

DOES PARTICIPATION IN THE COMMUNITY INTEGRATED HEALTHCARE  
PROGRAM REDUCE HEART FAILURE READMISSIONS

by

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A DNP Project Submitted to the Faculty of the

COLLEGE OF NURSING

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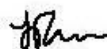
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As members of the DNP Project Committee, we certify that we have read the DNP project prepared by Jennifer Lynn Ward, titled Does Participation in the Community Integrated Healthcare Program Reduce Heart Failure 30-Day Readmissions and recommend that it be accepted as fulfilling the DNP project requirement for the Degree of Doctor of Nursing Practice.



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## DEDICATION

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## ABSTRACT

**PURPOSE:** Perform a program evaluation of the paramedicine transitional care program, the Community Integrated Healthcare Program, to determine its effectiveness in reducing heart failure 30-day readmissions compared to usual care.

**BACKGROUND:** Heart failure is the leading cause of 30-day readmissions in the country with a rate of approximately 21.9%. Heart failure affects 6.2 million Americans and the incidence is expected to grow to 8 million by 2030. Additionally, the cost of treating heart failure is 30.7 billion dollars annually and is anticipated to double by 2030. The complexity of managing heart failure and high rate of complications has prompted the development of transitional care programs aimed at reducing readmissions.

**METHODS:** This is a program evaluation using a quantitative, retrospective design. Data was gathered from the Zoll ® EMS Mobile Health EHR to describe the demographics of the Community Integrated Healthcare Program population and discover the 30-day heart failure readmission rate of participants. This was compared to the readmission rates of the two hospitals that refer to the program (obtained from the Center for Medicare and Medicaid Services) using a two-sample t-test of proportions.

**RESULTS:** There were 13 females (48%) and 14 males (52%) with a mean age of  $81.7 \pm 2.846$ . The 70-79-year age bracket represented 33.3% of the sample, the 80-89 year age bracket represented 37%, and the 90-99 year age bracket represented 22.2%. Days from discharge to the first home visit varied from 3 to 22 days (median 6.5), and the number of visits within 30-days ranged from 3 to 8 (median 5). Participation in the Community Integrated Healthcare Program

significantly reduced heart failure readmissions compared to the total readmission rate of the referring hospitals ( $p= 0.0477$ ).

**CONCLUSION:** This project shows encouraging results as to the effectiveness of the Community Integrated Healthcare Program in reducing heart failure 30-day readmissions. The program evaluation was able to identify areas of success, and areas for improvement in the program. Additionally, a new role for the Doctor of Nursing Practice prepared nurse practitioner has been identified.

## INTRODUCTION

Heart failure (HF) is affecting a growing number of people, as the aging population increases. The incidence of HF is expected to increase to 8 million people by 2030, and in that time, the cost of treating HF will more than double to 69.8 billion dollars annually (Benjamin et al., 2019). Heart failure is the leading cause of 30-day readmissions nationally, resulting in decreased quality of life and an increased financial burden on the healthcare system overall (Fingar, Barrett, & Jiang, 2017; Van Spall et al., 2019; Zohrabian, Kapp & Simoes, 2018). With the implementation of the Center for Medicare and Medicaid Services (CMS) penalties for 30-day hospital readmissions in 2010, there has been a push to find a solution to reduce the burden of HF readmission rates (Murtagh et al., 2017). Evidence reveals a significant gap in support for patients during care transitions, notably from the acute care setting to the community (Naylor et al., 2004). Current research has uncovered that many transition of care (TOC) programs have not been consistent with the utilization and implementation of successful TOC models (Kansagara et al., 2016). This project aims to evaluate a paramedicine program designed to cover the gap in care experienced by HF patients when transitioning home after a hospitalization.

### Background Knowledge

Heart failure currently affects 6.2 million Americans and is responsible for the highest 30-day hospital readmission rate of any other disease in the United States (Benjamin et al., 2019; Fingar, Barrett, & Jiang, 2017). Heart failure accounts for one in eight deaths, and the 5-year mortality rate after diagnosis is approximately 50% (Benjamin et al., 2019). The lifetime risk of developing HF between 45 and 95-years of age is 20%-45% (Benjamin et al., 2019). In addition to these staggering statistics, HF costs an estimated 30.7 billion dollars a year to treat, with more

than two-thirds of that amount going directly to medical costs (Benjamin et al., 2019). The Hospital Readmissions Reduction Program (HRRP) was passed in 2010 with the Affordable Care Act in order to help find a solution to HF readmissions (CMS, 2018). The Hospital Readmissions Reduction Program penalizes hospitals with high readmission rates by decreasing reimbursement. Therefore, in addition to the human impact, there is a strong financial incentive to prevent HF complications and readmissions. It is essential to implement strategies to reduce costly, preventable complications secondary to HF (Zohrabian, Kapp & Simoes, 2018).

Heart failure is a particularly complex disease to manage for patients due to the complicated medication regimen, multiple providers involved, and the progressive nature of the disease (Yancy et al., 2013). One of the most vulnerable times HF patients experience is the transition from the acute care setting to home (Naylor et al., 2004). Exacerbating the risk of complications during care transitions is the complex management of HF and communication breakdowns between inpatient and outpatient providers.

Van Spall et al. (2019) attributes approximately 40% of HF readmissions to poor care transitions. Attempts to increase HF care efficiency and reduce readmissions have resulted in an immense amount of studies aimed at solving the problem of care transition complications and hospital readmissions. Naylor and Keating (2008) define TOC as a range of services designed to promote the safe and timely transition between care settings. Written and verbal education about HF management at discharge is just the beginning of addressing the vulnerable time of transition from an acute care hospital admission to home. Care coordination between clinicians, the patient, and caregivers is essential to reducing HF readmissions and improving the quality of life among HF patients (Naylor & Keating, 2008).

The number of HF diagnoses is expected to grow by approximately 2 million people by the year 2030 (Benjamin et al., 2019). Patients with a new HF diagnosis are thrown into, and expected to comply, with a complicated self-care routine designed to effectively manage their disease and maximize their quality of life (Yancy et al., 2013). HF management is complicated for medically trained professionals, and even more so for those without medical experience, which is part of the reason for frequent readmissions in HF patients.

Without the implementation of TOC programs, HF patients typically receive their discharge teaching before leaving the hospital. Patients are instructed to follow-up with their provider within a specified timeframe, usually two to four weeks. Coffey and McCarthy (2012) describe the difficulty in teaching HF patient's self-care in the hospital setting because patients are often not ready to learn at hospital discharge due to psychosocial barriers. The time of discharge is often the only opportunity HF patients have to learn about managing their disease before following up with their outpatient provider if a true TOC program is not in place. HF patients can decompensate quickly and require increased support during this transitional period to avoid complications and hospital readmission (Naylor et al. 2004).

With HF's growing incidence, healthcare professionals will need additional resources to aid these patients in effective self-management. There has been a multitude of evidence produced regarding TOC; however, the heterogeneous nature of transitional care research makes translating effective interventions into practice extremely difficult (Kansagara et al., 2016). Researched TOC interventions include early physician follow-up, home healthcare, telephone follow-up, multidisciplinary transition teams, mobile integrated healthcare (paramedicine programs), heart failure clinics, and many more (Beck et al., 2013; DeVore et al., 2016;

Murtaugh et al., 2017; Naylor et al., 2004; Nejtcek et al., 2017; Whitaker-Brown et al., 2016). The overall theme of successful TOC interventions is early (usually within one week), in-person follow-up after hospital discharge (DeVore et al., 2016; Kansagara et al., 2016). Early follow-up allows for the identification of problems before they become emergent and allows the patient time to be ready to learn in their home environment (Hurguy, 2015). Successful TOC programs also allow for individualization of the interventions based on patient needs and tend to be more comprehensive in addressing multiple aspects of the transition (Kansagara et al., 2016).

### **Local Problem**

The specific focus of this program evaluation was to examine how a local community paramedicine program impacts HF readmissions. Golder Ranch Fire District (GRFD) serves the Southern Arizona towns of Oro Valley, Catalina, Saddlebrooke, and portions of northwest Tucson (GRFD, 2018). Golder Ranch Fire District implemented a paramedicine program six years ago called the Community Integrated Healthcare Program (CIHP) to assist its residents in the transition to home after a hospitalization. The Community Integrated Healthcare Program is addressing high-risk patients with transitional care needs in the community (Hurguy, 2015). Patients with qualifying diagnoses are enrolled in CIHP by nurse case managers from two referring hospitals, hospital A and hospital B, upon discharge. For this project, the focus will be on patients enrolled in CIHP upon discharge from a HF admission. The CIHP coordinator follows up with the patients that agree to participate and schedule an appointment with the community paramedic (CP) within one to three days after discharge (J. Jansen, personal communication, November 14, 2019). The CP goes to the patient's home, performs an assessment, reviews medications, and provides education about medications and disease

management. In addition to these responsibilities, the CP assists in scheduling follow-up appointments, arranging transport, and contacting the outpatient provider if needed (Hurguy, 2015). The goal of CIHP is for the CP to conduct six visits over 30-days and has the freedom to add more visits if needed (Hurguy, 2015). The CP can assist in the management of HF patients because, in addition to being a certified paramedic, the CP completes an additional 60 hours of training on the specific diagnoses eligible for CIHP. The additional training includes patient education, assessment, common medications, their indications, and side effects. Additionally, the CP also completes a nutrition class at a local community college (A. Prince, personal communication, September 10, 2019).

Participants have 24/7 access to a CP. There is a dedicated phone number to contact the CP, and should a participant call 911, they are identified as a CIHP participant and asked whether they would like an ambulance or a CP to respond. To further streamline patient care, the treatment algorithms, or administrative orders (AOs), used to by the CP flow seamlessly into the AOs used by paramedics should the participant require transport to the hospital (J. Hurguy, personal communication, September 3, 2019).

To date, there has not been a formal evaluation of CIHP to determine if it effectively reduces HF readmission rates among its participants. In addition to this, there is not any formal reporting between CIHP and the referring hospitals. The results of this program evaluation show the value of CIHP and identify it as a framework for a successful TOC program.

The fragmentation and specialization of healthcare has created gaps in care that are putting our patients at risk, particularly during transitions of care (Naylor et al., 2004). Public health programs vary in their applicability based on location and population; what works in one

area may not work in another (Centers for Disease Control and Prevention [CDC], 2011; Kansagara et al., 2016). Golder Ranch Fire District has implemented CIHP to cover the TOC gap in healthcare present in the area they serve. According to the CP and the CIHP founder, most patients enrolled in CIHP are due to a HF admission (J. Hurguy, personal communication, September 3, 2019; J. Jansen, personal communication, November 14, 2019).

There are multiple stakeholders involved in CIHP, including the patients, GRFD, the CP, the two referring hospitals, hospital nurse case managers, caregivers of the HF participants, inpatient providers referring patients to this resource, and outpatient providers that collaborate with the CP. First and foremost, there must be buy-in from patients. The CIHP is an unusual concept in today's healthcare landscape, and patients can be skeptical about a completely free program that promises everything CIHP does (J. Hurguy, personal communication, September 3, 2019). Secondly, there must be buy-in from the referring hospitals, case managers, inpatient providers, and outpatient providers who need to collaborate with the CP to assist in streamlining patient care. The CP is integral in performing and coordinating the activities that result in CIHP's desired outcomes.

According to Aggarwal and Gupta (2014), one HF group demographic associated with increased 30-day readmissions is females over 65 years old, covered by Medicare, and living in areas with a higher median income. Additionally, Whellan et al. (2016) found that the risk of death and readmission increases after the age of 55. The median age in Oro Valley is 52.6 years old, and the median household income is \$79,458 (Data USA, 2017). Compared to Tucson's median age of 37.7 and median household income of \$56,581, it is clear that Oro Valley has a higher concentration of older adults with a higher median income per household (Data USA,

2019). It can be inferred, based on Aggarwal and Gupta (2014), and Whellan et al. (2016) findings, that residents in Oro Valley, AZ are at a higher risk of HF readmissions.

### **Intended Improvement**

#### **Project Purpose**

Finding a solution to aid HF patients in better managing their disease and reducing readmissions is essential to improving the patient's quality of life and controlling healthcare costs in the future. The purpose of performing a program evaluation of GRFD's CIHP is to evaluate it as a TOC program and determine its effectiveness in reducing HF 30-day readmissions in GRFD's service area. If CIHP effectively reduces HF readmission, it could potentially serve as a model for a nurse practitioner (NP) run, community-based TOC program for HF.

#### **Project Question**

In patients hospitalized with HF, how does participation in GRFDs Community Integrated Healthcare Program, compared to traditional follow-up, affect hospital readmissions within 30 days?

#### **Project Objectives**

**Aim 1.** Demographically describe the HF population that completed CIHP as well as participants that were readmitted to the hospital prior to program completion within the program evaluation period of July 1, 2015, to June 30, 2018. Demographic information to be collected includes referring hospital (A or B), age, gender, race and ethnicity, insurance carrier, comorbidities, time from hospital discharge to the first home visit, program completion status, number of visits prior to readmission (if readmitted), and the total number of visits within 30-

days for program graduates. The percentage of HF discharges from hospitals A and B that participated in CIHP will also be deduced to describe the impact of CIHP on the referring hospital's readmission rates.

**Aim 2.** Of the HF patients discharged from the two referring hospitals in Northwest Tucson, compare the HF 30-day readmission rate of those discharged into the CIHP program to the HF 30-day readmission rate of those discharged with usual care.

### **Theoretical Framework**

Dr. Afaf I. Meleis (2010) developed the transitions theory framework to describe and better manage TOC before, during, and after the transition. Dr. Meleis first became interested in transitions in the 1960s. Initially, she investigated family planning and the transition to parenthood. Dr. Meleis was particularly interested in the role that the nurse plays in facilitating healthy transitions. In 1994 Dr. Meleis and Dr. Karen Schumacher (then a doctoral student) identified transitions as a concept central to nursing. Dr. Meleis primarily applied the concept of transitions to populations at risk for having difficulty making transitions, particularly immigrant families. However, in 2000 Dr. Meleis published the transitions theory as a middle-range theory applicable to a wide variety of health transitions (Meleis, 2010). Since that time, the transitions theory has been used internationally in research studies, nursing education, and nursing practice (Im, 2014; Meleis, 2010).

The transitions theory is a middle-range theory with broad applicability to further the understanding of the transition phenomenon and can be applied to any life transition, making it relevant in many settings throughout the life span (Halpin & Schanche Hodge, 2019; Im, 2014; Meleis, 2010). The goal of the transitions theory in practice is to understand the patient's

personal experience during TOC relative to community, cultural, and societal beliefs, as well as to facilitate appropriate therapeutic interventions that promote wellness while minimizing the risk of complications and hospital readmissions (Halpin & Schanche Hodge, 2019; Im, 2014; Meleis, 2010). It is the nurse's role to facilitate the TOC in a way that enables the patient to achieve optimum health (Im, 2014; Meleis, 2010). Application of the transitions theory for this project will focus on the transition from hospital to home after a HF admission.

### **Assumptions**

The transitions theory's assumptions allow the user to fully understand the patient experience of TOC and aid in successful transitions. First, the transition begins before the first change and extends beyond the change (Meleis, 2010). Next, each patient will experience change differently, with distinctive responses and outcomes. Meleis (2010) states that patient outcomes are impacted by the transition experience, whether positive or negative. The patient's environment and personal characteristics can impact their experience during the care transition (Meleis, 2010). Also, preventative and therapeutic interventions can impact the patient's outcome. Finally, patients are capable of learning and adopting new roles and adapting to challenges (Meleis, 2010).

### **Central Tenets**

The tenets of the transitions theory are the nature of the transition (determined by the type, pattern, and property), transition conditions (facilitators and inhibitors of successful TOC), patterns of response to TOC, and the effect of nursing therapeutics on the aforementioned concepts (Im, 2014; Meleis, 2010). Appendix F depicts the influencers of these tenets. Process and outcome indicators both influence healthy transitions. Also, an effective relationship

between the patient and the transition facilitator is essential to its success (Meleis, 2010). Each concept in the transitions theory creates a unique impact, but they must be evaluated in relation with each other to create a complete picture (Halpin & Schanche Hodge, 2019)

### **Nature of Transition**

**Type.** Type is the first descriptor of the nature of a transition. A change in health or environment can initiate a transition (Im, 2014; Meleis, 2010). Four types of situations will trigger a transition: health-illness change, developmental change related to age or role change, situational change, and organizational change (Meleis, 2010). Health-illness is the transition from wellness to illness or illness to wellness. Developmental changes occur with a role change, for example, a change from being able to function independently to being dependent on caregivers (Meleis, 2010). A situational trigger could occur with admission to the hospital or discharge home (Meleis, 2010). Unlike the other three, the organizational trigger does not focus on individual change, but an organizational change (Meleis, 2010). An example of an organizational change is the implementation of a TOC program to reduce high readmission rates.

**Pattern.** The transition pattern can be singular, multiple, sequential, simultaneous, related, or unrelated (Meleis, 2010). Coping with singular change or multiple changes that happen sequentially may be easier than adapting to multiple changes that are coinciding. Multiple changes can be occurring at one time, adding to the complexity of the transition.

**Property.** The property of the transition experience includes awareness, engagement, change and difference, time span, and critical events. Awareness addresses the patient's recognition of the transition (Im, 2014; Meleis, 2010). Engagement is the extent to which a patient is willing to participate in the transition process (Im, 2014; Meleis, 2010). Changes and

differences address components that are either internal or external to the transition, such as, alteration in the role of the patient or caregiver, and different quality of life following a new diagnosis (Im, 2014; Meleis, 2010). Time span describes the fact that transitions occur over time, and the timing of each transition is individual (Im, 2014; Meleis, 2010). Critical points and events are specific markers during the transition (Im, 2014; Meleis, 2010). An example of a critical event includes the diagnosis of HF or discharge from the hospital.

### **Transition Conditions**

Transition conditions refer to facilitators and inhibitors of successful transitions, including personal conditions, community conditions, and societal conditions (Im, 2014; Meleis, 2010). Personal conditions include how an individual applies meaning to the event that initiated the transition, cultural beliefs, socioeconomic status, and level of preparation for the transition (Im, 2014; Meleis, 2010). There are many examples of this in HF, including access to heart healthy foods, health literacy, and the ability to understand the importance of self-care behaviors in the management of HF. Community conditions that affect transitions include access to community resources such as TOC programs and outpatient providers. Societal effects on transitions can be related to how transitions are viewed (Im, 2014; Meleis, 2010). For some, views of health and illness can inhibit the health transition. For example, the stigmatization of poor health may inhibit the acceptance of help via a TOC program.

### **Patterns of Response**

Process and outcome indicators comprise the pattern of responses that characterize healthy responses to TOC (Meleis, 2010). Process indicators are the patient's feeling of connectedness, level of interaction with the process, location and situation, confidence

development, and improved coping skills. Process indicators can promote health when patients are active participants in the TOC process and feel connected to it or inhibit successful outcomes when these elements are not present (Im, 2014; Meleis, 2010). Outcome indicators give information to determine whether an effective transition is taking place (Meleis, 2010).

### **Nursing Therapeutics**

Three measures make up nursing therapeutics; assessment of readiness, preparation for the transition, and role supplementation (Im, 2014; Meleis, 2010). Assessment of readiness requires an assessment of each transition condition. Each patient will be at different readiness stages because of their individual personal, community, and societal factors (Im, 2014; Meleis, 2010). The primary mode to prepare for a transition is education about HF and its management, as well as what to expect from the TOC process.. Role supplementation also involves education of the patient's support system (significant others, family, and friends) about the expected process of transition and how they can best support the patient through the process (Im, 2014; Meleis, 2010). Clarification of role and role assigning can contribute to a smoother transition and better outcomes (Meleis, 2010).

### **Applicability**

The transitions theory can describe and facilitate transitions due to a health-illness event by being broken up into situation-specific transitions while still maintaining its universal tenants related to process, direction, and care transitions (Halpin & Schanche Hodge, 2019). Health-illness transitions are an easy to understand concept; however, the multifaceted relationships and variety of responses involved in the transition create complexity. This complexity makes every transition individual and unique (Halpin & Schanche Hodge, 2019). The transitions theory offers

a logical structure to understand and facilitate a successful TOC (Halpin & Schanche Hodge, 2019). For these reasons, the transitions theory is the basis for this DNP project program evaluation.

## **Literature Synthesis**

### **Evidence Search**

The search for current literature regarding TOC interventions, dated 2015-2020, was conducted via the University of Arizona Health Sciences Library online resources. The databases searched included PubMed and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). Reference lists of relevant articles were reviewed for further resources, which resulted in finding articles older than five years. An internet search was performed for relevant 'gray material' referencing TOC for HF patients. The following search terms were used to locate articles to support this project: *transitional care*, *heart failure*, *patient readmission*, and *paramedicine*. Variations of these terms were used to ensure the search results were inclusive.

Appendix C contains a diagram depicting article selection. The search results were refined based on the year, English language, and the United States (US) as the geographical location. The initial search yielded 71 articles from the databases described above and 17 references from the internet search and reference list reviews. After duplicates were removed, 82 articles and references remained. The abstracts of the remaining resources were read to assess for applicability to the project question. Articles were excluded that did not evaluate a transitional care model or intervention(s), did not include the evaluation of HF patients, did not report HF outcomes independent of other diagnoses, did not evaluate 30-day hospital readmissions as an outcome measure (quantitative studies), or did not report TOC themes (qualitative studies). The

remaining 36 articles were read in their entirety to evaluate for pertinence to the research question. Twenty-one was the final number of articles included in this literature synthesis. A literature grid summarizing the 22 articles included can be found in Appendix E.

### **Comprehensive Appraisal of Evidence**

#### **How are Transition of Care Programs Defined?**

Transition of care programs are defined differently throughout the literature; however, each article's general theme points to increased support for the patient when they transition between care settings. Transition of care interventions are often time-limited and patient-centered, to create safe transitions by educating the patient about self-care management and coordinating care between providers (Kansagara et al., 2016; Naylor et al., 2004; Thompson et al., 2019; Whitaker-Brown et al., 2016).

#### **Why are Transitions of Care Important?**

There is consensus in the literature that the transition from the hospital to the community is the most vulnerable phase for patients with HF. There is an increased risk for complications and readmissions to the hospital in the time immediately following a hospitalization (Murtaugh et al., 2017; Naylor et al., 2004; Naylor et al., 2017). Heart failure patients have the highest readmission rates in the country reported anywhere from 21.6% to 24.5% (Albert 2016; DeVore et al., 2016; Fingar et al., 2017; Murtaugh et al., 2017; Ong et al., 2016). Readmissions after a HF hospitalization not only decrease quality of life and are associated with increased mortality, but also place an incredible burden on the healthcare system in the US (Albert, 2016; Anand et al., 2016; DeVore et al., 2016; Fingar et al., 2017; Garnier et al., 2018; Hoover et al., 2017; Li et al., 2017; Murtaugh et al., 2017; Ong et al., 2016; Whitaker-Brown et al., 2016). The incidence

of HF is continuing to increase, which makes improving outcomes in these patients imperative to the health of the nation, and the healthcare system as a whole (Albert, 2016; Garnier et al., 2018; Murtaugh et al., 2017; Whitaker-Brown et al., 2016). The goal of TOC programs is to prevent hospital readmissions and provide the necessary resources to aid in the improvement of quality of life in patients with chronic diseases (Mitchell et al., 2018; Naylor et al., 2004; Naylor et al., 2017; Whitaker-Brown et al., 2016).

### **Which Transition of Care Program Should be Implemented?**

The 2013 American College of Cardiology Foundation (ACCF)/American Heart Association (AHA) Guideline for the Management of Heart Failure clinical practice guideline gives recommendations regarding TOC; however, they are vague. Yancy et al. (2013) suggests focusing the treatment of HF on ensuring it is most effective in improving the quality of care, enhancing patient outcomes, and reducing the overall cost burden on the healthcare system.

In reviewing the available literature, it becomes clear why the TOC recommendations made by Yancy et al. (2013) are imprecise. The literature review performed here yielded results that are consistent with what several researchers mention, TOC is far from being standardized (Albert, 2016; Kansagara et al., 2016; Mitchell et al., 2018; Thompson et al., 2019). The research conducted on TOC programs contains a great deal of variation in interventions and patient populations (Albert, 2016; Kansagara et al., 2016; Mitchell et al., 2018). Outcomes are variable because the interventions are variable. Furthermore, there is added difficulty because an intervention that works in one community or population may not work in another (CDC, 2011). Each community and patient have unique needs that must be identified before TOC program implementation (Choi et al., 2015; Hurguy, 2015; Li et al., 2016; Whitaker-Brown et al., 2016).

Effective interventions are challenging to generalize based on the heterogeneous nature of the study designs, sample sizes, and the numerous differences among healthcare system's abilities to coordinate care between independent institutions (Albert, 2016; Kansagara et al., 2016; Mitchell et al., 2018). One theme identified is that early outpatient follow-up within one-week post-discharge is key to reducing readmission rates and the cost burden of HF (Boykin et al., 2018; DeVore et al., 2016; Hoover et al., 2017; Nejtek et al., 2017). However, the type of follow-up varies widely in TOC literature. Telephone only follow-up has not been shown to be effective (Garnier et al., 2018; Ong et al., 2016). Another frequent model studied is discharge to a HF clinic. HF transition clinics have been shown to be effective when a multidisciplinary approach is followed (i.e., MD or NP, pharmacist, RN, and case manager are involved in care planning); (Kansagara et al., 2016; Murtaugh et al., 2017; Thompson et al., 2019; Whitaker-Brown et al., 2016). Discharge to an outpatient provider without a multidisciplinary approach has not shown significant improvements in readmission rates over regular care (Kansagara et al., 2016; Li et al., 2017; Murtaugh et al., 2017). In contrast, in-home follow-up after discharge is a successful TOC intervention (Boykin et al., 2018; Choi et al., 2015; Naylor et al., 2004; Naylor et al., 2017; Nejtek et al., 2017; Thompson et al., 2019)

Ultimately, successful TOC interventions focus on patient-centered and collaborative care. Encouraging patients to engage in self-care management and guide the care they receive appears to be an essential part of the TOC process (Albert et al., 2015; Kansagara et al., 2016; Mitchell et al., 2018; Naylor et al., 2004; Naylor et al., 2017; Nejtek et al., 2017; Thompson et al., 2019).

The intervention (or set of interventions) that is most effective in preventing HF readmissions is still unknown and should be the subject of further research (Li et al., 2016; Yancy et al., 2013). Due to the qualitative and complex nature of TOC, conducting well designed clinical trials is difficult (Yancy et al., 2013). This does not imply that recommendations for TOC programs are based on weak evidence or that the lack of higher-grade evidence means the recommendations do not have support for being useful and effective. However, Yancy et al. (2013) do state that evidence supporting specific TOC recommendations is “critically needed.”

For this project, a program evaluation will be completed of CIHP, a paramedicine program covering a TOC gap in the community. Paramedicine programs’ effects on HF readmission rates are not widely studied. This literature search resulted in only two studies evaluating paramedicine programs for HF outcomes, including the program that CIHP was inspired by (Choi et al., 2015; Nejtek et al., 2017). The evidence presented in Choi et al. (2015) and Nejtek et al. (2017) support paramedicine programs as effective TOC models to reduce HF readmissions. Paramedicine programs, including CIHP, incorporate many elements that make up a successful TOC program, including early follow-up, home visits, and interprofessional collaboration (Choi et al., 2015; Hurguy, 2015; Nejtek et al., 2017). The next important step is to evaluate the CIHP program in place to show its effectiveness and areas in which it can improve to serve the GRFD community better.

### **Barriers to Transition of Care Program Implementation**

There are significant barriers to implementing a successful TOC program. Most frequently cited in the literature is the segmentation and fragmentation of the healthcare system (Albert, 2016; Boykin et al., 2018; Garnier et al., 2018; Hoover et al., 2017; Murtaugh et al.,

2017; Naylor et al., 2004). The acute care setting, outpatient providers, different specialties, and home health personnel are not communicating with one another because they are each part of a separate organization. Coordinating these different healthcare providers is an arduous task. Patients get caught in the middle of a disorganized (and sometimes contradictory) plan of care with a HF diagnosis that is already a complex disease to navigate under perfect circumstances.

Other frequently cited barriers to the implementation of TOC programs are the resources, time, and cost associated with them (Choi et al., 2015; Garnier et al., 2018; Hurguy, 2015; Mitchell et al., 2018; Ong et al., 2016; Whitaker-Brown et al., 2016). TOC programs often require new positions to be staffed and specialized training for the team members (Choi et al., 2015; Hurguy, 2015; Garnier et al., 2018; Naylor et al., 2004; Whitaker-Brown et al., 2016). In addition to the time associated with staff training, there is often incredible time involved in the coordination of multiple healthcare agencies. As discussed above, the separation of healthcare can make coordination and collaboration difficult. Even if there is a resolution of the care coordination problem, it will bring to light another hurdle in determining which agency will take on the responsibility of the cost burden. TOC programs are varied, which means there is no standardized reimbursement for TOC services (Choi et al., 2015; Hurguy, 2015; Whitaker-Brown et al., 2016). Another challenging concept is the idea that a substantial benefit of TOC programs is not that they make money, but that they reduce costs. The cost reduction is more of an abstract concept, and it is difficult to make the financial benefits appear tangible to create buy-in among stakeholders (Naylor et al., 2004).

Another, and potentially the most crucial barrier faced in the implementation of TOC programs, is that patients are not always ready to become active participants in their health and

plan of care (Albert et al., 2015; Choi et al., 2015; Ong et al., 2016; Whitaker-Brown et al., 2016). This issue is not widely reported, but it is vital to consider when assessing TOC programs.

It is easy to become immersed in the financial implications of treating multiple HF readmissions and complications; however, the ultimate goal of healthcare is to improve patients' quality of life with chronic diseases. Preventing multiple readmissions is one approach healthcare can use to serve patients and improve the community (Naylor et al., 2004; Naylor et al., 2017).

## **METHODS**

### **Project Design**

This DNP project is a program evaluation to determine the effectiveness of CIHP as a TOC program in reducing HF 30-day readmissions that will use a quantitative, retrospective design. The design of a program evaluation is intended to systematically appraise a program's characteristics, activities and outcomes to improve the program's effectiveness (CDC, 2011). The outcome of the evaluation includes an observational description of the HF 30-day readmission rates of CIHP participants compared to the total HF 30-day readmission rates of patients receiving usual care. Five diagnoses qualify for participation in CIHP: HF, myocardial infarction, pneumonia, diabetes mellitus, and chronic obstructive pulmonary disease (Hurguy, 2015). Patients are eligible for CIHP based on their primary discharge diagnosis. Due to this project's purpose and scope, only participants with a primary diagnosis of HF were included in the sample.

### **Model for Evaluation**

This DNP project utilized the Center for Disease Control and Prevention's framework for program evaluation. The CDC framework for program evaluation is graphically depicted in Appendix G.

### **Standards for Evaluation**

There are four standards for evaluation to guide decision making during the six steps of the evaluation process (CDC, 2011). According to the CDC (2011), the four standards in program evaluation are utility, feasibility, propriety, and accuracy. The utility standard discusses the applicability of the results and who they will be of use to (CDC, 2011). Feasibility discusses whether the evaluation is realistic with the scope of time, resources, and expertise available. Propriety involves engaging those most directly affected by the program and its changes, as well as whether or not the evaluation protects the rights and welfare of those involved. Accuracy entails producing valid and reliable findings for the needs of the people that will use them (CDC, 2011). With these standards in mind, the evaluation can proceed through the six steps of evaluation.

**Step 1: Engage stakeholders.** The first step in a program evaluation is to ensure the investment of the people and organizations involved. Investment in the program evaluation will ensure investment in the results (CDC, 2011). Performing a program evaluation without the stakeholder's interests at the center sets the investigator up for failure. Stakeholders include those involved in program operations, such as management and program staff; those served or affected by the program, like patients; and the intended users of the evaluation results, such as taxpayers, funding agencies, and partners (CDC, 2011).

The priority stakeholders for this project are GRFD, CIHP founder, CIHP management staff, and the CP. Secondary stakeholders are CIHP HF participants, caregivers of participants, referring hospitals, hospital nurse case managers, inpatient providers referring patients to CIHP, and outpatient providers collaborating with the CP.

**Step 2: Describe the program.** A complete program description lays the foundation for a valuable program evaluation (CDC, 2011). A comprehensive program evaluation includes descriptions of the following components: need, targets, outcomes, activities, outputs, resources and inputs, and the relationship of activities and outcomes. Need describes the public health problem that the program addresses. Targets address the groups or organizations that need to take action to ensure progress is made on the problem the program is intended to take on. Outcomes are how and why the targets require change. Activities are what the program will have to do to make changes. Outputs are the tangible products produced by the program's activities. Resources and inputs describe what is needed from the broader environment for the program's activities to be mounted successfully. The relationship between activities and outcomes describe the implementation of activities to produce outcomes (CDC, 2011).

A logic model is used to depict and clarify the relationship between the activities of the program and the outcomes (CDC, 2011). The logic model should include inputs, activities, outputs, short-term effects/outcomes, intermediate effects/outcomes, and long-term effects/outcomes. Describing the stage of development of the program is also essential to its description. Also crucial to the program description is the context in which the program operates in a broader environment (CDC, 2011).

The logic model for CIHP can be viewed in Appendix H. The CIHP is well established and has been in place for six years. This investigation focused primarily on the intermediate outcome of reduced 30-day HF readmissions.

**Step 3: Focus the evaluation design.** After completing the first two steps in the evaluation process, the project lead should have a clear grasp of the program and agree with stakeholders on the need for evaluation (CDC, 2011). Moving on to planning the evaluation requires deciding on the essential questions that require answers. Determining the focus of the evaluation will assist in forming an appropriate plan for evaluation. The entire program does not need evaluation at once; in fact, concentrating the evaluation on the relevant questions will produce results that are usable by the program. The logic model developed in step two can aid in determining the best evaluation focus (CDC, 2011).

A program evaluation can fall into two groups; implementation and process, or effectiveness and outcomes (CDC, 2011). This project focused the program evaluation on effectiveness and outcomes due to the desired outcome expressed by the primary CIHP stakeholders. Effectiveness and outcomes assess the progress of desired outcomes the program was implemented to address. The logic model in Appendix H maps out the short-term, intermediate, and long-term outcomes of CIHP. An implementation and process program evaluation focuses on the inputs, activities, and outputs, which are also listed in the logic model to provide a cohesive overview of CIHP. The emphasis of this project was on the intermediate outcome of reduced 30-day HF readmissions.

**Step 4: Gather credible evidence.** After steps one, two, and three are completed, the next step required is gathering evidence to evaluate the outcomes. The evidence must be credible

to give credible results (CDC, 2011). Consideration for the evidence gathered must include indicators, the source and method of collection, the quality, quantity, and logistics. The indicators are measurable statements that provide clear definitions of the evaluated program component. Data collection methods and sources then need to be collected after determining the outcomes to be measured. Ensuring quality data will produce reliable, valid, and informative results (CDC, 2011). The data collection for this project was from an existing data source, the CIHP electronic health record (EHR), and Hospital Compare. One potential problem using a secondary data source is that it is difficult to determine the quality (CDC, 2011). The quantity of data needed to answer the question depends on the measured outcome and the size of the change. Logistics and protocols address the methods, timing, and physical infrastructure involved in gathering and handling evidence (CDC, 2011)

**Step 5: Justify conclusions.** The results of the data collected in step four of the program evaluation justify the conclusions drawn from it (CDC, 2011). The evidence should support the purpose of the program evaluation as determined in step three, in this case, show the effectiveness of CIHP as a TOC program in reducing HF 30-day readmissions. This step does not just analyze the data but evaluates it against the value of the stakeholders. It is vital to apply the evidence to the outcomes desired by the stakeholders to form a complete and worthwhile program evaluation. When the conclusions are justified, the results are more likely to be used (CDC, 2011).

**Step 6: Ensure use of evaluation findings and share lessons learned.** The final step of a program evaluation is to ensure the information gleaned from the findings is used to support the original purpose of the program evaluation (CDC, 2011). For this project, the findings

demonstrated the effectiveness of CIHP in reducing 30-day HF readmissions. Disseminating the results to stakeholders will ensure they can be used to improve CIHP (CDC, 2011). An executive summary of the program evaluation and result will be provided to GRFD upon completion of this project, in addition to presentation of the results to GRFD stakeholders at a time of their choosing.

### **Setting and Stakeholders**

The project took place at GRFD in Oro Valley, Arizona. Established in 1977, GRFD covers over 241 square miles and serves approximately 120,000 residents (Oro Valley Chamber, n.d.). Golder Ranch Fire District implemented and currently runs CIHP. Heart failure is the leading diagnosis for CIHP participants (J. Hurguy, personal communication, September 3, 2019). Golder Ranch Fire District primarily serves Oro Valley, Arizona, Catalina, and Saddlebrooke, all of which are suburbs of Tucson, Arizona (GRFD, 2018).

The 30-day readmission comparison group consisted of the HF readmission rates of hospitals A and B for patient's that did not participate in CIHP. The HF 30-day readmission rates of five other Tucson area hospitals (hospitals C-G) that report HRRP data to CMS were be reported for comparison because the data was readily available.

The range of hospitals in the Tucson area varies widely and includes academic centers, privately owned, and locally owned, nonprofit hospitals that range in size from approximately 150 beds to over 600 beds (Hospitals.net, n.d.-a; Hospitals.net, n.d.-b; Northwest Healthcare, 2020a; Northwest Healthcare, 2020b; The University of Arizona Health Sciences [UAHS], n.d.; TMC Healthcare, n.d.). Tucson has a single level one trauma center, that has also achieved Magnet status. Hospitals A and B refer participants to CIHP, hospital A has 146 beds whereas

hospital B has 300 beds as well as an accredited HF program (Northwest Healthcare, 2020a; Northwest Healthcare, 2020b). Both hospital A and B are privately owned by the same company.

Engagement of stakeholders can increase the credibility of the evaluation and is essential to the project's success. Priority stakeholders are those responsible for the day-to-day management of the program, advocate for or authorize recommended changes after the evaluation, and authorize continuation or expansion of the program (CDC, 2011). Priority stakeholders were identified using the standards described in the CDC program evaluation framework above in step one.

The priority stakeholders for this project include GRFD, CIHP founder, CIHP management staff, the CP. These stakeholders have a direct interest in the success of CIHP and can make changes based on the result of this project.

Secondary stakeholders include patients, hospitals A and B, hospital nurse case managers, caregivers of the HF participants, inpatient providers referring patients to CIHP, and outpatient providers that collaborate with the CP. These secondary stakeholders have the potential to benefit from the results of this evaluation. As the effectiveness of CIHP in reducing HF 30-day readmission rates was shown, the program could expand to serve a larger population, resulting in overall better outcomes for HF patients and reduced financial burden to the healthcare system.

### **Planning the Evaluation**

The evaluation of CIHP followed the six steps of performing a program evaluation outlined above. The first step involved engaging stakeholders. The project lead scheduled meetings with various GRFD employees involved in CIHP, including the founder, the RN

educator/CIHP coordinator, and the CP. The project lead decided to complete a program evaluation after asking open-ended questions and learning about CIHP from those involved. There is buy-in for the program evaluation from key stakeholders, including the CIHP founder, the RN educator for GRFD, the EMS Deputy Chief, and the Fire Chief. Through these meetings, a comprehensive program description was developed by the project lead, thereby completing the second step. The Background section of this project details the complete program description. Demonstrating the effectiveness of CIHP was expressed as the overall need for the evaluation. Therefore, step three focused the evaluation on effectiveness and outcomes.

Step four, collecting credible evidence, began by obtaining site approval from GRFD (Appendix A) and approval of this proposal by the University of Arizona Institutional Review Board (IRB) (Appendix A). The process of secure data collection is described further in the data collection section of this proposal. Here, the source of the data is described related to the specific aims of this project.

### **Aim 1**

*Demographically describe the HF population that completed CIHP as well as participants that were readmitted to the hospital prior to program completion within the program evaluation period of July 1, 2015 to June 30, 2018.* The project lead collected CIHP HF participant data from the Zoll ® EMS Mobile Health EHR used by CIHP. The Zoll ® EMS Mobile Health EHR is specifically designed for community paramedicine programs. It allows for patient information to be easily accessible and streamlined during recurrent visits by the CP (Zoll, 2020). The information that was collected to describe HF CIHP participants included the referring hospital (A or B), age, gender, race, insurance carrier, program completion status,

comorbidities, the time from discharge to first home visit, number of visits prior to readmission (if readmitted), and the total number of visits within 30-days for program graduates. Descriptive variables for 30-day HF readmissions among CIHP participants were evaluated in an effort to identify areas for improvement, and to recognize participants at higher risk of returning to the hospital during program participation.

The percentage of Hospital A and B HF discharges that participated in CIHP from July 1, 2015, to June 30, 2018, was evaluated as well because describing the reach of CIHP is important to identify areas of improvement in the future. The data was garnered from the number of HF CIHP participants included in the sample for this project and the number of HF discharges from Hospital A and B as reported by the HRRP data during the designated time period.

## **Aim 2**

*Of the HF patients discharged from the two CHIP referring hospitals in Northwest Tucson, compare the HF 30-day readmission rate of those discharged into the CIHP program to the HF 30-day readmission rate of those discharged with usual care.* The CIHP HF participant 30-day readmission data was obtained from the Zoll ® EMS Mobile Health EHR by the project lead and de-identified. The usual care group consisted of the HF 30-day readmission rates of patients discharged from Hospitals A and B that did not participate in CIHP. Five other Tucson area hospitals that report HRRP data, Hospitals C-G, will be reported for comparison. Data to evaluate HF 30-day readmission rates of area hospitals was obtained from Hospital Compare, which is part of the CMS Hospital Quality Initiative (Medicare.gov, n.d.-b). Hospital Compare publicly reports data related to hospital quality indicators collected from CMS claims and reported by hospitals themselves. Unplanned hospital visits, including HF 30-day readmission

rates, are collected from Medicare enrollment and claims data from Medicare-certified hospitals (Medicare.gov, n.d.-c). The period of HF 30-day readmission data currently available through Hospital Compare is July 1, 2015, to June 30, 2018; therefore, it was compared to CIHP data from the same period.

The evaluation of data occurred in step five of the CDC's Program Evaluation Framework. The results were analyzed as to their credibility in addressing the aims of this project. The completion of step six will ensure the use of the evaluation findings by sharing the lessons learned with primary stakeholders. Presentation of the results to CIHP stakeholders will occur at a time of their choosing. In addition, the project lead will provide an executive summary of the evaluation and results to GRFD.

### **Study Participants**

This project's inclusion criteria was comprised of patients that participated in CIHP following hospital admission for HF between July 1, 2015, and June 30, 2018, as this is the current data collection period for the HRRP data on Hospital Compare (Medicare.gov, n.d.-d). Evaluation of CIHP readmission rates during this time frame allowed for an accurate comparison against those of area hospitals. The number of program graduates and readmissions (within 30 days of discharge) among HF participants was identified from the CIHP EHR. The 30-day time frame was chosen for an accurate comparison of CIHP participants to those receiving usual care. Thirty-day readmission rates are reported by CMS and is the measure HRRP uses to impose penalties on hospitals that do not meet standards of care (CMS, 2018). In addition, 30-days is the length of CIHP enrollment, making for an apt comparison.

Participants were excluded that did not complete the program for any reason other than readmission. Participants with inadequate information documented to evaluate completion status or readmission were also be excluded. Data from CIHP participants with primary diagnoses other than HF were not collected. No participants was contacted for this study.

### **Consent and Ethical Considerations**

University of Arizona IRB approval was obtained prior to completion of this program evaluation. The project lead obtained site approval for this project from GRFDs acting Fire Chief Tom Brandhuber (Appendix A). A Business Associate Agreement (BAA) was completed between GRFD and the University of Arizona in compliance with the Health Insurance Portability and Accountability Act requirements for accessing protected health information (Appendix B). All data was de-identified upon collection by the project lead. Additionally, the project lead completed the Collaborative Institutional Training Initiative (CITI) training in order to maintain and respect the ethical principles of this retrospective review of EHR data.

In accordance with the ethical considerations presented in The Belmont Report, the ethical principles of respect for persons, beneficence, and justice were maintained throughout this project (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research [NCPHS], 1979). Respect for persons was maintained as all patient information collected during the investigation was de-identified. Beneficence refers to doing no harm and applies to both the project lead and society as a whole (NCPHS, 1979). This project ensured beneficence was respected as there was no intervention, de-identified data was used, and no contact with participants occurred. Given the study design, there was very minimal risk for harm to the participants. In addition, the study result can be used to promote TOC programs and

bring TOC services to more people that would benefit. Justice signifies equal or fair distribution (NCPHS, 1979). Justice was maintained during this project by including all HF participants that met this project's inclusion criteria as discussed above, and all data was treated equally. The exclusion of qualified participants for reason other than those described above did not occur as it would have amounted to injustice on the part of the project lead.

### **Timeline**

The timeline for project implementation is described in Appendix D. The timeline included the project proposal defense and IRB application submission in July 2020. IRB approval was obtained in August 2020. The BAA was approved in October 2020 and data collection occurred shortly thereafter. The evaluation of the data was also completed October 2020. The final project defense is scheduled for November 17, 2020. Presentation of the results to primary CIHP stakeholders will occur upon at GRFD's discretion.

### **Data Collection**

All data collected by the project lead from the Zoll ® EMS Mobile Health EHR was de-identified and organized into Microsoft Excel, which was secured by password protection on a dedicated USB drive that was also password protected and encrypted. The USB drive is stored in a locked filing cabinet in the project lead's home. No one other than the project lead has access to the USB drive.

The HF 30-day readmission data for hospitals A-G was collected from the HRRP information reported on Hospital Compare (Data.Medicare.gov, 2020). This claims data is reported by CMS and is available for public use. The HRRP data was downloaded from Hospital

Compare into Microsoft Excel and placed on the same password protected and encrypted USB drive as the EHR data for ease of reference.

## **Data Analysis**

### **Aim 1**

*Demographically describe the HF population that has participated in CIHP as well as participants that were readmitted to the hospital prior to program completion within the program evaluation period of July 1, 2015, to June 30, 2018.* The data that was collected by the project lead to describe the CIHP HF population included the referring hospital (A or B), age, gender, race, insurance carrier, program completion status (readmission or graduation), comorbidities, time from hospital discharge to the first home visit, number of visits prior to readmission (if readmitted), the total number of visits within 30 days (for program graduates), and the percent of Hospital A and B discharges referred to CIHP. This descriptive data was both categorical and discrete. Referring hospital, age groups, gender, race, insurance carrier, program completion, comorbidities, and the number of discharges referred to CIHP are categorical data. The categorical data was reported in frequencies and relative frequencies. The number of referrals to CIHP from Hospitals A and B were represented on pie charts. The time to first home visit, and the total number of visits within 30 days (for program graduates) are discrete variables. The reporting of these variables will be reported as a minimum, median, maximum, and represented on box-and-whisker plots. The number of visits prior to readmission (if readmitted) represented one participant, therefore it could not be graphically depicted. This data point was discussed in the narrative of the Results section below.

**Aim 2**

*Of the HF patients discharged from the two referring hospitals in Northwest Tucson, compare the HF 30-day readmission rate of those discharged into the CIHP program to the HF 30-day readmission rate of those discharged with usual care.* The CIHP HF 30-day readmission data is considered categorical and, as such, was reported in frequencies and relative frequencies. The readmission rates of hospitals A-G was also be reported as relative frequencies and displayed in a bar chart with the CIHP HF readmission rate as well. The data lent itself to performance of two-sample t-tests between proportions to determine the statistical significance in the difference in readmissions between CIHP participants and those receiving usual care.

**Resources and Budget**

The was no budget required for this project. The project lead collected and evaluate all data that was required for project completion.

**RESULTS****Outcomes**

Participant data was collected from the CIHP EHR database, Zoll ® EMS Mobile Health EHR. Patients were filtered by the primary diagnosis of congestive heart failure and participation dates from July 1, 2015, to June 30, 2018. Of these participants, 27 met the stated inclusion criteria for this project. Patient data was de-identified upon collection by the project lead. The results will be discussed in relation to this project's aims.

**Aim 1**

*Demographically describe the HF population that has participated in CIHP as well as participants that were readmitted to the hospital prior to program completion within the*

*program evaluation period of July 1, 2015, to June 30, 2018.* The demographic data for the participants meeting inclusion criteria is represented in tables 1 and 2; 14 males (52%), 13 females (48%), age range 68-94, mean age 81.7 years  $\pm$  2.846. The race for each participant included in this data analysis was listed as white; ethnicity was not included in the documentation reviewed. All patients were covered by Medicare; 17 participants had primary Medicare, 10 had a Medicare Advantage Plan.

**Table 1**

*CIHP Demographics*

Female	(N= 13) 48%
Male	(N= 14) 52%
Total	27
Medicare Primary	(N= 17) 63%
Medicare Advantage Plan	(N=10) 37%

**Table 2**

*CIHP Sample by Age*

Age Group	N	Male	Female
60-69	(N= 2) 7.40%	(N= 1) 50%	(N= 1) 50%
70-79	(N= 9) 33.30%	(N= 6) 66.7%	(N= 3) 33.3%
80-89	(N= 10) 37.00%	(N= 6) 60%	(N= 4) 40%
90-99	(N= 6) 22.20%	(N= 2) 33.3%	(N= 4) 66.7%

*Age range 68-94; Mean Age 81.7  $\pm$  2.846*

CIHP referrals from two hospitals were examined, denoted as Hospital A and B. Twenty-three patients were referred from Hospital A and four patients were referred from Hospital B. The referral numbers represent 7.1% and 1.3% of the total HF discharges from Hospitals A and B respectively (Figures 1 and 2).

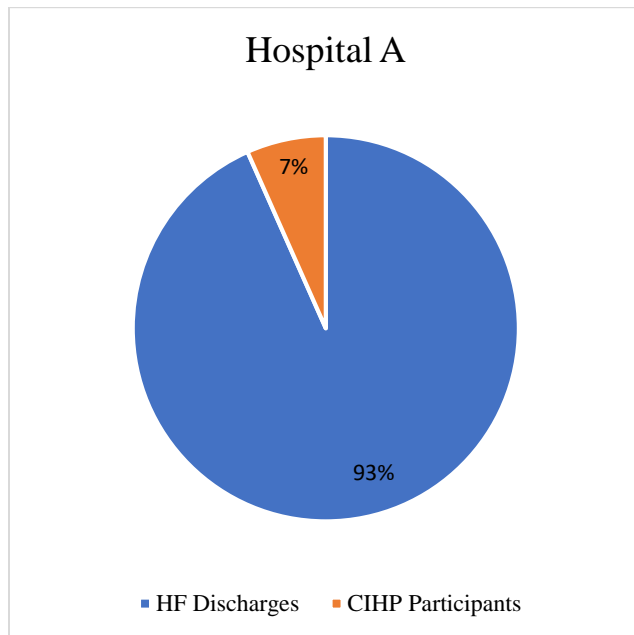
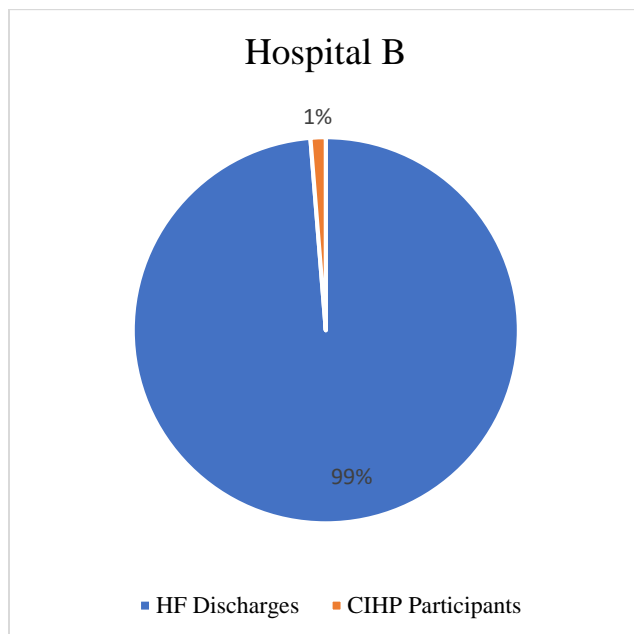
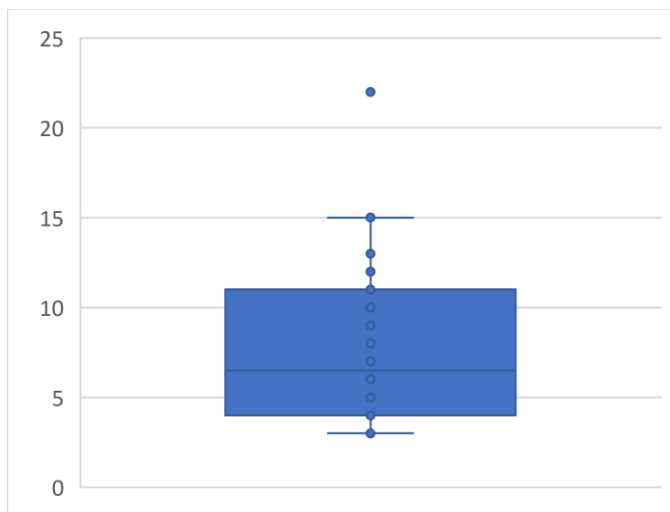
**Figure 1***Hospital A CIHP Referral Rate***Figure 2***Hospital B CIHP Referral Rate*

Figure 3 represents the time from discharge to the CP's initial home visit (measured in days). There was a considerable variation in the time to initial visit (3-22 days, median 6.5).

Figure 4 represents the number of visits by the CP for CIHP graduates (3-8 visits, median 5).

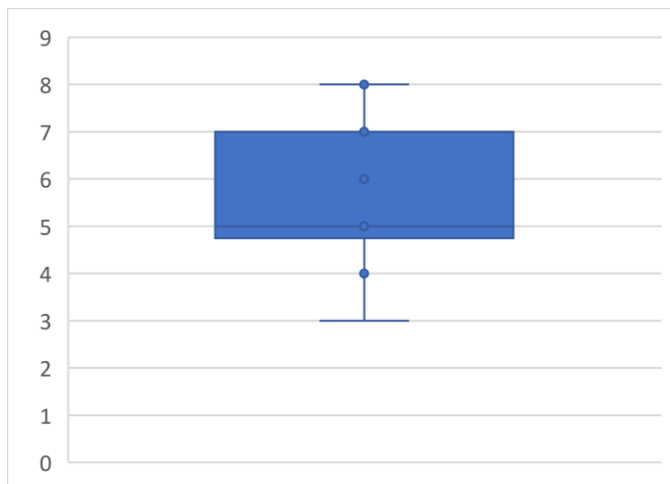
### Figure 3

*Days from Discharge to Initial Home Visit*



### Figure 4

*Total Number of Visits for CIHP Graduates*



Of the 27 participants that met inclusion criteria, 26 patients completed CIHP, and one patient was readmitted. The only readmission among the CIHP sample was an 80-year-old female. She was readmitted prior to the initial CP appointment, which was scheduled eight days after her initial discharge. The participant did successfully complete the program following her second discharge from the hospital.

The most common comorbidities among participants were hypertension (80.8%), hyperlipidemia (69.2%), and former tobacco use (65.4%). Table 3 lists the incidence of comorbidities among participants. The number of comorbidities per participant ranged from 1-7. The median number of comorbidities was 4.

**Table 3**

*CIHP Comorbidities*

Comorbidity	%	Count
Type II Diabetes Mellitus	30.80%	8
Hypertension	80.80%	21
Hyperlipidemia	69.20%	18
Coronary Artery Disease	46.20%	12
Atrial Fibrillation	26.90%	7
Pacemaker/AICD	30.80%	8
Former Smoker	65.40%	17
Chronic Obstructive Pulmonary Disease	19.20%	5
Chronic Kidney Disease	23.10%	6

**Aim 2**

*Of the HF patients discharged from the two referring hospitals in Northwest Tucson, compare the HF 30-day readmission rate of those discharged into the CIHP program to the HF 30-day readmission rate of those discharged with usual care. There was one readmission among the CIHP sample resulting in a readmission rate of 3.7%. Hospital A had a readmission rate of*

20.4%, and Hospital B had a readmission rate of 16.8%. The CIHP participants were compared to their respective referring hospitals. The only readmission was referred from Hospital A. A two-sample t-test between proportions was performed between the hospital and CIHP readmissions. The null hypothesis states there is no significant improvement in HF readmission with participation in CIHP. A p value of less than 0.05 indicates the observed outcome is unlikely to occur under the null hypothesis, and the result is statistically significant. There was not a statistically significant difference in the readmission rate of Hospital A, and the CIHP participants referred from Hospital A ( $p= 0.05876$ ). Similarly, there was not a statistically significant difference in the readmissions of Hospital B and CIHP participants referred from Hospital B ( $p= 0.36812$ ). When the total readmissions of Hospitals A and B are compared to the total CIHP sample, there is a significant improvement in readmissions among CIHP participants ( $p= 0.0477$ ).

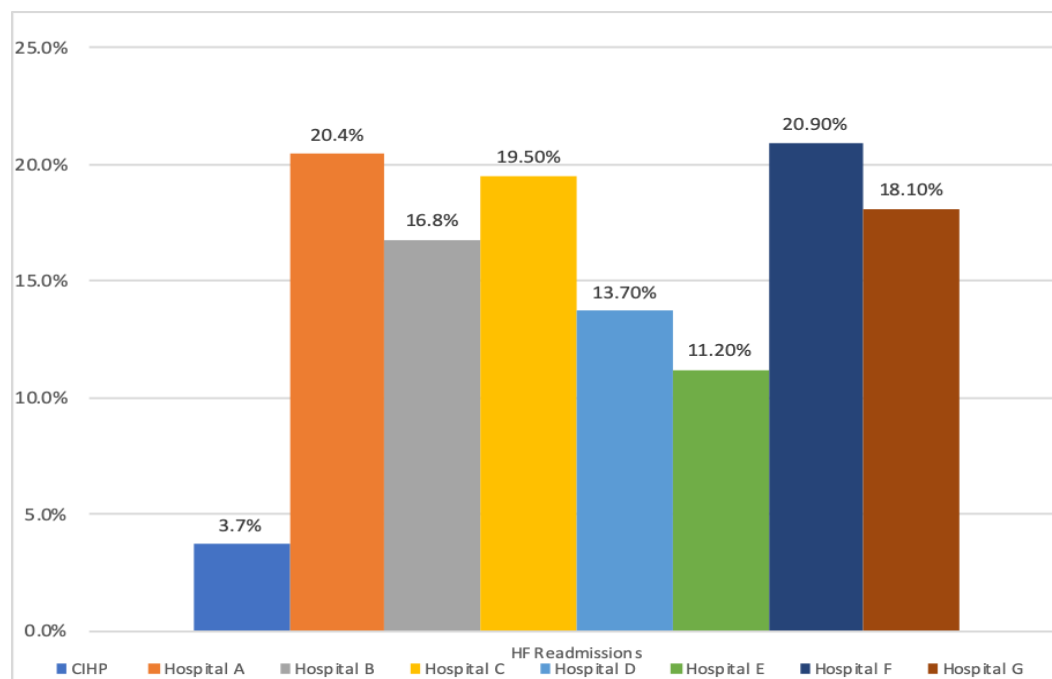
**Table 4**

*Usual Care Readmissions vs. CIHP Readmissions*

Referring Hospital	HF Discharges	HF Readmissions	CIHP Participants	CIHP Readmissions	p value
Hospital A	N=323	N= 66	N= 23	N= 1	0.05876
Hospital B	N=310	N= 52	N= 4	N= 0	0.36812
<b>Total</b>	N=633	N= 118	N= 27	N= 1	0.0477*

\*CIHP readmissions vs. total readmissions  $P < 0.05$

Figure 5 shows the readmission rates among Tucson area hospitals. Area hospital readmission rates were calculated using the HF discharges and readmissions reported by CMS. Hospital E had the lowest HF readmission rate at 11.2%, while Hospital F had the highest readmission rate at 20.9%. As previously stated, the readmission rate for the hospitals referring to CIHP was 20.4% (Hospital A) and 16.8% (Hospital B).

**Figure 5***CIHP and Tucson Area Hospital Readmission Rates*

## DISCUSSION

### Overall Project Purpose and Key Findings

The purpose of this project was to evaluate CIHP as an established TOC program and determine its effectiveness in reducing HF 30-day readmissions. Heart failure readmissions in Tucson, as in the rest of the US, remain high. The incidence of HF is only expected to grow, giving little hope of improving the average 30-day readmission rate of 21.9% unless the care of these patients is revolutionized (Benjamin et al., 2019; Naylor et al., 2004). The data on the effectiveness of TOC programs for HF is scattered, but certainly promising, suggesting that increased surveillance and healthcare team collaboration can improve the management of HF patients and keep them from returning to the hospital (Kansagara et al., 2016; Yancy et al.,

2013). Due to the high cost of HF treatment and the penalties imposed by CMS for excessive HF 30-day readmission, it is imperative to find a solution for effective HF management. The Community Integrated Healthcare Program is an innovative model that allows for close monitoring of HF patients following discharge from the hospital and has the opportunity to improve inter-professional communication among medical providers.

The study design was a quantitative, retrospective review of HF CIHP participants within a program evaluation framework. Participant demographic data and program completion status for Aims one and two were collected from the Zoll ® EMS Mobile Health EHR. The data collected was analyzed using standard statistical methods such as frequencies, relative frequencies, median, and hypothesis testing.

The project question asked whether CIHP, compared to usual care, improved 30-day readmissions in patients hospitalized with HF. This project's results described the demographics of CIHP participants and indicate that CIHP is effective in reducing HF readmissions. This study's findings are encouraging and bring us one step closer to better care for HF patients.

### **Discussion of Results According to Project Aims**

#### **Aim 1**

The patient demographic data was expected for this population. A majority of patients were in the seventh or eighth decade of life. The CIHP population is primarily covered by Medicare which is an essential consideration for the future as there has been interest in obtaining insurance reimbursement for CIHP services in the future. It was a pleasant surprise to have a nearly even split of male (N= 14) and female (N= 13) patients in the CIHP sample, making the results relevant for participants of both genders. Documentation was reviewed for each

participant, and for each one, their race was listed as white. The ethnicity was not reported. This lack of diversity is unfortunate for the relevance of this project's results to non-white patients that could benefit from participation in CIHP. This was a clear limitation to collecting secondary data as the accuracy of the listed race cannot be verified and the ethnicity was not available.

The referral rate for hospitals A (7.1%) and B (1.3%) are underestimated. There were patients that were referred to CIHP but did not participate or complete the program for reasons other than readmission. These patients were not included in the analysis because they did not meet the project's inclusion criteria. Additionally, Hospital B did not begin participating in CIHP until 2017, which is a likely contributor to their low referral rate. The project lead evaluated HF discharges from July 1, 2015, to June 30, 2018.

When evaluating the time from hospital discharge to the CP's initial home visit, it was surprising to find the median was 6.5 days. This time frame does still comply with the recommendations made by the 2013 ACCF/AHA Guideline for the Management of Heart Failure to follow-up within 7-14 days of discharge. However, the goal of CIHP is to see patients within 48-72 hours following discharge. The time from hospital discharge to the first home visit is identified as an area to evaluate further. Interestingly, the one admission that occurred within the CIHP sample had the initial visit scheduled for eight days after discharge. The patient was readmitted before this appointment.

The number of visits completed by CIHP graduates was also not expected. The goal is for the CP to complete a minimum of six visits within 30-days for CIHP participants, with the freedom to add visits as necessary. The minimum number of visits was 3, the median number of visits was 5, and the maximum number of visits was 8. The goal of six visits during CIHP

enrollment may be a point to reconsider, as the sample for this project generally did well at fewer visits. If fewer than six visits are effective, this program goal could be reevaluated to assist in reducing the operation costs of the program. Of course, the freedom to complete more visits as necessary is thought to be a key feature to the success of CIHP.

The incidence of hypertension (80.8%) and hyperlipidemia (69.2%) among the CIHP sample was expected. It was surprising to find that the incidence of coronary artery disease was only 46.2%. Participant comorbidities are likely underestimated due to the inherent uncertainty of secondary data collection. The number of comorbidities among CIHP HF participants was expected. The median number of comorbidities was 4. It has been shown that patients with more comorbidities have a higher rate of complications (Naylor et al., 2004). It is necessary to consider that CIHP participants with a higher number of comorbidities may need increased visits.

## **Aim 2**

Overall, the project lead was disappointed to find only 27 participants who met the project's inclusion criteria. However, the sample size was still able to yield significant results. There was not a significant difference when comparing hospital readmissions to their respective CIHP referral readmissions, which is likely due to the low CIHP sample size. Also, as discussed earlier, Hospital B did not participate in CIHP until 2017. When the total readmissions of CIHP referring hospitals were compared to the entire CIHP sample, a significant difference was found ( $p= 0.0477$ ). Showing a significant improvement in HF readmissions with CIHP participation is encouraging. Golder Ranch Fire District implemented CIHP in 2014. Since that time, several refinements have taken place to aid in the efficacy and efficiency of the program as well as personnel changes. The CIHP process has been polished since implementation, and there has

likely been improvement in patient outcomes following the timeframe for this project. A prospect look at CIHP outcomes would likely yield even more favorable results.

An important consideration when discussing the results of this program evaluation is that the statistically non-significant results do not imply the result is not impactful. Regardless of the statistical analysis, it is vital to keep the human impact of these outcomes in perspective. Every readmission that is prevented is a person who is spared the complications, mental anguish, and cost of another hospitalization. Each prevented readmission is a success for CIHP regardless of the statistical significance.

According to CMS, most Tucson area hospitals have HF readmission rates similar to the national HF readmission rate (21.9%). The high HF readmission rates in Tucson present an opportunity for improvement. The positive outcomes resulting from CIHP participation can be used as an example of a successful model to improve HF readmissions throughout the city.

### **Implications**

#### **Practice**

The most exciting practice implication from this study is the potential for integration of a DNP into TOC programs. Nurse practitioner run TOC programs represent a relatively new role in the profession. Dr. Naylor has used advanced practice nurses in TOC programs with extraordinarily successful results (Naylor et al., 2004; Naylor et al., 2017; Naylor & Keating, 2008). However, the project author is currently unaware of DNP involvement in any paramedicine TOC programs. This project presents the opportunity to integrate a DNP into the CIHP structure, creating a brand-new role in the field. The DNP can use their knowledge as

practitioners and researchers to bridge the research-to-practice gap and bring evidence-based research to TOC (Dracup et al., 2005).

### **Education**

Projects such as this raise awareness of the need for TOC programs, particularly for HF patients. Continued emphasis on healthcare innovation and collaborative care in DNP education is essential to promoting TOC programs. In challenging the traditional model of healthcare, DNPs can pave the way for innovation. The author's hope is that this project's results will continue to foster the need for change in the care of HF patients. Transition of care programs like CIHP are paving the way to reduced HF 30-day readmissions and improving HF patients' quality of life.

### **Research**

The literature regarding TOC programs is exceptionally varied. This is related to the diverse needs in each community and the mixed structures of the TOC programs evaluated. Further research should be done to determine the feasibility of scaling up CIHP and the CIHP model's applicability in other populations. As discussed earlier, the reliability of secondary data collection is not always certain, which can reduce the validity of the results. A prospective review of CIHP could certainly verify the findings in this study.

### **Policy**

Medicare covered all CIHP participants in the project sample. Currently, CMS does allow billing for TOC services, implying that the value of TOC programs is recognized at the national level. Through discussions with CIHP stakeholders, the principal investigator discovered the desire to eventually structure CIHP to submit for insurance reimbursement of TOC services. The

Center for Medicare and Medicaid Services requires qualified medical practitioners to oversee TOC services in order to bill for them. This is an area where a nurse practitioner can add significant value to the CIHP structure. Doctor of Nursing Practice education emphasizes inter-professional collaboration, which would be an asset to any TOC program. This change is at least a couple of years away; however, this study's results can help promote growth and expansion of CIHP, including obtaining reimbursement for their services.

### **Limitations**

Given the scope of this project, there were limitations. A program evaluation by nature is intended to apply to the population being assessed. This project design is not generalizable research and cannot be applied to other geographic areas or populations. Secondary data collection was another limitation of this study. The project lead could not confirm the reliability of the documentation. Inconsistent documentation made it difficult to assess participant eligibility for inclusion in this project. Program status is a searchable field within the Zoll ® EMS Mobile Health EHR. Several participants did not have their completion status updated to graduated after they completed the program, which created difficulty during data collection. The project lead did a chart review for each patient within the project timeframe to assess eligibility and form an inclusive sample.

### **Project Findings Applied to DNP Essentials**

This project integrates all eight Doctor of Nursing Practice (DNP) Essentials (I-VIII). The effectiveness of a TOC program (CIHP) in reducing HF 30-day readmissions was evaluated (DNP Essential I) within the context of the CDCs framework for program evaluation and Dr. Meleis' Transition Theory (DNP Essential II). Collecting data to evaluate the effectiveness of

CIHP as a TOC program focuses on areas of success as well as areas for improvement, giving the opportunity to expand TOC for HF patients in Tucson (DNP Essential's III, IV, and VII) Focusing on reducing readmissions will, in turn, reduce the financial burden of HF readmissions on the national healthcare system (DNP Essential V). This project highlights the importance of inter-professional collaboration between healthcare providers from the hospital to outpatient offices and services to ensure a successful TOC for HF patients (DNP Essential VI). This project evaluated the positive impacts of a unique TOC program on HF patients and can be used to guide the design of a DNP lead TOC program (DNP Essential VIII).

## **Conclusions**

### **Plan for Sustainability**

The results of this program evaluation can be used to guide further improvements in CIHP. There are multiple areas where the results of this project can be used. This study shows that CIHPs TOC model is effective at reducing HF readmissions. It can serve as the justification for expansion of CIHP. As discussed above, the integration of a DNP in the CIHP structure can aid in obtaining insurance reimbursement for TOC services.

Additionally, the findings regarding days from discharge to the initial visit and the total number of visits are an area that is generally not meeting overall CIHP goals. This is an area for CIHP personnel to evaluate. Changes can be made to meet these goals, or the goals can be reevaluated.

### **Plan for Dissemination**

The results of this program evaluation will be given to GRFD and CIHP stakeholders. The author will attempt to plan a presentation of the results for CIHP stakeholders. However, organizing a presentation may prove difficult considering the ongoing Covid-19 pandemic.

Significant gaps remain in TOC research. The transition from the hospital to home is often unorganized and confusing due to our healthcare system's complexity, creating a significant risk for complications and readmissions. Preventing readmission for HF patients can improve their outcomes and quality of life. Furthering the study of TOC programs is essential to improve the care and outcomes of the HF population. The goal of this study was to perform a program evaluation of CIHP as a TOC program to prevent HF 30-day readmissions. This study's results were able to describe the CIHP population and found a significant improvement in HF 30-day readmissions with participation in CIHP. The study design's most significant limitation was its retrospective nature and the need for secondary data collection. Even so, the results of this study were able to show the positive impact of CIHP and the potential growth of the program. The project author hopes that GRFD will take the results of this program evaluation and feel encouraged about the noble work they are doing for the HF population and all CIHP participants.

### **Funding**

The project lead did not receive funding for this project.

APPENDIX A:

GOLDER RANCH FIRE DISTRICT SITE APPROVAL / THE UNIVERSITY OF ARIZONA

INSTITUTIONAL REVIEW BOARD DETERMINATION LETTER



## **GOLDER RANCH FIRE DISTRICT**

*www.grfdaz.gov*

July 9, 2020

University of Arizona Institutional Review Board  
c/o Office of Human Subjects  
1618 E Helen St  
Tucson, AZ 85721

To Whom It May Concern,

Please note that Mrs. Jennifer Ward, UA Doctor of Nursing Practice student, has permission of the Golder Ranch Fire District to conduct a program evaluation at our facility for her DNP project entitled, "Does Participation in the Community Integrated Healthcare Program Reduce Heart Failure Readmissions?"

Mrs. Ward will conduct an evaluation of the Community Integrated Healthcare Program heart failure participants. She is authorized to access the Zoll ® EMS Mobile Health records of past heart failure participants. Mrs. Ward has agreed to provide to my office a copy of the University of Arizona IRB Determination and will sign a Business Associate Agreement prior to accessing the Zoll ® EMS Mobile Health application and collecting any information. All patient information collected will be de-identified.

Mrs. Ward's activities will be completed by December 17, 2020. She will present the final results of the program evaluation to CIHP stakeholders at a time of their choosing.

If there are any questions, please contact my office.

Respectfully,

A handwritten signature in blue ink, appearing to read "Tom Brandhuber", with a long, sweeping flourish extending to the right.

Tom Brandhuber  
Acting Fire Chief  
Golder Ranch Fire District


 Human Subjects  
 Protection Program

 1618 E. Helen St.  
 P.O. Box 245137  
 Tucson, AZ 85724-5137  
 Tel: (520) 626-6721  
<http://hgw.arizona.edu/compliance/home>

**Date:** September 01, 2020

**Principal Investigator:** Jennifer Lynn Ward

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**Protocol Number:** 2007839203

**Protocol Title:** Does Participation in the Community Integrated Healthcare Program Reduce Heart Failure Readmissions?

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**Determination:** Human Subjects Review not Required

**Documents Reviewed Concurrently:**

**H SPP Forms/Correspondence:** *Ward\_DHR 8\_26\_2020 revision.pdf*

**Other Approvals and Authorizations:** *ward\_site\_auth\_signed.pdf*

**Regulatory Determination/Comments:**

- Not Research as defined by 45 CFR 46.102(l): As presented, the activities described above do not meet the definition of research cited in the regulations issued by U.S. Department of Health and Human Services which state that "Research means a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge. Activities that meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program that is considered research for other purposes. For example, some demonstration and service programs may include research activities. For purposes of this part, the following activities are deemed not to be research."

The project listed above does not require oversight by the University of Arizona.

If the nature of the project changes, submit a new determination form to the Human Subjects Protection Program (HSPP) for reassessment. Changes include addition of research with children, specimen collection, participant observation, prospective collection of data when the study was previously retrospective in nature, and broadening the scope or nature of the study activity. Please contact the HSPP to consult on whether the proposed changes need further review.

The University of Arizona maintains a Federalwide Assurance with the Office for Human Research Protections (FWA #00004218).

APPENDIX B:  
CONSENT DOCUMENT (GOLDER RANCH FIRE DISTRICT BUSINESS ASSOCIATE  
AGREEMENT)

**GOLDER RANCH FIRE DISTRICT  
BUSINESS ASSOCIATE AGREEMENT**

This Privacy Agreement ("Agreement") is effective upon the last authorized signature below ("Effective Date") and is entered into by and between Golder Ranch Fire District ("Covered Entity") and **the Arizona Board of Regents on Behalf of the University of Arizona** (the "Business Associate").

1. **Term.** This Agreement shall remain in effect for the duration of the Services (as defined here) and shall apply to the services provided by the Business Associate pursuant to this Agreement as outlined in Exhibit A ("Services").
2. **HIPAA Assurances.** In the event Business Associate creates, receives, maintains, or otherwise is exposed to personally identifiable or aggregate patient or other medical information defined as Protected Health Information ("PHI") in the Health Insurance Portability and Accountability Act of 1996 or its relevant regulations ("HIPAA") and otherwise meets the definition of Business Associate as defined in the HIPAA Privacy Standards (45 CFR Parts 160 and 164), Business Associate shall:
  - (a) Recognize that HITECH (the Health Information Technology for Economic and Clinical Health Act of 2009) and the regulations thereunder (including 45 C.F.R. Sections 164.308, 164.310, 164.312, and 164.316), apply to a business associate of a covered entity in the same manner that such sections apply to the covered entity;
  - (b) Not use or further disclose the PHI, except as permitted by law;
  - (c) Not use or further disclose the PHI in a manner that had the Golder Ranch Fire District done so, would violate the requirements of HIPAA;
  - (d) Use appropriate safeguards (including implementing administrative, physical, and technical safeguards for electronic PHI) to protect the confidentiality, integrity, and availability of and to prevent the use or disclosure of the PHI other than as provided for by this Agreement;
  - (e) Comply with each applicable requirements of 45 C.F.R. Part 162 if the Business Associate conducts Standard Transactions for or on behalf of the Covered Entity;
  - (f) Report promptly to Golder Ranch Fire District any security incident or other use or disclosure of PHI not provided for by this Agreement of which Business Associate becomes aware;
  - (g) Ensure that any subcontractors or agents who receive or are exposed to PHI (whether in electronic or other format) are explained the Business Associate obligations under this paragraph and agree to the same restrictions and conditions;
  - (h) Make available PHI in accordance with the individual's rights as required under the HIPAA regulations;
  - (i) Account for PHI disclosures for up to the past six (6) years as requested by Covered Entity, which shall include: (i) dates of disclosure, (ii) names of the entities or persons who received the PHI, (iii) a brief description of the PHI disclosed, and (iv) a brief statement of the purpose and basis of such disclosure;
  - (j) Make its internal practices, books, and records that relate to the use and disclosure of


PHI available to the U.S. Secretary of Health and Human Services for purposes of determining Customer's compliance with HIPAA; and

- (k) Incorporate any amendments or corrections to PHI when notified by Customer or enter into a Business Associate Agreement or other necessary Agreements to comply with HIPAA.

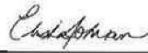
3. **Termination Upon Breach of Provisions.** Notwithstanding any other provision of this Agreement, Covered Entity may immediately terminate this Agreement if it determines that Business Associate breaches any term in this Agreement. Alternatively, Covered Entity may give written notice to Business Associate in the event of a breach and give Business Associate five (5) business days to cure such breach. Covered Entity shall also have the option to immediately stop all further disclosures of PHI to Business Associate if Covered Entity reasonably determines that Business Associate has breached its obligations under this Agreement. In the event that termination of this Agreement and the Agreement is not feasible, Business Associate hereby acknowledges that the Covered Entity shall be required to report the breach to the Secretary of the U.S. Department of Health and Human Services, notwithstanding any other provision of this Agreement or Agreement to the contrary. Business Associate may terminate this Agreement with thirty (30) days written notice to the Covered Entity.
4. **Return or Destruction of Protected Health Information upon Termination.** Upon the termination of this Agreement, unless otherwise directed by Covered Entity, Business Associate shall either return or destroy all PHI received from the Covered Entity or created or received by Business Associate on behalf of the Covered Entity in which Business Associate maintains in any form. Business Associate shall not retain any copies of such PHI. Notwithstanding the foregoing, in the event that Business Associate determines that returning or destroying the Protected Health Information is infeasible upon termination of this Agreement, Business Associate shall provide to Covered Entity notification of the condition that makes return or destruction infeasible. To the extent that it is not feasible for Business Associate to return or destroy such PHI, the terms and provisions of this Agreement shall survive such termination or expiration and such PHI shall be used or disclosed solely as permitted by law for so long as Business Associate maintains such Protected Health Information.
5. **No Third Party Beneficiaries.** The parties agree that the terms of this Agreement shall apply only to themselves and are not for the benefit of any third party beneficiaries.
6. **De-Identified Data.** Notwithstanding the provisions of this Agreement, Business Associate and its subcontractors may disclose non-personally identifiable information provided that the disclosed information does not include a key or other mechanism that would enable the information to be identified.
7. **Amendment.** Business Associate and Covered Entity agree to amend this Agreement to the extent necessary to allow either party to comply with the Privacy Standards, the Standards for Electronic Transactions, the Security Standards, or other relevant state or federal laws or regulations created or amended to protect the privacy of patient information. All such amendments shall be made in a writing signed by both parties.
8. **Interpretation.** Any ambiguity in this Agreement shall be resolved in favor of a meaning that permits Covered Entity to comply with the then most current version of HIPAA and the HIPAA privacy regulations.

- 9. All parties contracting with the University of Arizona agree to adhere to applicable state and federal rules governing equal employment opportunity, non-discrimination and immigration.
- 10. Additionally, all agreements with the University of Arizona are subject to the conflict of interest provisions of A.R.S. 38-511, and the State of Arizona may cancel an agreement if any person significantly involved in negotiating, drafting, securing or obtaining an agreement for or on behalf of the Arizona Board of Regents becomes an employee in any capacity of the other party or a consultant to the other party with reference to the subject matter of the Agreement while the Agreement or any extension hereof is in effect.
- 11. The Parties hereby acknowledge that this Agreement may be subject to arbitration in accordance with applicable law and court rules.
- 12. When fully executed, this Agreement itself cannot be Confidential Information per the Arizona Public Records Law, Arizona Revised Statutes 39-121 and 41-1350.
- 13. **Definitions.** Capitalized terms used in this Agreement shall have the meanings assigned to them as outlined in HIPAA and its related regulations.
- 14. **Survival.** The obligations imposed by this Agreement shall survive any expiration or termination of this Agreement.

**Golder Ranch Fire District**

Sign:   
 Name: Randy Lorrer  
 Title: Fire Chief  
 Date: 10/8/20

**The Arizona Board of Regents on Behalf of the University of Arizona :**

Sign:   
 Name: Elisha Johnson, JD  
 Title: Director, Clinical Trials and Contracting  
 Date: October 2, 2020

Return to: **Golder Ranch Fire District, 3885 E. Golder Ranch Drive, Tucson, AZ 85739**



## **GOLDER RANCH FIRE DISTRICT**

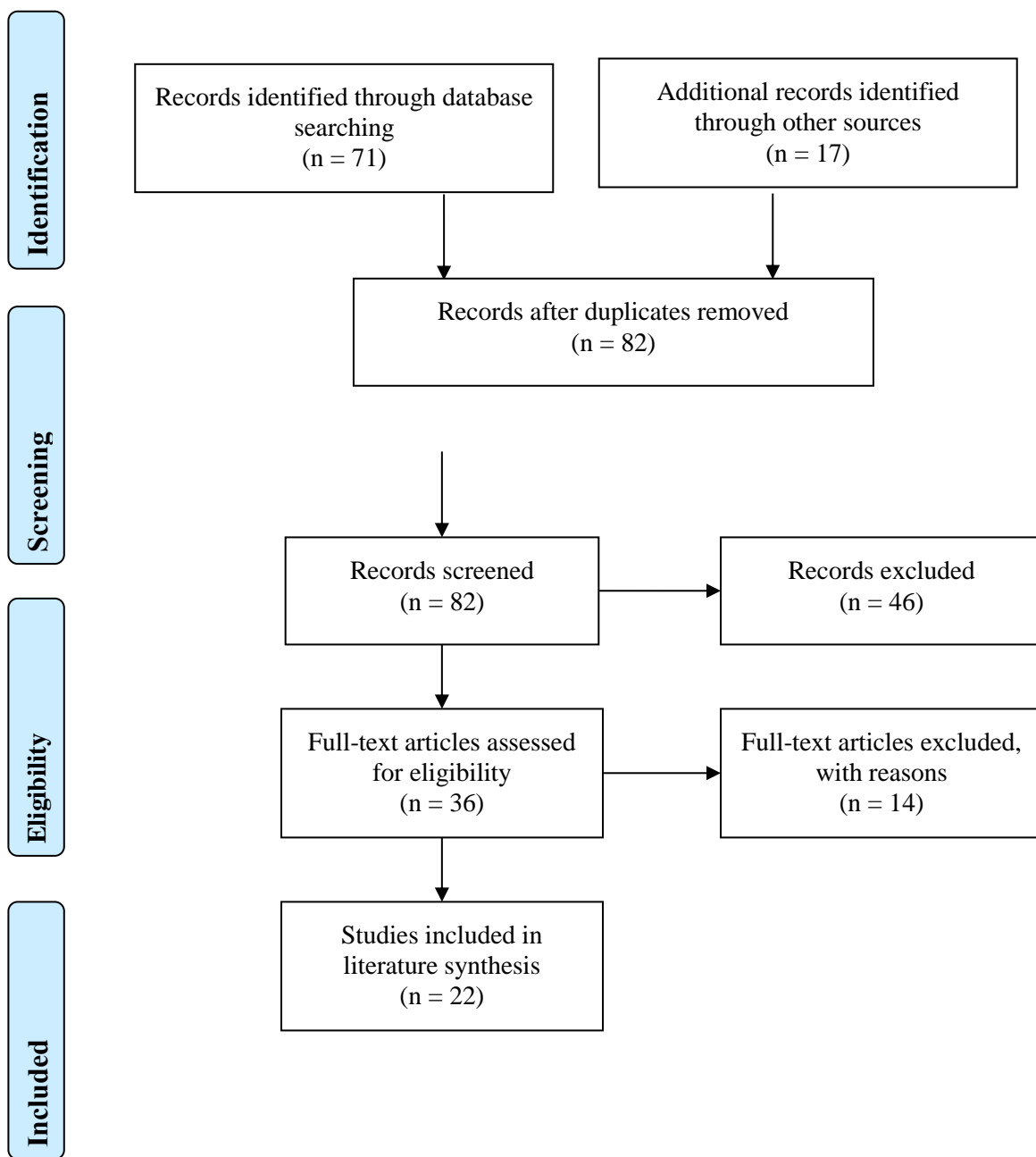
*www.grfdaz.gov*

### **Exhibit A Services**

A program evaluation of the Community Integrated Healthcare Program will be performed by Jennifer Ward, the project lead. The outcomes for heart failure (HF) participants will be specifically evaluated for the purposes of this project. The project lead will collect CIHP HF participant data from the Zoll<sup>®</sup> EMS Mobile Health EHR used by CIHP. The information that will be collected to describe HF CIHP participants will include the referring hospital (A or B), age, gender, race, insurance carrier, program completion status, comorbidities, the time from discharge to first home visit, number of visits prior to readmission (if readmitted before 30-days), and the total number of visits within 30-days for program completers. All data will be obtained from the Zoll<sup>®</sup> EMS Mobile Health EHR by the project lead and de-identified upon collection. This data will be analyzed and compared to the HF readmission rates of area hospitals which are obtained from Medicare's publicly available database.

Services shall be complete upon the presentation of the program evaluation to the Golder Rancher Fire District and CIHP stakeholders.

APPENDIX C:  
ARTICLE SELECTION FLOW DIAGRAM



Adapted from (PRISMA, 2015)

APPENDIX D:  
TIMELINE FOR PROJECT IMPLEMENTATION

<b>Completion Date</b>	<b>Planning</b>	<b>Pre-Implementation</b>	<b>Implementation</b>	<b>Evaluation</b>
<b>September 2019</b>	Meet with key stakeholder to obtain support for program evaluation			
<b>July 2020</b>		Proposal defense		
<b>July 2020</b>		Complete and submit IRB application following approved proposal		
<b>October 2020</b>		IRB approval		
<b>October 2020</b>			Collect data from CIHP EHR	
<b>October 2020</b>				Evaluate data
<b>December 2020</b>				Present findings to CIHP stakeholders

APPENDIX E:  
LITERATURE REVIEW GRID

Project Question: In patients hospitalized with HF, how does participation in GRFDs Community Integrated Healthcare Program, compared to traditional follow up, affect hospital readmissions within 30 days?

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2016 Albert, N.M.	A systematic review of transitional-care strategies to reduce rehospitalization in patients with heart failure	Qualitative literature review	<p>Systematic review of transitional care interventions</p> <p>Highly heterogeneous interventions</p> <p>Bundled approaches were more successful in reducing readmissions, emergency visits, and increasing quality of life, post discharge follow up and cost savings.</p> <p>Themes identified:</p> <ol style="list-style-type: none"> <li>1. planning for discharge</li> <li>2. multi-professional teamwork, communication and collaboration</li> <li>3. timely clear and organized information</li> <li>4. medication reconciliation and adherence</li> <li>5. engaging social and community support groups</li> <li>6. monitoring and managing signs and symptoms after discharge and delivering patient education</li> <li>7. Outpatient follow-up</li> <li>8. Advanced-care planning and palliative and end-of-life care</li> </ol>	<p>Review of 24 different transitional care interventions.</p> <p>Themes identified for successful TOC programs</p>
2015 Albert, N.M., Barnason, S., Deswal, A., Hernandez, A., Kociol, R., Lee, E., Paul, S., Ryan, C.J., & White-Williams, C.	Transitions of Care in Heart Failure: A Scientific Statement From the American Heart Association	AHA Scientific Statement	<p>Lists reasons for HF readmission, unmet needs</p> <p>Features of transition programs and outcomes</p>	AHA recommendations for transitional care interventions in clinical practice

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			<p>Recommendations for transitional care in practice</p> <ul style="list-style-type: none"> <li>• Systematically implement principles of transition of care programs in high-risk patients with chronic HF</li> <li>• Routinely assess patients for high-risk characteristics that may be associated with poor post-discharge clinical outcomes</li> <li>• Ensure that qualified and trained HF nurse or other healthcare providers of clinical HF provide care services</li> <li>• Allot adequate time in the hospital and post-acute setting to deliver complex chronic HF intervention and to assess patient and caregiver responsiveness</li> <li>• Implement handoff procedures at the hospital or post-acute care discharge</li> <li>• Develop, monitor, and ensure transparency of results of quality measures using a structure, process, and outcome framework</li> <li>• Consider patients' perceptions of QoL as a surrogate for physical, psychological, and social concerns that require support during the transition of care process</li> <li>• Ensure availability of transition of care component details in writing</li> </ul> <p>Use health informatics technology to assist with program sustainability. Informatics should be patient and healthcare provider centric</p>	

<b>Pub. Year; Author's Last Name</b>	<b>Title of Publication</b>	<b>Type of Study</b>	<b>Main Outcomes of Findings</b>	<b>Support for and or Link to Project</b>
2016 Anand, V., Garg, S.K., Koene, R., Thenappan, T.	National Trends in Hospital Readmission Rates in Congestive Heart Failure Patients	Qualitative, retrospective observational	CHF 30-day readmission rate is 24%  1.6% reduction in readmission rate between 2009-2013, however the cost of readmissions increased in this time  Readmissions were highest in 18-44 age group, followed by 45-65, and then over 65 years.	Shows need for strategies to reduce readmissions to decrease overall cost and morbidity
2018 Boyken, A., Wright, D., Stevens, L., & Gardner, L.	Interprofessional Care Collaboration for Patients with Heart Failure	Observational	Implementation of a collaborative care model to prevent HF readmissions. Took place at New Hanover Regional Medical Center.  Team members include 5 TOC pharmacists, 4 CP, and 4 advanced care practitioners.  HF readmissions were reduced by 44% using the collaborative care model.	Describes a successful TOC intervention using collaborative care between pharmacists, CP, and nurse practitioners.
2015 Choi, B.Y., Blumberg, C., & Williams, K.	Mobile Integrated Health Care and Community Paramedicine: An Emerging Emergency Medical Services Concept	Observational	Description and outcomes of paramedicine programs, including the program CIHP is based on  Discusses 2012 evaluation tool for community paramedicine programs published by Health Resources and Services Administration  Discuss barriers to paramedicine programs	Description of paramedicine programs similar to CIHP

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2016 DeVore, A.D, Cox, M., Eapen, Z.J., Yancy, C.W., Bhatt, D.L., Heidenreich, P.A., Peterson, E.D., Fonarow, G.C., & Hernandez, A.F.	Temporal Trends and Variation in Early Scheduled Follow-Up After a Hospitalization for Heart Failure: Findings from Get with The Guidelines- Heart Failure	Observational retrospective	Data from AHA Get with the Guidelines database was evaluated to show the effectiveness of early follow-up in preventing HF 30-day readmissions.  30-day readmissions were reduced when there was early follow-up (less than or equal to 7 days after discharge)	CIHP paramedic assists with early follow-up
2017 Fingar, K. R., Barrett, M. L., & Jiang, H. J.	A Comparison of All-Cause 7-Day and 30-Day Readmissions, 2014: Statistical Brief #230	AHRQ Statistical briefing	HF number one cause of readmission within 30-days (23.3%), number 3 cause of readmission within 7-days (7.4%)	Importance of addressing HF readmissions
2018 Garnier, A., Rouiller, N., Gachoud, D., Nachar, C., Voirol, P., Griesser, A.C., Uhlmann, M., Waeber, G. & Lamy, O.	Effectiveness of a transition plan at discharge of patients hospitalized with heart failure: a before and after study	Quasi-experimental before and after design	Multidisciplinary transition plan for heart failure patients discharged to home.  Outcomes: <ul style="list-style-type: none"> <li>• Fraction of hospital days due to readmission based on the sum of all hospital days.</li> <li>• All readmissions rate and potentially avoidable readmissions</li> </ul> Neither the rate of readmission or the days spent in the hospital were reduced, however noncompleters had a higher rate of days spend in the hospital during a 30-day readmission.  The rate of potentially avoidable readmissions was reduced from 11.3% to 9.9% for the noncompleters and 8.7% for completers	A transitional care strategy that was not effective in reducing 30-day readmissions

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2017 Hoover, C., Plamann, J., & Beckel, J.	Outcomes of an interdisciplinary transitional care quality improvement project on self-management and health care use in patients with heart failure	Quasi-experimental, descriptive	<p>Intervention took place in a 489-bed hospital</p> <p>N=66</p> <p>Intervention included a nurse coach visit and follow-up, medication reconciliation and education by a pharmacist, and referral to a HF clinic.</p> <p>Self-Care of Heart Failure Index was used to assess improvement in self-care management.</p> <p>Chart review evaluated readmissions.</p> <p>HF readmission rates decreased from 24% to 13%</p>	Example of a successful collaborative TOC strategy.
2015 Hurguy, J.	Fire-Based Community Paramedicine: Golder Ranch Fire District's Community Integrated Healthcare Program	Descriptive article	Discuss implementation and purpose of CHIP	Only publication regarding CIHP, describes the program.
2016 Kansagara, D., Chiovaro, J. C., Kagen, D., Jencks, S., Rhyne, K., O'Neil, M., Kondo, K., Relevo, R., Motu'apuaka, M., Freeman, M., & Englander, H.	So many options, where do we start? An overview of the care transitions literature	Literature review	<p>Successful interventions that reduced readmissions addressed multiple aspects of the care transition, extended beyond hospital stay, and had the flexibility to accommodate individual patient needs</p> <p>Unable to determine impact of caregiver involvement, transition to sites other than home, staffing, patient selection practices,</p>	Shows successful interventions that CIHP addresses

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			<p>or care settings modified intervention effects.</p> <p>Strength of evidence is low due to heterogeneity of interventions, population, settings, and implementation</p>	
<p>2016 Li, J.B., Jack, B., Mittman, B., Naylor, M., Sorra, J., Mays, G., &amp; Williams, M.V.</p>	<p>Project ACHIEVE- Using implementation research to guide the evaluation of transitional care effectiveness</p>	<p>Observational</p>	<p>Describes purpose and design of study currently underway.</p> <p>Purpose- Identify the necessary elements to improve patient outcomes and reduce 30-day readmissions.</p>	<p>Describes need for more research to identify which components of TOC are needed for success.</p>
<p>2017 Li, M., Whitehead, D., Peters, C., &amp; Long, P.</p>	<p>7 An APN-led transitional care program to reduce 30-day readmission in patients with heart failure</p>	<p>Quality improvement project-retrospective data analysis</p>	<p>30 patient's followed up with advanced practice nurse-led HF clinic (inpatient visits and education, HF clinic visits)- 10% readmission rate</p> <p>175 patients followed up with community physician group- 17% readmission rate</p> <p>No statistical difference between groups.</p>	<p>Unsuccessful TOC intervention</p>
<p>2017 Murtaugh, C.M., Deb, P., Zhu, C., Peng, T.R., Barron, Y., Shah, S., Moore, S.M., Bowles, K.H., Kalman, J., Feldman, P.H. &amp; Siu, A.L</p>	<p>Reducing Readmissions among Heart Failure Patients Discharged to Home Health Care: Effectiveness of Early and Intensive Nursing Services and Early Physician Follow-Up</p>	<p>Retrospective cohort study</p>	<p>Research Question: Is early and intensive home health, in addition to early physician follow-up, more effective in preventing hospital readmissions in HF patients than less intensive home health and later physician follow-up or no intervention</p> <p>No difference in 30-day readmissions with individual interventions, but readmissions were significantly reduced when they were combined</p>	<p>Example of successful transitional care strategy</p>

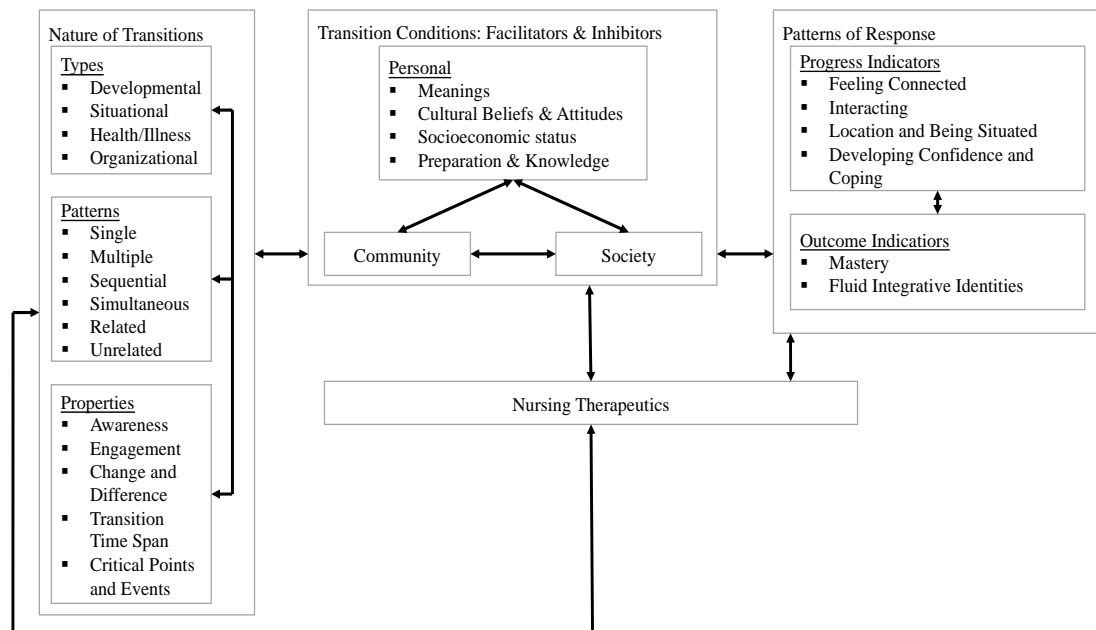
Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2018 Mitchell, S.E., Laurens, V., Weigel, G.M., Hirschman, K.B., Scott, A.M., Nguyen, H.Q., Martin Howard, J., Laird, L., Levine, C., Davis, T.C., Gass, B., Shaid, E., Li, J., Williams, M.V. & Jack, B.W.	Care Transitions from Patient and Caregiver Perspectives	Qualitative	Identified themes regarding patient and caregiver desired outcomes for transitions of care  Three desired outcomes: <ul style="list-style-type: none"> <li>• To feel cared for and about by providers</li> <li>• To have accountability from the healthcare system</li> <li>• To feel prepare and capable to implement care plans</li> </ul> Five services or provider behaviors were linked to achieving these outcomes <ul style="list-style-type: none"> <li>• Using empathetic language/gestures</li> <li>• Anticipating patient needs to support self-care at home</li> <li>• Collaborative discharge planning</li> <li>• Providing actionable information</li> </ul> Providing uninterrupted care with minimal handoffs	CIHP addresses and supports these outcomes desired by patients and caregivers
2004 Naylor, M.D., Brooten, D.A., Campbell, R.L., Maislin, G., McCauley, K.M. & Schwartz, J.S.	Transitional care of older adults hospitalized with heart failure: A randomized, controlled study	RCT	Evaluate the effectiveness of a transitional care program for older adults hospitalized with HF  Intervention group: <ul style="list-style-type: none"> <li>• Time to first hospitalization or death was longer</li> <li>• Fewer hospitalizations at one year, and fewer hospital days</li> <li>• Cost savings of approximately \$4845 per patient per year</li> <li>• Improved quality of life at 12 weeks</li> </ul>	Example of successful transitional care program

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			<ul style="list-style-type: none"> <li>• Greater function status at 2 and 12 weeks</li> </ul>	
2017 Naylor, M.D., Schaid, E.C., Carpenter, D., Gass, B., Levine, C., Li, J., Malley, A., McCauley, K., Nguyen, H.Q., Watson, H., Brock, J., Mittman, B., Jack, B., Mitchell, S., Callicotte, B., Schall, J., & Williams, M.V.	Components of comprehensive and effective transitional care	Descriptive	Describes outcomes of Project ACHIEVE workgroup.  Patient/Caregiver concerns identified: <ul style="list-style-type: none"> <li>- Lack of patient engagement</li> <li>- Lack necessary information to participate in shared decision-making</li> <li>- Poor continuity of care</li> <li>- Inadequate preparation</li> <li>- Caregivers are not satisfactorily prepared, do not have confidence or resources to care for patient.</li> <li>- Gaps in services</li> <li>- Inadequate communication</li> <li>- Poor collaboration</li> <li>- Multiple health and social challenges</li> <li>- Complex treatments</li> </ul>	Identified concerns of patients and caregivers and barriers that TOC programs should address.
2017 Nejtek, V. A., Aryal, S., Talari, D., Wang, H., & O'Neill, L.	A pilot mobile integrated healthcare program for frequent utilizers of emergency department services	Observational retrospective	Participants reported improved quality of life, reduced ED admission, and reduced inpatient admissions.  MIH provided education about how to manage health	Successful mobile health program that CHIP was based on
2016 Ong, M.K., Romano, P.S., Edgington, S., Aronow, H.U., Auerback, A.D., Black, J.T., De Marco, T., Escarce, J.J., Evangelista, L.S., Hanna, B.,	Effectiveness of remote patient monitoring after discharge of hospitalized patients with heart failure: The better effectiveness after transition-heart failure	RCT	Intervention- health coaching telephone calls and telemonitoring of blood pressure, heart rate, symptoms and weight  Primary Outcomes- all-cause readmission 180 days after discharge.	Telephone follow-up and telemonitoring not effective in reducing HF 30-day readmissions.

<b>Pub. Year; Author's Last Name</b>	<b>Title of Publication</b>	<b>Type of Study</b>	<b>Main Outcomes of Findings</b>	<b>Support for and or Link to Project</b>
Ganiats, T.G., Greenberg, B.H., & Greenfield, S	(BEAT-HF) randomized clinical trial		<p>Secondary outcomes- all-cause readmissions within 30 days of discharge, all-cause mortality at 30 and 180 days, quality of life at 30 and 180 days.</p> <p>No significant difference in 30-day readmissions between intervention and usual care group.</p> <p>Significant difference in quality of life at 180 days between intervention and usual care group.</p>	
2019 Thompson, D. R., Ski, C. F., & Clark, A. M.	Transitional Care Interventions for Heart Failure: What Are the Mechanisms?	Descriptive	<p>Encourage understanding mechanisms of HF and why interventions work, not just if they work.</p> <p>Mechanisms shown to work include increasing patient understanding of their condition, and links to self-care, promote involvement of other people in self-care, improve psychosocial well-being, attain support from health professionals to use technology.</p>	Identification of mechanisms to address in transitional care
2013 Yancy, C.W., Jessup, M., Bozkurt, B., Butler, J., Casey Jr, D.E., Drazner, M.H., Fonarow, G.C., Geraci, S.A., Horwich, T., Januzzi, J.L., Johnson, M.R., Kasper, E.K., Levy, W.C., Masoudi, F.A., McBride, P.E., McMurray, J.J.V., Mitchell, J.E., Peterson, P.N., Riegel, B., Sam, F., Stevenson, L.W., Wilson	2013 ACCF/AHA guideline for the management of heart failure.	Clinical practice guideline	<p>8.9 Inpatient and Transitions of Care: Recommendations</p> <p>Multidisciplinary HF management programs are recommended for patients that are at high risk for readmission</p> <p>Early follow-up (within 7-14 days) visit is recommended, early (within 3 days) phone follow-up is recommended.</p> <p>Specific TOC interventions are not known and required further research.</p>	Clinical guidelines for TOC after HF admission

<b>Pub. Year; Author's Last Name</b>	<b>Title of Publication</b>	<b>Type of Study</b>	<b>Main Outcomes of Findings</b>	<b>Support for and or Link to Project</b>
Tang, W.H., Tsai, E.J. & Wilkoff, B.L.				
2016 Whitaker-Brown, C.D., Woods, S.J., Cornelius, J.B., Southard, E. & Gulati, S.K.	Improving quality of life and decreasing readmissions in heart failure patients in a multidisciplinary transition-to-care clinic	Quasi-experimental pre and post-test design	Pilot of 4-week transitional care program to determine feasibility of implementation. Only 2 of 50 participants were readmitted to the hospital within 30 days. Neither admission was for heart failure. (secondary outcome)  Quality of life (primary outcome), improvement in symptoms, and emotional status was improved	Successful transitional care intervention

APPENDIX F:  
TRANSITIONS THEORY DIAGRAM



Adapted from (Meleis, 2010)

APPENDIX G:  
CDC FRAMEWORK FOR PROGRAM EVALUATION



Adapted from (CDC, 2011)

APPENDIX H:  
PROGRAM EVALUATION LOGIC MODEL

Logic Model for Program Evaluation of CIHP					
Inputs	Activities	Outputs	Short-term Effects/Outcomes	Intermediate Effects/Outcomes	Long-term Effects/Outcomes
<ul style="list-style-type: none"> <li>• Patients</li> <li>• CP</li> <li>• Collaboration with hospitals, case managers and outpatient providers</li> </ul>	<ul style="list-style-type: none"> <li>• Extra training for CP to prepare for transitional care role (Hurguy, 2015)</li> <li>• Participant recruitment</li> <li>• Follow up with patient within 24-72 hours after discharge (Hurguy, 2015)</li> <li>• Educate about discharge instructions, medications (Hurguy, 2015)</li> <li>• Perform assessment (Hurguy, 2015)</li> <li>• Collaborate with outpatient provider (Hurguy, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced 30-day readmissions (Hurguy, 2015)</li> <li>• Increased ability to self-manage care (Hurguy, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Extra support provided to manage disease during transitional care period (Hurguy, 2015)</li> <li>• Streamlining healthcare resources for patients (Hurguy, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced 30-day readmissions (Hurguy, 2015)</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion of a healthier community (Hurguy, 2015)</li> </ul>

Adapted from (CDC, 2011)

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