program embedded within a preexisting community health center.[68] The TC's primary care team consists of a primary care provider with experience caring for formerly incarcerated patients and a trained and certified community health worker (CHW) with a personal history of incarceration.[68] The TC arm included 98 participants who received expeditated primary care (within four weeks) appointments with the TC provider.[68] The second intervention was expedited primary care (EPC), which included 102 participants who received expedited (within four weeks) primary care appointments with a safety-net primary care clinic provider.[68] The two main outcomes for this study were: 1. primary care utilization (2 or more visits to the assigned primary care clinic) and 2. emergency department (ED) utilization (the proportion of participants making any ED visit).[68] This study utilized several statistical analysis techniques: chi-square, Wilcoxon rank-sum test, Poisson regression, survival analysis, and frequency analyses.[68] The overall participant characteristics were the following: mean age was 43.2 years, 64.3% were Black and 12% were Hispanic, 38.3% had less than high school education, 6% were employed, 68.7% were uninsured, and 7.5% had stable housing.[68] This study demonstrated when older adults and those with chronic conditions leaving prison are

provided early access to care such as screenings and referrals, they remain in primary care for at least 12 months.[68] Furthermore, this study found a 51% reduction of ED visits among those participants who received ongoing primary care at the TC versus EPC.[68] These findings suggest the TC PC-CCM intervention may be an effective care management model for reducing frequent utilization of ED for high-risk and high utilizing populations in primary care.[68] Furthermore, Remien and colleagues (2015) conducted a qualitative study among 80 people living with HIV that included previously incarcerated adults.[106] This study found engagement in primary care is maximized when coordinated services are available and address housing, mental health, and substance use disorder treatment, and peer navigation.[106]

Collectively, these studies suggest the importance of community-based programs specifically tailored to engage formerly incarcerated individuals in addressing their physical health needs with one-on-one care management services shows efficacy in remaining in care and improving health outcomes. In addition, these services are critical to assisting individuals in accessing and navigating through complex physical health services and reducing repeated ED use.

THE EFFECTS OF HOUSING ON EMERGENCY DEPARTMENT USE AMONG FORMERLY INCARCERATED

A history of incarceration places individuals at an increased risk of housing insecurity and homelessness immediately upon release. According to the Prison Policy Initiative, formerly incarcerated people living in the U.S. are ten times more likely to be homeless than the general public.[107] The causes of homelessness include a shortage of affordable housing, large security deposits, and other application requirements like professional references.[108] These factors,

coupled with stigma and discrimination related to renting, housing policies, and legal barriers, make it highly stressful and challenging to find and maintain secure and stable housing. [108-111]

Previous studies have found a relationship between a history of incarceration and unstable housing and homelessness. For example, Metraux and Culhane (2006) conducted a retrospective study by matching administrative shelter records with data on releases from New York State prisons and jails to examine incarceration histories and shelter use patterns among 7,022 persons staying a public shelter in New York City.[112] This study utilized descriptive and multivariate regressions to assess previous incarceration history with shelter use patterns.[112] The multiple regression analyses focused on four outcomes: 1. number of shelter stays, 2. the length of stay after the index date, 3. the occurrence of a subsequent shelter stay, 4. the time-release from incarceration, and shelter admission.[112] This study found 23.1% had been incarcerated in the past two years at a NY state jail or prison and were majority Black, Hispanic, and predominantly male.[112] In addition, at least 61.8% of those in the study population released from prison had a shelter stay within thirty days of release.[112] Therefore, the thirty days after incarceration represents a critical time when releasees are vulnerable to various adverse outcomes including homelessness.[112]

Scholars, justice officials, and public health care providers advocate strengthening policies to support stable housing.[110,113] Housing is essential to good health and the foundation for successful reentry.[110,113] Homeless individuals are three times more likely to use an ED at least once a year compared with the general population.[108] These reasons support homeless

status as an essential variable for this study since stable housing post-incarceration may mitigate repeated ED use.

CONCLUSION

Formerly incarcerated individuals are more likely to utilize acute and costly health care services such as EDs. The Riverside County Whole Person Care (WPC) pilot program, implemented by Riverside University Health System (RUHS), was designed to coordinate, and integrate services among multiple providers to assist reentry individuals in gaining active Medi-Cal health insurance, see a physical health provider, receive MH and SUD treatments, and assist with housing services. This study will assess the rate of ED use among formerly incarcerated individuals in the 12-month period after screening by an RN in the RUHS WPC pilot program. Evidence from this study will inform future Medicaid/Medi-Cal innovations and public health policy to improve access to supportive reentry services for releasees.

CHAPTER 3 - METHODS

DATA SOURCE

This study utilized secondary data from the Whole Person Care (WPC) pilot program implemented by the Riverside University Health System (RUHS).[25] Participants were recruited from their local Probation department office, where they were required to report within 48 hours of release from incarceration.[25] Individuals were eligible to participate in the WPC pilot program if they would be on probation for at least one full year, were at risk of experiencing homelessness, currently had a behavioral health diagnosis, and had a physical health diagnosis.[25] After the probation intake meeting. The probation officer introduced the participant to the Registered Nurse (RN) as close to the first probation appointment as possible.[25] The RN provided each participant with an informed consent form describing each type of screening service.[25] Once the participant was screened, they were referred to each service depending on their assessment score. The participant had the right to refuse to participate and share data with any departments.[25]

This was a retrospective cross-sectional study of formerly incarcerated individuals who participated in the RUHS WPC program for 12 months, specifically during 2017, 2018, and 2019. Participants enrolled after July 31, 2019, were excluded because they would not have up to 12 months of follow-up data at the time of this study.

ETHICAL-HUMAN STUDIES CONSIDERATIONS

An initial inquiry for approval was made to the Claremont Graduate University (CGU) Institutional Review Board (IRB). However, the IRB at CGU deferred to Riverside University Health Center IRB because only secondary data belonging to RUHS was proposed to be used for the study. Approval for the current study was obtained from the RUHS IRB. The current study

analyzes secondary data; therefore, there are no direct risks or benefits to participants in the WPC. The potential risk may include having the patient's privacy or confidentiality compromised.

However, every reasonable effort was made to protect privacy while participants' data was used as part of this study. Data obtained from RUHS were de-identified by RUHS staff using the Safe Harbor Method before sharing with the researchers. In addition, all data and records generated throughout the study were kept confidential in alignment with the policies of the RUHS IRB. Finally, only study personnel had access to the study data and records to conduct the study.

VARIABLE MEASURES

I. Emergency department

Emergency departments (EDs) have a pivotal role in the United States health care system. EDs serve as the "safety net of the safety nets"[69,114] as they have a legal obligation to treat all patients in need, despite their ability to pay under The Emergency Medical Treatment and Active Labor Act (EMTALA). For this study, the dependent variable (DV) is ED use 12 months after screening by an RN and referral to services in the RUHS WPC pilot program. A dichotomized variable was created to reflect any ED use during the 12-month follow-up and was coded as "0" for no ED use and "1" for any ED encounter.

II. Medi-Cal

All eligible participants were referred to Medi-Cal public health insurance services. Those who complied with their referrals would have active Medi-Cal benefits. In contrast, those who

did not comply had non-active Medi-Cal benefits. A dichotomized dummy variable was created and coded as “1-active Medi-Cal benefits” and “0-non-active Medi-Cal benefits.”

III. Mental health treatment services

All individuals were screened for mental health (MH) during baseline, and depending on their assessment score, they were referred to MH treatment services. An MH treatment service encounter determined if an individual showed up to their referral. A dichotomized dummy variable was created and coded as "0-no" and "1-yes."

IV. Substance use disorder treatment services

All individuals were screened for substance use disorder (SUD) during baseline, and depending on their assessment score, they were referred to SUD treatment services. A SUD treatment service encounter determined if an individual showed up to their referral. A dichotomized dummy variable was created and coded as "0-no" and "1-yes."

V. Outpatient services

All participants were referred to physical health based on need in the initial screening assessment from the RN. Individuals who complied with their physical health care referral had an outpatient visit. A dichotomized dummy variable was created and coded as "0-no" and "1-yes."

VI. Homeless status

During the initial assessment, participants were assessed for housing instability. Participants were asked, "What are your living arrangements?" Responses included "Co-housed"; "Homeless Shelter"; "Not Homeless"; "Street"; "Transitional"; "Vehicle"; "Other.” A dummy variable for homeless status was created, which collapsed responses of “homeless

shelter, transitional, vehicle, other." This variable was coded as "0-not homeless" and "1-homeless."

VII. Covariates-age, gender, race/ethnicity

The participant's demographic information was collected via a survey at the initial screening. The demographic variables used for this study included gender, age, and race/ethnicity. Gender was categorized as a dichotomous variable and coded as "0-male" and "1-female." Age in years was obtained as a continuous variable and was categorized into a categorical variable with the following age groups, "1 as 18-26," "2 as 27-34," "3 as 35-44," "4 as 45-54," and "5 as 55 +." Race/ethnicity variable consisted of four groups: Black or African American, Hispanic, or Latino, non-Hispanic White or Caucasian, and Others/Unknown/Multiple Races.

VIII. Additional covariates - chronic illness/conditions, mental health and substance use disorder, perceived physical health, and perceived emotional health

Chronic illness/conditions, mental health and substance use disorder diagnosis, perceived physical health, and emotional health were assessed during the initial screening, six months, and 12-month follow-up period after enrollment in the RUHS WPC pilot program and considered additional covariates in the analysis.

Comorbidity of chronic illness/conditions

Physical health comorbidities were assessed during the initial screening. Chronic illness/conditions were identified if a person had one or more diagnosed chronic health conditions such as hypertension, hepatitis, diabetes, HIV, tuberculosis, and other physical health conditions. A dichotomous dummy variable was created because this variable outcome was zero-

inflated. The variable was categorized as the presence of one or more of these conditions and coded as "1-yes" and "0-no."

Mental health and substance use diagnosis

The RN assessed participants for any mental illness or substance use disorder during the initial assessment. If any disorder was identified, it was recorded in the participants' records. Mental health (MH) diagnoses included generalized anxiety disorder, major depressive disorder, schizoaffective disorder, among others. Substance use disorders (SUD) had alcohol dependence, opioid dependence, sedative, hypnotic or anxiolytic abuse, and other SUDs. A dummy variable was created for MH and SUD diagnoses. The variable was categorized into MH diagnosis, SUD diagnosis, co-occurring MH and SUD disorders, and none.

Self-rated physical health

Self-rated physical health was assessed with a question asking participants to self-report their general physical health status with responses ranging from 1 to 4 indicating "poor, fair, good, and excellent" status. A dummy variable was created and was further dichotomized into a binary variable coded as "1-good," which collapsed "excellent and good," and "0-poor," which collapsed "fair and poor status."

Self-rated emotional health

Self-rated emotional health was assessed with a question asking participants to self-report their general mental health status with responses ranging from 1 to 4 indicating "poor, fair, good and excellent" status. A dummy variable was created and was further dichotomized into a binary variable coded as "1-good," which collapsed "excellent and good," and "0-poor," which collapsed "fair and poor status."

ANALYSIS PLAN

All statistical analyses were conducted using Social Sciences (SPSS) Analysis Software (Version 25). Data was first inspected on distribution, missing cases, outliers, or other unusual features that may be influential. The general sample characteristics were described with frequencies, proportions, means and standard deviations, and ranges.

For the first research question, descriptive statistics were utilized to describe the proportion of ED use during the 12-month period after screening by an RN in the RUHS WPC pilot program. Cross-tabulations were used to describe the status of ED use across groups of sociodemographic variables (e.g., age and racial/ethnic groups). Chi-square tests were utilized to test for bivariate associations between ED use status and each sociodemographic variable.

Logistic regression was used with the dichotomized ED use status as the dependent variable to address the second research question. Univariate logistic regression was carried out first to linearly link the logit (i.e., the natural log-odds) of ever use of ED within the 12-month of enrollment to each of the hypothesized health services related determinants (i.e., active Medi-Cal status).

Second, multivariate logistic regressions were conducted to link the log odds of ED use to each hypothesized health service-related determinant with control for sociodemographic covariates, including age, gender, and racial/ethnicity. All participants were eligible for all health care services. Depending on the releasees screening assessment, they were referred to the specified services. For example, the whole sample was used when the model was focused on the effect of active Medi-Cal benefit status on ED use. Both crude and adjusted odds ratios, as well as 95% confidence intervals, were reported. Tolerance and variance inflation factors were used for multicollinearity diagnosis in multivariate models. The final multivariate logistic regressions

were constructed to include all hypothesized health service-related determinants and covariates in the model to evaluate the independent effects of these hypothesized health reservice-related determinants.

CHAPTER 4-RESULTS

DESCRIPTIVE ANALYSIS

The total sample for this study was 6,347. Of the total sample, 1,828 had ever used the emergency department (ED), and 4,519 had never used ED in the past 12 months. The results of the descriptive analysis showed the sample was majority males (80.9%), and they slightly had more ED use (81.6%) than females (21%). The participant sample age group distributions were: 22.5% were 18-26 years, 31.7% were 27-34 years old, 25.4% were 35-44 years old, 13.2% were 45 to 54, and 7.2% were 55 and older. Most participants were under the age of 45 years, and there was no significant difference in ED use status across age groups. The race/ethnicity of the sample comprised of 33.4% Non-Hispanic White, 27% Hispanic, 12% Black or African American, and 27.6% Others/Unknown/Multiple Races. Among those who ever used ED, 40.2% were Hispanic/Latino, and 20.9% were Black/African American.

Every eligible participant was referred for Medi-Cal insurance, mental health (MH) treatment, substance use disorder (SUD) treatment, and housing services. Among those referred, 47.4% had active Medi-Cal benefits, and 52.6% did not have active Medi-Cal benefits. Specifically, 62% who had active Medi-Cal benefits ever used the ED. Whereas 49.2% who had active Medi-Cal benefits never used the ED in the past 12 months ($p<0.001$).

Among mental health (MH) treatment services, 8.8% of participants encountered services, whereas 91.2% did not. Specifically, 13.6% who encountered MH treatment services had used the ED, whereas 6.8% had never used ED in the past 12 months ($p<0.001$). Similarly, the proportion of participants who had SUD treatment services was 7.6% and 6.8% among those who had ever used the ED and those who did not use the ED, respectively.

Of the total sample, 79% were not homeless, and 19.9% were homeless. Among homeless participants, 27.1% had ever used the ED, and 17.3% had never used the ED in the past

12 months ($p<0.001$). Furthermore, 24% had an outpatient visit, whereas 76% did not. Of those who had an outpatient visit, 93.6% had ever used the ED. Whereas 68.8% never used the ED who had an outpatient encounter.

In addition, 13.9% reported having one or more chronic illness health conditions from the total sample. Among those who ever used the ED, 16.7% reported having at least one chronic disease diagnosis. On the contrary, among those who never used the ED, 12.8% had at least one chronic disease diagnosis. Furthermore, 75.8% had no diagnosis for MH and SUD diagnoses, 10% had MH diagnosis, 8.6% had SUD diagnosis, and 5.6% had a co-disorder. The proportion of those with MH diagnoses, 16.6%, ever used the ED and 7.3% never used the ED. The proportion of those with SUD diagnosis, 8.2%, ever used the ED, and 8.8% never used the ED. Also, there were similar trends among those with a co-disorder where 9.1% ever used the ED, and 4.1% never used the ED.

Across self-reported physical health, 78.9% mentioned "good," whereas 19.9% mentioned "poor." However, 77.1% mentioned "good" among self-reported emotional health, whereas 21.5% mentioned "poor." There was a slight difference in ever using and never using ED among self-reported physical and emotional health. Furthermore, 13.9% had a chronic illness/condition, and 86.1% did not. This variable was zero-inflated; therefore, we used the dichotomized variable for this analysis. There was a slight difference in ever using and never using ED among those with chronic illness conditions.

LOGISTIC REGRESSION MODEL ANALYSIS

Univariate and multivariate logistic regressions were employed to assess if encounters to services for Medi-Cal health insurance, SUD treatment, MH treatment, outpatient visits, and homeless status among formerly incarcerated individuals affect ED use during the 12-month

period after screening by an RN in the RUHS WPC pilot program. The following covariates were controlled in the multivariate models: age, gender, race/ethnicity, self-reported emotional health, self-reported physical health, and chronic conditions, and mental health and substance use diagnosis.

The results from the univariate model for each encounter services such as active Medi-Cal benefits, outpatient visit, any mental health treatment encounter, and being homeless, was individually related to higher odds of using ED than those who had any substance use treatment encounter in the bivariate logistic regression model. All the significant odds ratios observed in the univariate models remained statistically significant in the multivariate models except for active Medi-Cal benefits and any mental health treatment encounter, which became non-significant. The magnitude of the multivariate models' odds ratios was also substantially reduced after adjustment for the covariates. Substance use disorder treatment services were not significantly related to ED use in the univariate or multivariate model.

The results from the multivariate logistic regression with the inclusion of all encounter variables with adjustment of covariates indicated participants who received services of an outpatient clinic visit (AOR of 4.06 with 95% CI of 3.09-5.33) and being homeless (AOR=1.40 with 95% CI of 1.16-1.70) had significantly higher odds for ED use than those counterparts who encountered mental health services and had active Medi-Cal benefits. Substance use disorder treatment services were found to have a statistically significant association with ED use, and all encounters were controlled in the model (AOR of 0.58 with 95% CI of 0.37—0.89).

CHAPTER 5- DISCUSSION

This is the first study to assess if linkages to upstream services impacted emergency department (ED) use specifically among formerly incarcerated individuals. The present study specifically assessed if active Medi-Cal benefits, homeless status, outpatient visits, substance use disorder (SUD) treatment, and mental health (MH) treatment services may reduce the likelihood of ED use among post incarcerated people during the 12 months after screening by a Registered Nurse (RN) in the Whole Person Care (WPC) pilot program implemented by Riverside University Health Systems (RUHS). The encounter variables used for this study represent those who did or did not follow through with their screening referrals. The analysis controlled for age, gender, race, self-reported emotional and physical health, chronic illnesses, and mental health and substance use diagnosis.

The results from this study showed mixed findings. For instance, active Medi-Cal benefits and MH treatment services were not significantly related to ED use in the multivariate models. Homeless status and outpatient visits had greater odds of using the ED. Interestingly, SUD treatment services were not significantly associated with ED use in either univariate or multivariate models but were significant when all different encounters were controlled in the model.

This study found active Medi-Cal benefits were not statistically significant with ED use. It is difficult to determine if active Medi-Cal benefits lowered or increased ED use from this study. However, it is logical to assume that individuals with active Medi-Cal benefits would be less likely to use the ED. Future studies are needed to explore this relationship further. Nearly 90% of formerly incarcerated individuals lack health insurance at the time of their release.[21,94,95] Under the Affordable Care Act (ACA), formerly incarcerated individuals meet

eligibility for Medicaid coverage as they have incomes below 138% of the federal poverty line.[8,21,91] Since California is a Medicaid expansion state, many of the participants in this study were referred for Medi-Cal health insurance. Although the measures vary, previous studies have demonstrated that Medicaid expansion can increase or decrease ED use. For instance, a longitudinal study by Nikpay and colleagues (2017) showed ED visits increased more in Medicaid expansion states than in non-expansion states.[90] The researchers argued that coverage often reduces the out-of-pocket, co-payment costs for going to the ED, which may be driving more frequent visits.[90] Another study by Pines and colleagues (2016) examined the effect of Medicaid insurance expansion during the first year of expansion in 2014 on ED use in 478 hospitals in 36 states.[115] The overall findings demonstrated Medicaid expansion increased Medicaid paid ED visits and decreased uninsured ED visits.[115] Therefore, Pines and colleagues (2016) concluded that expanding Medicaid did not significantly increase or decrease overall ED visits.[115]

Previous studies suggest having mentioned several reasons why Medicaid populations use ED services.[116] For instance, the Medicaid population, may have a higher burden of co-occurring chronic illnesses and be more likely to experience primary care access problems or unsatisfactory primary care.[116] Medicaid enrollees may perceive the ED as a one-stop-shop that provides multiple services simultaneously, such as lab work, check-ups, prescription medications, and other immediate support. [116] These are also notable reasons why formerly incarcerated individuals seek ED services despite having Medicaid benefits. In addition, releasees have other unprecedented circumstances depending on an individual's sentence length because returning to their communities is a significantly stressful time. [21,55] They face competing priorities such as reconnecting with family, seeking stable housing, applying for

identity cards, and employment. [54] These circumstances, coupled with transportation access, severe co-occurring health challenges, stressors, and obstacles with navigating the complex health care systems, prevent releasees from seeking adequate health care services from a primary care provider.[54] Therefore, relying on ED for their health care service needs.

This study found that MH and SUD treatment services were not significantly related to ED use. Therefore, we cannot assume that MH and SUD treatment services may change the odds of using the ED. Previous studies have not looked at this association specifically among releasees. Advocates, public health care providers, and prior studies have mentioned that incarceration can trigger and worsen symptoms of mental illness which has lasting implications after someone reenters back to their communities.[117] For instance, incarceration has been linked to severe mood disorders, including bipolar disorders, major depressive disorders, and post-traumatic stress disorder (PTSD).[117] These conditions vary per person and are all reasons why access to MH and SUD treatment services are critical immediately following release.

Although there are differences in our study methodologies and outcome variables, previous studies have shown efficacy when releasees are enrolled in Medicaid services and utilization of MH and SUD treatment services. For example, Cuddeback and colleagues (2016) found a referral to expedited Medicaid benefits upon release from incarceration was statistically significant with increased Medicaid enrollment.[103] This study found a significant association between increased Medicaid enrollment and use of community MH and medical services within 90 days after release.[103] These findings underscore the importance of enrolling releasees into Medicaid/Medi-Cal benefits to facilitate successful transitions back to their communities.[103]

In addition, Gertner and colleagues (2019) examined the efficacy of referral to expedited Medicaid on SUD treatment services among releasees diagnosed with serious mental illness

(SMI) within three, six, and twelve months of release.[102] The findings suggested those who received expedited Medicaid enrollment with SMI increased utilization of SUD treatment within three months (90 days) of reentry versus those who did not receive referrals.[102] Also, individuals continued to access SUD services at six and 12-month follow-up.[102] Engaging with MH and SUD treatment services is supportive as many stressors and obstacles are associated with the reentry process. Furthermore, Etim (2020), who also utilized the RUHS WPC data, found releasees had a lower rate of re-arrest over the 12-month follow-up who had active Medicaid benefits and encountered MH and SUD treatment services.[118] Collectively, these studies indicate active Medicaid benefits are a promising pathway for complying with SUD and MH treatment services despite this study's findings. Future studies are needed to explore MH and SUD treatment's relationship with ED use, specifically among Medicaid groups who have been formerly incarcerated.

Furthermore, surprisingly we found a higher odds of using the ED among participants who had outpatient visits. About 76% of participants complied with their physical health referrals and encountered outpatient services. This high rate of participants engaging with outpatient services was a notable impact made by RUHS WPC. It is reasonable to assume that having an outpatient visit would show lower ED use. Yet, it is unclear why it prevented someone with outpatient visits from having higher ED use. There are a few reasons why this may occur. First, there may be a lack of health providers who can timely see the patient.[119] Currently, wait times are longer than expected to see a provider right away.[119] Also, sometimes, when the patient is connected to a health provider for services, they may not feel comfortable seeing them. This may be due to stigma, difficulty navigating systems, transportation barriers, and many more unseen issues.[120] These are all notable reasons why ED use may be higher.

Therefore, relying consistently on ED services deters one from adequately managing and treating care by a regular provider and often leads to adverse health outcomes. Contrary to our study's findings, Wang et al. (2012) demonstrated a 51% reduction of ED visits among releasees who received ongoing primary care. [68] Given this positive outcome, future studies are needed to continue exploring the relationship between outpatient services and ED use.

Housing promotes better health outcomes. We found homeless status showed higher odds of using the ED. This supports previous findings that homelessness is a significant risk factor contributing to higher rates of ED use. Previously incarcerated individuals suffering from multiple comorbidities require access to care management and coordinated care. Without stable housing, individuals returning to their communities cannot adhere to care, thus preventing them from adequately treating and managing their health conditions. These are all notable reasons why ED's are the first contact with the healthcare system for releasees.[121] Furthermore, releasees are also the most repeated visitors to the ED, especially if they are homeless.[121] A national study conducted by Niska and colleagues (2010) utilizing the 2007 National Hospital Ambulatory Medical Care Survey found an estimated 552,000 ED visits were made by individuals who reported being homeless. [121-123] This was double the rate of individuals who live at private residencies.[121-123]

Contrary to this study's findings, Larimer, M.E. et al. (2009) found a reduction in ED visits and inpatient hospital admissions among chronically homeless people living in a housing first (HF) intervention model after one year.[121,124] Furthermore, as an extension to this study, Mackelprang and colleagues (2014) found after two years of living in the HF intervention model, there was a continued reduction in ED utilization among chronically homeless adults.[121] These studies underscore the importance of housing in reducing ED utilization among formerly

incarcerated individuals at an increased risk of becoming homeless. Future studies should continue to examine the relationship between housing and ED use among releasees.

POLICY AND PRACTICE IMPLICATIONS

The findings in this study have several policy and practice implications. First, this study utilized data from the Riverside County Whole Person Care (WPC) pilot program implemented by Riverside University Health System (RUHS) pilot program designed to provide reentry service for formerly incarcerated individuals. The RUHS WPC pilot program has impacted the lives of many releasees. This program underscores the importance of developing targeted integrated and coordinated care management services across multiple stakeholders who historically operate in siloes to improve the health outcomes of releasees. An essential policy suggestion would be to utilize the strategies by RUHS WPC as a model for designing and implementing services at the national, state, and county levels. For example, these services can include expedited Medicaid services as Medicaid is the largest payer for MH and SUD services. Furthermore, these services can integrate community health workers (CHWs) with shared lived experiences as stakeholders, which builds trust, empathy, efficacy among individuals remaining in long-term care and improving long-term health outcomes.

The second policy suggestion is to continue supporting and funding Medicaid section 1115(a) waivers as they are critical state-level demonstration projects intended to provide services beyond the scope of Medicaid services. It is essential to strengthening section 1115(a) waivers across states that support high-needs beneficiaries to improve health outcomes. Although this study found that certain RUHS WPC services have a higher odds or no significant relationship to ED use, the access to services designed explicitly for releasees has provided support and improved long-term health outcomes for the population.

The third policy suggestion is suspension rather than termination of Medicaid services for incarcerated individuals.[125] Under the Medicaid Inmate Exclusion Policy (MIEP), Medicaid is terminated upon incarceration.[125] Currently, in California, Assembly Bill 112 has been proposed "requiring the suspension of Medi-Cal benefits for juvenile and adult incarcerated individuals to end on the last day of incarceration or three years from the date they become incarcerated."[125] Suspension instead of terminating Medi-Cal benefits, and re-enrolling post-incarceration, allows easier access to health care coverage following an incarcerated individual's release.[125] This bill increases the duration of the suspension from one year to three years.[125] This can also prevent unnecessary administrative burden to the health care systems, churning of individuals enrolling and disenrolling in services, and reduce gaps in coverage.[125] I would encourage policymakers and advocates to consider moving this policy through. It may help many individuals access care are upon release and alleviate many obstacles associated with enrollment, thus, improving long term health outcomes.

Furthermore, the Medicaid Reentry Act (MRA) of 2021 has also been proposed to address the MIEP to allow for enrollment in Medicaid 30 days before releasee.[126] This has received bipartisan support.[126] Creating a standardized process of enrolling releasees in Medicaid before returning to society, policymakers, and community workers can further support reentry through compassionate release.[126] For example, in Ohio, the Medicaid Pre-Enrollment Reentry pilot program begins 90 days before exit with a class taught by peer Medicaid educators.[126] Participation is optional, and those interested complete enrollment before release.[126] This service has resulted in increased involvement in substance use treatment, and releasees reporting that cost relief provided by Medicaid reduced their odds of returning to correctional settings.[126] Also, individuals mentioned losing Medicaid would create a range of financial difficulties.[126]

This pilot program has made a positive impact and improved the outcomes of many releasees.[126] However, MIEP provisions limit many states from piloting such programs.[126]

The fourth policy suggestion is the American Rescue Plan Act (ARPA) provisions provide an additional temporary fiscal incentive to encourage states that have not yet adopted the Affordable Care Act (ACA) Medicaid expansion to consider expanding coverage.[127] It is critical for the remaining 11 states to support Medicaid expansion. It is one of the largest payers for safety-net services such as behavioral health, SUD treatment services, nutrition services, and so much more.[127] This can aid in supporting complex Medicaid populations living in their states in improving health outcomes.[127]

Despite this study's findings, the fifth policy suggestion is that Medicaid benefits extend support beyond medical services such as dental care, eye health, medication support, maternal and childcare, MH, SUD treatments, and food and nutrition services. A critical policy call is for state-level Medicaid services to expand services further, including housing support. This study found homeless status shows a higher odds of ED use. This outcome joins a growing body of studies that have found homeless individuals have higher rates of acute ED use. Housing is the foundation of reentry and better health outcomes. Therefore, policies must support interventions to place releasees at a higher risk of homelessness into housing support programs.

As the de-incarceration movement grows in the U.S., and more individuals are released back into the community, the need for housing will continue to increase. Formerly incarcerated individuals face an obstacle in finding housing because of the stigma and discrimination associated with their previous incarceration. A policy suggestion would be for carceral systems to collaborate with county organizations to link individuals needing housing support before release.

In 2022, the California Advancing and Innovating Medi-Cal (CAL-AIM) program will begin to implement and strengthen Medi-Cal services.[128] The ambitious program entails managing comprehensive needs, improving quality outcomes, providing a value-based approach to health care services, and making Medi-Cal a more consistent and seamless system for enrollees to navigate by reducing complexities and improving flexibility.[128] CAL-AIM will also target severely homeless and those with complex needs to improve their long-term health outcomes.[128]

The sixth policy suggestion is to continue to examine ED use patterns among releasees. This study contributes to the few studies that specifically follow formerly incarcerated individuals and ED use patterns. Because releasees are low income, they are grouped under Medicaid beneficiaries. This can make it challenging to determine which beneficiaries have been previously incarcerated. Due to confidentiality reasons, EDs and other intervention support programs may not ask whether someone has been previously incarcerated to prevent stigma and discrimination. Therefore, a policy suggestion is to strategize compelling methods to capture ED use information. Utilizing the RUHS WPC pilot program methods can be beneficial.

CHAPTER 6- CONCLUSION

This study examined if active Medi-Cal benefits, outpatient visits, substance use disorder (SUD) treatment, mental health (MH) treatment, and homeless status affect emergency department (ED) use among post incarcerated people during the 12 months after screening by the RN in the Riverside University Health System (RUHS), Whole Person Care (WPC) pilot program.

Several logistic regression analyses were utilized to assess the relationship between each service and ED use. The results showed mixed findings. For instance, active Medi-Cal benefits and MH treatment services were not significantly related to ED use in the multivariate models. It is reasonable to assume that when one gains health insurance or has access to MH treatment services, they would utilize EDs less. These results convey uncertainty as to the effect of active Medi-Cal benefits and MH treatment services on ED utilization. This calls for further examination in the future, specifically among releasees.

Homeless status and outpatient visits had greater odds of using the ED. Homeless status confirms findings from previous studies as a risk factor for greater ED use. Surprisingly, outpatient visits indicated increased ED use. The outpatient visit variable was defined as a participant complying with their physical health services referral. It is reasonable to think that when one has outpatient services, their likelihood of seeking non-urgent care from ED will reduce. This uncertainty calls for further examination in the future among reasons for outpatient use and ED visits.

Interestingly, SUD treatment services were not significantly associated with ED use in either univariate or multivariate models but were significant when all different encounters were controlled in the model. This uncertain finding cannot determine whether ED use was higher or

lower among releasees. It would be interesting to understand the causal factors associated with seeking SUD treatment services and utilizing ED use among releasees.

While the outcomes of this study revealed mixed findings among some services and confirmed previous research findings, it is integral to continue to support targeted care management services for formerly incarcerated individuals as close to reentry as possible. These pivotal services can prevent the high rates and risk of hospitalization, recidivism, and potentially even death immediately the following release. In addition, the overall RUHS WPC pilot program underscores the importance of improved integration, coordination, better data infrastructure, communication, and support from stakeholders from various sectors who often operate in siloes. Improving health care coordination across multiple systems can assist individuals, especially those from complex circumstances, to better navigate through the safety net systems with the assistance of care support staff. Therefore, the RUHS WPC pilot program has profoundly impacted supporting and improving the health outcomes for releasees.

LIMITATIONS

There are several limitations to consider in this study. First, this study was conducted in Riverside County, and participants were not randomly sampled. Each participant was able to choose whether to participate in the pilot program. Therefore, the findings from this study may not be generalizable beyond the participants in this study sample. Second, this study relied on administrative data linked and compiled by RUHS before being provided to researchers for confidentiality reasons. This made it difficult for the researchers to judge or validate the reliability of the measures and the data linkage process. Third, this study did not control other confounders such as education level and employment as this data was not collected. These are

common characteristics variables used in previous large-scale research to describe participants. Although, this data source was significant and could bring more visibility to the medical, physical, and social needs of an often-understudied group in public health research. Fourth, it was difficult to assess the risk factors for homeless status in this study group as 19.9% of the sample indicated they were homeless. Understanding the background of their homeless could have provided more context. Fifth, comorbidity/chronic illness was zero-inflated, which is why this variable was coded as a dichotomous variable. This variable should be categorized according to the number of comorbidities in any future studies. This may change the direction of the results.

Lastly, in terms of ED use, more information was needed to add ED frequency data, meaning the number of times the ED was used per participant. It was challenging since this data came from the electronic health record (EHR) and not a questionnaire. We checked the ED frequency distribution data, and there were several issues. First, the ED encounter was heavily zero-inflated as 71% of the sample did not have any ED encounter in the 12 months. The second issue was that a few cases had extremely high ED encounters, such as 40 ED encounters in the 12 months. These issues were challenging in capturing frequency data use. Therefore, understanding ED frequency data would require data from baseline to the completion of the RUHS WPC pilot program, potentially a future study.

FUTURE DIRECTIONS

Future studies should use other methodologies and analysis techniques to understand ED use among formerly incarcerated populations. In fact, designing interventions with statisticians and data teams is essential. They can provide crucial insights into how assessment survey

instruments can better be coded to ease the analysis process. Since RUHS WPC was a longitudinal study for six years, 2015-2021 (extended for six due to COVID), this is a rich data set that provides insights for several other research studies. This study was only limited to those who participated in the RUHS WPC pilot program for 12 months after screening by an RN, specifically during 2017, 2018, and 2019. For example, including the entire pilot program from baseline to inception in 2021 may shift the direction of the results in the study. In addition, this may provide a thorough assessment of the entire RUHS WPC services impact on ED use from baseline to completion.

Other study analysis would be essential to consider ED use as the outcome. Another would be to redesign the study and use modeling techniques to see if mediating pathways can potentially reduce ED use. For example, Active Medi-Cal benefits, mediated by MH treatment or SUD treatment services on ED use. Furthermore, a qualitative study design can also impact understanding of the program's service provider and user experiences. This can provide a broader perspective and insights into improving future services. Overall, the RUHS WPC program stakeholders and staff have been instrumental in supporting the health outcomes of releasees and have impacted health equity.

TABLES

Table 1. Characteristics (n=6347) of upstream linkages and emergency department use

	Total Sample (N=6347)	Ever ED use (N=1828)	Never Used ED (N=4519)	P-Value
Age				
18-26	1430 (22.5%)	417 (22.8%)	1013 (22.4%)	
27-34	2009 (31.7%)	572 (31.3%)	1437 (31.8%)	.995
35-44	1612 (25.4%)	466 (25.5%)	1146 (25.4%)	
45-54	838 (13.2%)	242 (13.2%)	596 (13.2%)	
55+	458 (7.2%)	131 (7.2%)	327 (7.2%)	
Gender				
Female	1215 (19.1%)	383 (21%)	832 (18.4%)	.020
Male	5132 (80.9%)	1445 (79%)	3687 (81.6%)	
Ethnicity				
Black or African American	759 (12%)	382 (20.9%)	377 (8.3%)	
Hispanic	1715 (27%)	734 (40.2%)	981 (21.7%)	<0.001*
Others/Unknown/Multiple Races	1752 (27.6%)	42 (2.3%)	1710 (37.8%)	
White	2121 (33.4%)	670 (36.7%)	1451 (32.1%)	
Medi-Cal Insurance Services- Active/Not Active				<0.001*
Not Active	1893 (47.4%)	405 (38%)	1488 (50.8%)	
Active	2100 (52.6%)	661 (62%)	1439 (49.2%)	
Missing	2354	762	1592	
Mental health treatment services Encounter				<0.001*
No	5790 (91.2%)	1579 (86.4%)	4211 (93.2%)	
Yes	557 (8.8%)	249 (13.6%)	308 (6.8%)	
Substance use disorder treatment services Encounter				.281
No	5899 (92.9%)	1689 (92.4%)	4210 (93.2%)	
Yes	448 (7.1%)	139 (7.6%)	309 (6.8%)	
Homeless status				
No	5014 (79%)	1321 (72.9%)	3693 (82.7%)	<0.001*
Yes	1265 (19.9%)	491 (27.1%)	774 (17.3%)	
Missing	68	16	52	

Outpatient Services No Yes	 1526 (24%) 4821 (76%)	 117 (6.4%) 1711 (93.6%)	 1409 (31.2%) 3110 (68.8%)	 <0.001*
Chronic illness/conditions No Yes	 5464 (86.1%) 883 (13.9%)	 1523 (83.3%) 305 (16.7%)	 3941 (87.2%) 578 (12.8%)	 <0.001*
Mental health and Substance use disorder Diagnosis None MH Alone SUD Alone Co-Disorder	 4811 (75.8%) 635 (10%) 548 (8.6%) 353 (5.6%)	 1208 (66.1%) 303 (16.6%) 150 (8.2%) 167 (9.1%)	 3603 (79.7%) 332 (7.3%) 398 (8.8%) 186 (4.1%)	 <0.001*
Self-reported physical health Good Poor Missing	 5005 (78.9%) 1265 (19.9%) 77	 1346 (74.5%) 460 (25.5%) 22	 3659 (82%) 805 (18%) 55	 <0.001*
Self-reported emotional health Good Poor Missing	 4896 (77.1%) 1365 (21.5%) 86	 1276 (70.8%) 527 (29.2%) 25	 3620 (81.2%) 838 (18.8%) 61	 <0.001*

*Every individual was referred for Medi-Cal.

*For active/not active Medi-Cal, the sample size dropped from n=6347 to n=3933 because of potential unforeseen circumstances that may have prevented individuals from following through with their referrals.

*Outpatient services are receipt of physical health referral.

Table 2. Summary of logistic regression results for encounter services from the entire sample (n=6347)

	Univariate Model (Each service variable)			Multivariate Model (Each service variable plus covariates)		
Predictor	OR	95% CI	P-Value	AOR	95% CI	P-Value
Active Medi-Cal benefits	1.69	1.46-1.95	<0.001*	1.10	0.94-1.30	0.24
Outpatient visit	6.63	5.44-8.07	<0.001*	4.24	3.44—5.22	<0.001*
Substance use disorder treatment	1.21	.91-1.38	0.281	0.77	.57—1.04	.08
Mental health treatment	2.15	1.81-2.57	<0.001*	0.81	0.62—1.06	0.12
Homeless status	1.77	1.56-2.02	<0.001*	1.47	1.27—1.69	<0.001*

*OR: Unadjusted odds ratio; AOR: Adjusted Odds Ratio; 95% CI: 95% Confidence Interval; A dichotomized variable of ED use in the past 12 months was used as the outcome variable in both univariate and multivariate logistic regression models. The univariate model includes each encounter service as the predictor. The multivariate model includes each encounter service as the predictor with adjustment of covariates. Covariates adjusted in the multivariate model were age, gender, race, self-reported emotional and physical health, chronic illnesses, and mental health and substance use diagnosis.

Table 3- Multivariate logistic regression with the inclusion of all encounter services from the entire sample (n=6347)

Model with all encounter services variables plus covariates			
Predictor	AOR	95% CI	P-Value
Active Medi-Cal benefits	1.03	0.87—1.22	0.74
Outpatient Visit	4.06	3.09—5.33	<0.001*
Mental health treatment	1.06	0.71—1.57	0.79
Substance use disorder treatment	0.58	.37—.89	0.01*
Homeless status	1.40	1.16—1.70	<0.001*

*AOR: Adjusted Odds Ratio; 95% CI: 95% Confidence Interval; A dichotomized variable of ED use in the past 12 months was used as the outcome variable in the multivariate logistic regression model. Covariates adjusted in the multivariate model were age, gender, race, self-reported emotional health, self-reported physical health, chronic illnesses, and mental health and substance use diagnosis.

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